

## **PERFORMANCE OF THE CHILEAN WINE INDUSTRY THROUGH TRADE INDICATORS IN THE PERIOD 2001-2016**

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### **Abstract**

Guevara W. and C. Morales, 2018. Performance of the Chilean wine industry through trade indicators in the period 2001-2016. *Bulg. J. Agric. Sci.*, 24 (3): 341–351

The production and commercialization of wine have been two of the most dynamic and important economic Chilean activities. The growth rate of wine was 4% per annum in 2012-2016, with exports of 1853 million US dollars, amounting to 3.09% of total exports. This investigation aims to evaluate the exporting performance of Chile and that of its main international competitors in the international wine market during the period 2001-2016 using the index of revealed comparative advantages; the competitiveness of the internal market of wine exporting countries using both the penetration rate of imports and the Constant Market Share (CMS) methodology in the case of the USA market.

The Chilean wine, notwithstanding its loss of competitiveness in the US and its modest growth in price, stands out by its revealed comparative advantages, where it is surpassed only by New Zealand. This shows the specialization, importance and solidity of this industry in Chile. The strength of the sector is also apparent by its penetration rate since the internal consumption is satisfied by national producers.

*Key words:* wine commerce; revealed; comparative; advantage

*Abbreviations:* Constant Market Share (CMS)

### **Introduction**

Wine commerce has been affected by the growing globalization that has benefited global commerce in the last decades. Traditionally, the supply of wine was consumed by the producing countries and their neighbors. Nowadays, the export of wine has grown significantly, initially in Europe, in the 70's, and then in the US and Australia in the 80's. Countries from the southern hemisphere such as Chile, Argentina and South Africa became incorporated in the global wine trade towards the 90's (Banks and Overton, 2010).

The wine industry evolution has shown how the traditional exporters like France, Italy, Germany and Spain have faced the competition of new producers such as Chile, Argentina, USA, Australia, New Zealand and South Africa. The latter have managed to get access to the markets thanks

to quality and competitive prices, earning them a significant increase in market share (Felzensztein, 2014; Martínez and Medina, 2013). The participation of Chile in this market is a welcomed opportunity in its efforts to diversify its exports and to stop being an exporter of commodities.

The industrial processing of commodities has a positive effect in many macroeconomic indicators. It improves employability and the country's industrialization, but above all it increases the country's wealth through an increase in the value of its exports. In terms of international commerce, the trade balance improves given that the manufacture of a quality product the country might probably substitute the imports of the said product. Although it is not always true that local manufacture permits the substitution of foreign products. An example of this is the fact that, even as the US has become a main exporter of wine at a global scale, the American con-

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sumer still has a preference for foreign wines (Castaldi et al., 2006). This feature and its high purchasing power make the US one of the most attractive destinations for wine exports. The American leadership in wine imports, coupled with the good prices it pays for it, makes the US a highly relevant actor when studying the global trade of wine.

Another important feature of the US market is the increase in the per-capita consumption of ethanol, which went from 2.18 gallons in 2001 to 2.33 gallons in 2012. This increase of 7% did not affect all spirits in the same way. Wine consumption, for example, increased 34%, while beer consumption decreased 8%. This tendency can be explained by the increase in the number of consumers, from 65.4% in 2001-2012 to 72.7% in 2012-2013, and also the frequency of wine drinking, which went from 83.5 to 87.9 days/year in the same period (Dawson et al., 2015).

As far as exporters are concerned, the wine industry has shown an increasing dynamism. Among countries of the new world, studies have demonstrated Chile's leadership in production and commercialization (Crestacimanno and Galati, 2014; Martínez and Medina, 2013). The increasing impact caused by the development of the wine industry at the national level, and the high level of production and international exports make the Chilean wine industry an interesting object of study. Chile positions itself as one of the relevant actors, with attributes which allow it to compete with the world's greatest powers in the wine market (Bianchi and Wickramasekera, 2013; Felzensztein, 2014).

This sector is one of the most dynamic and important for Chile. Its annual growth rate by volume was 4% between 2012 and 2016, with exports of 1853 millions of dollars, which represents 3.09% of the total exports. In the 21<sup>st</sup> century, the volume of exports has had a mean growth rate close to 7%, when the main export activity of the country, copper extraction, decreased. This investigation has as its main goal to evaluate the performance of both Chile and its main competitors in the international wine market using quantitative indicators of trade for the period 2001-2016. The methodology Constant Market Share for the US market is also employed. The study also analyzes the main exporters and the evolution of prices.

This paper contains a theoretical framework to facilitate its understanding and to provide the relevant information for the study. This comprises the concepts related to trade, to the wine industry, as well as an analysis of the indicators required for the evaluation of trade performance. It also contains a section with an appropriate description of sources and the methodology employed, all of which leads to the analysis of the results. Finally, conclusions are formulated that aim to provide the elements to sustain the work policies of the Chilean wine clusters.

## Bibliographic Review

### *International Trade*

International trade fosters an increase in world production of goods since it allows each country to specialize in the production of the good in which it has a comparative advantage. A country has a comparative advantage in the production of a good if the opportunity cost for the production of this good in terms of other goods is, in this country, smaller than in other countries (Krugman and Obstfeld, 2006). In the Ricardian model, countries export those goods that their labor produces in a relatively more efficient way, and import those goods that their labor produces in a relatively more inefficient one. In other words, the production guideline of a country is determined by the comparative advantage. Countries may have a comparative advantage in the production of certain goods, and this way all countries benefit since they focus in those which they know how to produce in a relatively more efficient manner (Aiginger and Vogel, 2015).

Traditional theories of international trade show that trade flows are determined exclusively by a production specialization of the economies, a direct result of the "comparative advantages" derived from the relative opportunity costs and expressed by the means of production, land, labor and natural resources in both countries (Moreno and Mauricio, 2007).

Porter (2008) pointed out that "international trade and foreign investment might either improve the productivity of a nation or impair it. They contribute to raise national productivity by allowing a nation to specialize in those industries and industrial segments where its enterprises are more productive and to import in those where its enterprises are less productive". This statement is in complete accord with classical theory. However, it posits that the comparative advantage of nations in given industries is determined not only by factors of production such as land, labor and natural resources, and they must be based in quality, functionality and innovation of new products.

For the evaluation of international trade there are two key concepts. Imports (and exports), which is the set of goods and services bought (sold) by residents of a nation from (to) the residents of another one. Exports measure the fraction of the domestic production that is consumed abroad (Durán and Alvarez, 2008).

### *The wine industry*

In comparison with other goods, the study of the wine industry has complexities of its own given the ample variety of the product. First, there is a great variety of grape types employed in its production, quality and styles. Second, there are natural factors such as the weather, soil conditions and

irrigation, and the various technologies and methods used in its production. All this make wine a differentiable and heterogeneous product (Vergara, 2001).

In commercial terms, this industry does not have entry barriers of note. The main barriers for exporters, specially for companies of developing markets, are the lack of experience in foreign markets, deficiencies in management, both financial and technological, and narrow product lines that hamper economies of scale and scope (Bianchi and Wickramasekera, 2013).

There are several close wine substitutes, such as beer, spirits and other alcohols. Various factors affect the wide variety of wine prices, namely, the brand, the image of the company, the country and the producing region. Big production volumes also affect prices and they have the inverse effect of quality (Vergara, 2001).

Wine exports are distinguished by the effect of collective reputation, which benefits exporters from traditionally exporting countries like France, Spain and Italy. This allows them to export great volumes at better prices (Berríos and Saens, 2012).

Nowadays, the global wine market is characterized by a change in composition in the leadership of exporting countries. New producers like Chile, Argentina, California, Australia, New Zealand and South Africa have joined the traditional exporters: France, Italy, Germany and Spain (Bianchi and Wickramasekera, 2013). Some classify these two groups as the new world and the old world, respectively.

Some studies find a penetration strategy of low prices by the new world countries. The wine from these countries has gained entry to the market thanks to a favorable price-quality ratio. In Chile's case this ratio improved in the period 1997-2005, from 0.17 to 0.26, but in this measure the evolution of the French wine is more positive, as it triples that of the incoming countries (Berríos and Saens, 2012).

The Chilean wine has shown a good performance as it expands in international markets. Favorable natural conditions for the cultivation of the vinifera grape, trade policies, new technologies acquisitions from abroad, and a good business climate have permitted to duplicate the production of wine since 1990 (Visser, 2004).

The insertion of these new emerging countries like Chile, Australia, China and the USA in the top of wine exports is evidenced by an increase in the market quota, in detriment of the market quota of the main European producers which, this change notwithstanding, continue to hold the leadership in this market (Crestacimanno and Galati, 2014).

Wine tradition in Chile goes back to the Spanish arrival. Wine production began in the north, and gradually it expanded to the central zone of the country. Grape plantations

and its cultivars grew progressively and Chilean wine began to be noted in international markets, leading to an increase in production and quality. The grand commercial opening in Chile in the last decades has allowed direct foreign investment (DFI) to reach traditional industries like winegrowing. This in turn has made possible the access to modern technologies and to new markets (Vergara, 2001).

### ***Competitiveness and Indices of commercial performance***

One of the main ways to assess the performance of global commerce is the analysis of competitiveness, understood as the capacity to reach and keep a quota of some products or productive sectors in a foreign market. When talking about keeping a market quota, growth is implicit given that the markets are expected to grow. Therefore, competitiveness represents the efficiency of exports of a given country over time (Morales et al., 2008).

Hatzichronoglou (1996) defines competitiveness as the ability of businesses, sectors, regions, countries or supra-national areas to generate high levels of income and employment, all of this on a firm basis and under exposure to international competition.

The living standard of a country depends on the capacity of its businesses to reach a high level of competitiveness. Factors as international trade and foreign investment are also determinants of the productivity of a nation, as they allow it to specialize in those productions in which it has greater expertise or advantages and to benefit from importing what it needs and to export its production to obtain income (Porter, 2008).

Competitiveness has been studied from two approaches. One that focuses on the export competitiveness of nations, and another that pay attention to those factors that breed competitiveness in nations. They are also used at different levels, such as region, industry and company.

In the bibliographic revision performed, there was no similar study to assess the performance of the Chilean wine industry using a combination of our indicators and methods.

## **Sources and Methods**

### **Sources**

Our data was obtained from the UN online repository <http://comtrade.un.org/data/>, section International Commodity Trade Data (COMTRADE), in sections according to the Uniform Classification for International Commerce (CUCI). This database contains information from 1977 of 89 countries and 20 regional groups.

The series on exports and imports for the period 2001-2016 are given in thousands of nominal US dollars and correspond to commerce in the categories shown in Table 1.

**Table 1**  
**Category and description**

Category	Description
2204	Wine of fresh grapes, incl. fortified wines; grape must, partly fermented and of an actual alcoholic strength of > 0,5% vol or grape must with added alcohol of an actual alcoholic strength of > 0,5% vol
220421	Wine of fresh grapes, incl. fortified wines, and grape must whose fermentation has been arrested by the addition of alcohol, in containers of <= 2 l (excluding sparkling wine).

Source: COMTRADE

The information on wine consumption is obtained from the online database <http://www.oiv.int/es/> of the International Organization of the Vine and Wine (OIV, from the French name), which is an intergovernmental organization of scientific character, with recognized expertise in viticulture, wine, wine based drinks, table grapes, raisins and other products made from grapes.

### Methods

Based on the analysis of the world market of wine in the period 2001 to 2016, we determine which countries lead global exports and also the main consumer markets. To these we apply the indicators described below and thus we will be able to study the competitiveness in the main markets and Chile's performance in comparison to the main exporters to those markets.

### Revealed Comparative Advantages index

The Revealed Comparative Advantages index (RCA) was popularized by Balassa (1965), and revisited by Vollrath (1991), specifically for agricultural products and real trade data. It is an index which makes it possible to differentiate countries with a competitive advantage in a particular product with those that do not, and it also allows the comparison of revealed competitiveness among countries that in the market in the given category (Qineti et al., 2009). It is one of the most used tools to study the agricultural industry. It was applied by Medina-Albadalejo and Martínez-Carrión, (2013), to study the Spanish wine industry in 1960-2011.

With the aim of making competitiveness comparisons between the main global wine exporters, we use the revealed comparative advantages index on exports (Crestacimanno and Galati, 2014; Durán and Alvarez, 2008; Laursen, 2015). It is used for Chile and the main exporters in the period 2001-2016 according to:

$$RCA_{ij} = \frac{(x_{ij}/x_j)}{(x/x)} \times 100, \quad (1)$$

where,  $RCA_{ij}$ : RCA of product  $i$  of country  $j$ ;  $x_{ij}$ : exports of product  $i$  from country  $j$ ;  $x_j$ : total exports from country  $j$ ;  $x_i$ : exports of product  $i$  by the world;  $x$ : total world exports.

If the RCA index is greater than 100, the country shows revealed comparative advantages for the good under study, and disadvantages otherwise (Segura and Ruiz, 2004; Morales et al., 2008).

### Import Penetration Rate (TPI)

The internal import penetration allows us to know the internal market competitiveness of exporting countries and thus to determine if the competition is gaining quota in the national market. It is defined as the ratio of imports of a given product and its domestic demand (Acemoglu et al., 2016). Algebraically it is given by:

$$TPI_{ij} = \frac{M_{ij}}{C_{ij}} \times 100, \quad (2)$$

where  $TPI_{ij}$  = import penetration rate of product  $i$  in country  $j$  (%);  $M_{ij}$  = imports of product  $i$  by country  $j$  (t);  $C_{ij}$  = apparent consumption of product  $i$  in country  $j$  (t).

The apparent consumption is calculated as the production plus imports minus exports and waste (Durán and Pellandra, 2017). The index ranges from 0 to 100, and the greater its value the lesser the competitiveness. The import penetration rate is, strictly speaking, a measure of internal competitiveness of the sector. However, from the viewpoint of the given sector's suppliers, a greater rate implies greater the competitiveness (Silvestre et al., 2014).

### Methodology of analysis of Constant Market Share (CMS)

The constant market share analysis has been in use for a long time to study exports. Some works (Ahmadi-Esfahani, 2006; Fagerberg and Sollie, 1987) attribute its origin to Tyszynski (1950) in its study of global commerce of manufactured good in the period 1899-1950. However, studies performed during the 70's (Leamer and Stern, 1970; Richardson, 1971) are among the most quoted. Other relevant studies are those by Ahmadi-Esfahani (1995), Jepma (1986) and Milana (1988), among others.

There are many studies that validate this methodology which, as result of being a decomposition method, has made possible the introduction of new effects and, thus, new versions of the methodology. Examples of works using this method are those by Husted and Nishioka (2013), who analyze the growth of Chinese exports in 1995 and 2010; Chatterjee and Chattopadhyay (2013), high technology products exported by India and China (1998-2012); Arevalo, Nassar and Merlo (2014), the importance of the Brazilian market for olive exports of Argentina and Perú, 1999-2013; González

(2015), Spain's exports between 1996 and 2013. For its part, Lin (2015) performed a comparison of industrial competitiveness between China and Mexico in the US market in the period 2002-2012. No application of this method was found for the case concerning the Chilean wine industry.

Richardson (1971) pointed out that the use of this methodology that one of its drawbacks is that the sign and magnitude of the measured effects depends on the time period of the analysis, that is, the initial and final years. This is known as the index number problem. To take this into account, it is recommended to identify a breaking point in the export series in order to justify the year of the breaking point as the initial year of the analysis.

Some authors can be found in the technical literature who apply more sophisticated CMS formulas to account for additional effects (Jepma, 1986). Nevertheless, in accordance with the features of this study, we follow the formula that Ahmadi-Esfahani (1995) employed for the analysis of a product in a destination, as in formula (3):

$$S_{ijk} = \frac{q_{ijk}}{Q_{ik}}, \quad (3)$$

where  $S_{ijk}$ : market share of country  $j$  in country  $k$  for product  $i$ ;  $q_{ijk}$ : exports of product  $i$ , from country  $j$ , to the country or region under consideration;  $Q_{ik}$ : value of exports of good  $i$  of the group of competing countries (the standard) which export to country  $k$ , including exports of the country  $j$  under study. Whenever the index  $k$  is absent, it refers to world values.

Solving for  $q$  and differentiating with respect to time, one gets:

$$\Delta q_{ijk} = S_{ijk} \Delta Q_{ik} + \Delta S_{ijk} Q_{ik} \quad (4)$$

Equation (4) is valid only during an infinitesimally short time. When decomposition is applied to discrete intervals, the equation may be written variously using the initial and final period variables (Ahmadi-Esfahani, 1995) as in equations 4a, 4b and 4c that follow:

$$\Delta q_{ijk} = S_{ijk}^0 \Delta Q_{ik} + \Delta S_{ijk} Q_{ik}^1 \quad (4a)$$

$$\Delta q_{ijk} = S_{ijk}^1 \Delta Q_{ik} + \Delta S_{ijk} Q_{ik}^0 \quad (4b)$$

$$\Delta q_{ijk} = S_{ijk}^0 \Delta Q_{ik} + \Delta S_{ijk} Q_{ik}^0 + \Delta S_{ijk} Q_{ik} \quad (4c)$$

$\Delta$ : Time variation of the corresponding variable; 0: Initial year of analysis; 1: Final year of analysis

$S_{ijk}^0 \Delta Q_{ik}$ : Structural effect that means the expected change in exports so far as the country's share in the global market and in the destination country remains constant. The decision rule for the analysis is that if this term is positive, an increase in demand for the product favor an increase in exports (Chen and Duan, 2001; Hernández and Romero, 2009);

$\Delta S_{ijk} Q_{ik}^0$ : Competitiveness effect that measures the changes in exports due exclusively to variations in market share of the country (Milana, 1988). The decision rule stipulates that if the term is positive then competitiveness has increased; otherwise there is a loss in competitiveness (Dieter and Englert, 2006).

$\Delta S_{ijk} Q_{ik}$ : The second order effect is a dynamic component that captures the interaction of the changes in market share with changes in demand (Ahmadi-Esfahani, 1995)

A second level of decomposition introduces six additional effects. In this particular case it is adapted to a single market  $k = \text{USA}$  and a single good  $i = \text{wine}$  from the specific equation proposed by Ahmadi-Esfahani (1995):

$$\begin{aligned} \Delta q_{ijk} = & S_{ij}^0 \Delta Q_{ik} + (S_{ijk}^0 \Delta Q_{ik} - S_{ij}^0 \Delta Q_{ik}) + \Delta S_{ij} Q_{ik}^0 + \\ & + (\Delta S_{ijk} Q_{ik}^0 - \Delta S_{ij} Q_{ik}^0) + \left( \frac{Q_i^1}{Q_i^0} - 1 \right) (\Delta S_{ijk} Q_{ik}^0) + \\ & + (\Delta S_{ijk} \Delta Q_{ik} - \left[ \left( \frac{Q_i^1}{Q_i^0} - 1 \right) (\Delta S_{ijk} Q_{ik}^0) \right]). \end{aligned} \quad (5)$$

$S_{ij}^0 \Delta Q_{ik}$ : the growth effect shows the increase in exports as result of an increase in global demand, while the exporting country's share in the global market remains constant. A positive sign indicates that the country has been favored by the growth in global demand (Chen and Duan, 2001; Richardson, 1971; Singh and Mohan, 2011).

$(S_{ijk}^0 \Delta Q_{ik} - S_{ij}^0 \Delta Q_{ik})$ : the market effect is the change in exports provided that the exporter's share in the target and global markets remains constant. A positive sign implies a concentration of exports in the target market. (Ahmadi-esfahani, 2006; Milana, 1988).

$\Delta S_{ij} Q_{ik}^0$ : the pure residual effect, also known as general competitiveness effect, measure the change in exports to be expected as a result of a change in general competitiveness (Ahmadi-Esfahani, 1995).

$(\Delta S_{ijk} Q_{ik}^0 - \Delta S_{ij} Q_{ik}^0)$ : the estructural static residual effect is the change in exports of a good due to a change in competitiveness in a target market ( $k$ ) (Ahmadi-Esfahani, 1995).

$\left( \frac{Q_i^1}{Q_i^0} - 1 \right)$ : the pure second order effect measures the interaction between the change in the exporter's share in target market ( $k$ ) and the change in loba demand. (Ahmadi-Esfahani, 1995; Chen & Duan, 2001; Hernández and Romero, 2009).

$(\Delta S_{ijk} \Delta Q_{ik} - \left[ \left( \frac{Q_i^1}{Q_i^0} - 1 \right) (\Delta S_{ijk} Q_{ik}^0) \right])$ : The estructural dynamic

residual effect explains the interaction between the focus country's market share and structural changes of global demand. If the effect is positive, global demand for those goods

whose participation in the focus country's exports grows fast also grows. (Ahmadi-Esfahani, 1995; Chen and Duan, 2001; Hernández and Romero, 2009).

## Results and Discussion

### *Global wine market*

In 2016, wine exports in containers of less than 2 liters exceeded 23132 millions of dollars. France, with 24.3%, had the largest market share, followed by Italy, with 19.1%, and Spain, with 8.3%. Chile, with 6.6% is in 4<sup>th</sup> place, leading the American continent. Next in the list are the US, Australia, Germany, New Zealand, Portugal and Argentina. Even though 113 countries reported exports in this category, the ten countries above concentrate 84.3% of global exports. An even smaller group, the old world countries, exports over 56% of the total (Figure 1).

Figure 1 shows the relationship between the main actors in wine commerce. Flows toward the US, stand out. This country led the demand, with 18.4% of global imports, followed by the UK, with 11.1%, China, with 9.2%, and Germany with 7.4%. Complete the list of the top ten actors Canada, Hong Kong, Japan, the Netherland, Switzerland and Belgium. Of note are the USA and Germany, also included among the top ten global exporters.

In the period 2001-2016 the price of wine in the world market has shown a positive trend for the main exporters,

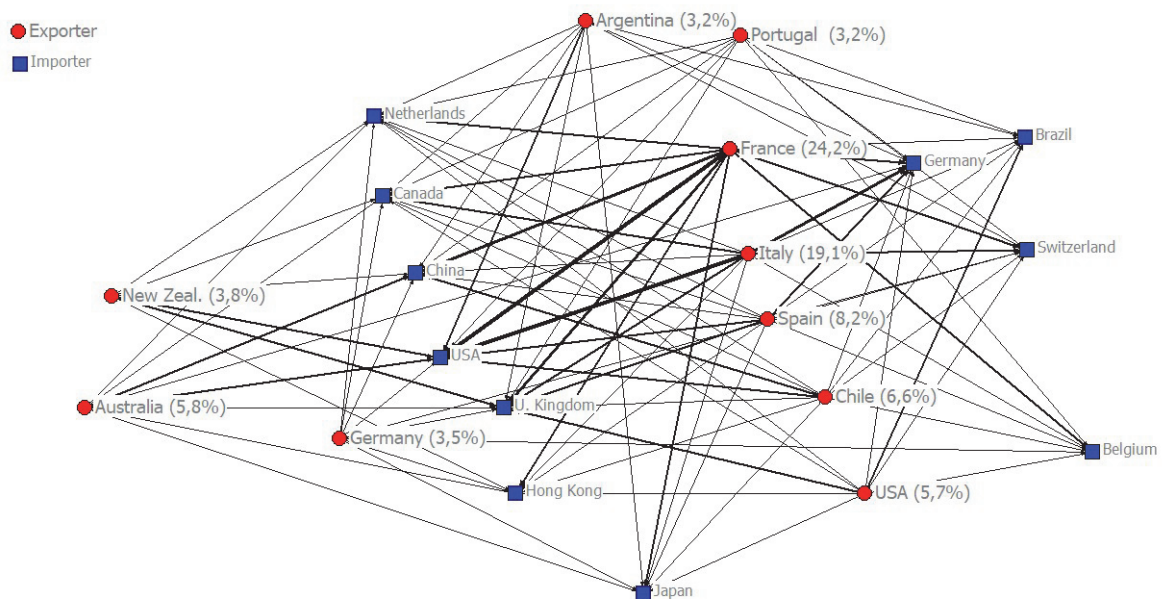
except for Spain, whose price was at its best in 2004 and has lost value ever since to become the worst among the countries under study, as shown in Figure 2.

The US stands out, with a historical maximum in 2016 over 6600 US\$/t and the greatest growth rate for the period, followed by Australia, 6.5%, Argentina, 5.2%, and Germany with 4.8%. France has seen the best price in the global market in the last 10 years, with values around 6000 US\$/t. Chile has experienced a growing trend and nevertheless maintains a modest price over 3000 US\$/t and a low growth rate of 1.6% in the last years, better only than Spain among the countries under study. Among the importers, worthy of note is the huge price paid by Hong Kong, surpassing the 20000 US\$/t and a growth rate of 10.8%. Switzerland was second in payment for a tonne of wine, with a mean over 8700 US\$/t. The third place corresponds to the US, with a mean price close to 6000 US\$/t. This fact makes it the most attractive for exporters since it is the main importer.

### *Indicators results*

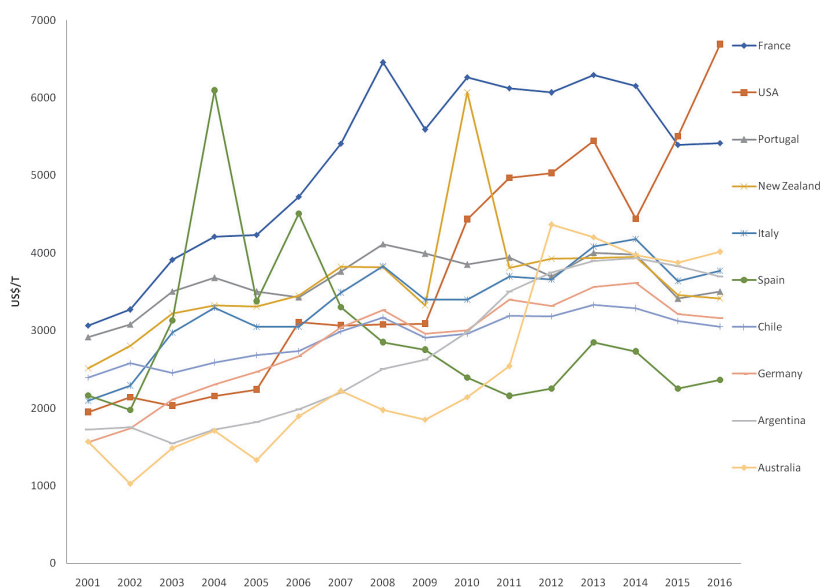
#### **Import penetration rate (TPI)**

Argentina and Chile are leaders in competitiveness in the internal market of each exporting country as expressed by the TPI (Table 2). Producers of these countries have almost 100% market share. A similar situation occurs in Australia, in which foreign suppliers have disappeared in the last years.



**Fig. 1: Relation between main exporters and importers of wine (over 400 millions of dollars), 2016**

Source: Authors, based on data from COMTRADE



**Fig. 2. Price of wine of main exporters in 2001-2016 (US\$/t)**

Source: Authors, based on data from COMTRADE

**Table 2**

**Import penetration rate (TPI) of main wine exporters, 2000-2015**

PAIS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Aw
Argentina	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	3.0	0.8	0.1	0.1	0.0	0.0	0.4
Chile	0.2	1.0	0.2	0.1	1.7	2.6	2.1	1.7	1.0	0.2	0.4	0.4	0.0	0.0	0.0	0.8
Spain	1.4	1.6	1.9	2.2	2.4	3.0	3.5	5.0	3.1	3.7	4.2	12.5	16.4	5.1	12	4.9
Australia	3.1	4.0	5.3	5.9	4.9	6.2	8.9	12.1	11.8	12.7	14.3	15.5	0.0	0.0	0.0	7.0
Italy	2.3	3.0	4.9	5.7	6.8	5.4	6.7	7.0	6.1	6.8	10.7	12.2	12.4	13.5	13.6	7.8
France	15.1	13.2	14.1	16.6	16.4	16.1	16.7	18.6	19.0	21.9	22.8	19.4	18.8	23.7	27.4	18.6
USA	22.1	24.2	25.6	25.9	27.3	28.9	30.1	29.8	33.8	33.8	35.9	40.0	35.2	51.1	33.3	31.8
Portugal	36.3	29.3	25.9	32.2	29.0	25.8	27.7	30.8	35.6	35.0	33.8	24.9	33.5	49.6	44.9	33.0
New Zealand	66.3	61.4	59.6	56.5	43.9	41.9	46.2	46.8	34.0	35.5	29.5	37.2	43.7	42.5	38.2	45.6
Germany	56.2	57.8	60.3	65.7	66.8	68.1	70.0	66.1	69.8	73.2	81.9	75.7	75.8	77.2	75.1	69.3

Source: Authors, based on data from COMTRADE and OIV

They are followed by Spain and Italy, where the trend indicates that the locals have ceded market share.

When trying to establish a relationship of this index with price, it becomes clear that export prices of the aforementioned countries are lower, with the exception of Germany, with low export prices and the lowest internal competitiveness. Therefore, excepting Germany, it can be established that these countries base their internal competitiveness on the low price of their wines.

#### Revealed Comparative Advantages Index (RCA)

New Zealand shows the largest growth and largest absolute value for the index in the last 10 years. This means that the New Zealand wine has had greater dynamism in

comparison with both the rest of global exporters and the totality of products exported by this country. Chile shows a complex series. In general there is a decrease, with high index values, which on average is the highest among the countries under analysis. However, a break in 2006 forces a division in two sub-periods, 2001-2006 and 2006-2016. In the first, the RCA decreased at an annual rate of 9.3%, whereas in the second they increased at an annual rate of 5.4%. It should be stressed that exports of Chilean wine increased in both subperiods. The RCA decrease in the first subperiod is explained by the fact that Chilean exports grew at 21.2% per year in the first sub-period, boosted mainly by mine exports, while wine exports grew only at a yearly rate of 6.1%.

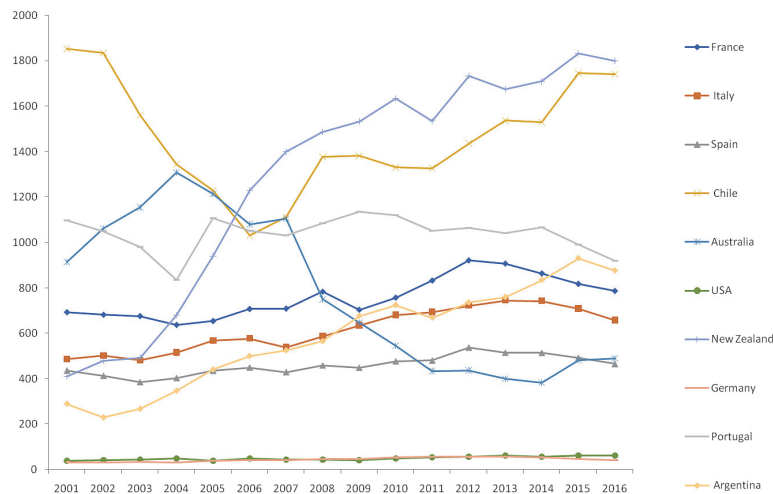
Argentina, with an average index growth of 7% per year, stands out. With a more modest growth follow Italy, with 1.9%, France, with 0.8%, and Spain, with 0.4%. An index decrease is shown by Australia and Portugal, explained by the slow growth of their wine exports. Last, the US and Germany show a favorable evolution de the index value, of 3% and 1.3%, respectively, even though only they have comparative disadvantages, as shown in Figure 3.

**Analysis of Constant Market Share (CMS) of wine in the US market**

Since the US is the market with the largest wine imports, here we analyze this market in more detail using the CMS methodology. The chosen years are 2009, it being the year in which the total wine exports of the main exporters to the US and the world reach bottom – which could be related to the sub-prime crisis – and 2016, since this is the last year with available data. Table 3 shows the results for the first

level of decomposition. It can be seen, in general, that the value of Australia’s wine exports suffered the greatest drop, with a difference of 163.5 MM of US\$. Germany and Chile followed. The country with the greatest increase in exports, with a difference of 309 MM US\$ was France. Italy, New Zealand, Spain, Argentina and Portugal also saw a positive growth.

The growth in wine demand in the US had a positive influence in all countries, as evidenced by the results of the structural effect. However, this effect did not benefit Germany, Australia and Chile. These countries were affected by the competitiveness effect, whose result explains the decrease in their exports. On the other hand, New Zealand shows the best result in this category, followed by Portugal, France and Argentina, as the countries with best competitiveness. The effect was also positive for Spain and Italy. The second order effect, as expected, has a negative impact in the three countries with export decrease, particularly in Australia (Table 3).



**Fig. 3. Revealed Comparative Advantages Index, main wine exporters (2001-2016)**

Source: Authors, based on data from COMTRADE

**Table 3**  
**Wine CMS in the US market, main exporters, first level, 2009-2016 (miles US\$)**

	Change in Exports	Structural effect	Residual effect	Second-order effect
Germany	-15.938.0	28.473.4	-36.041.9	-8.369.5
Argentina	82.834.0	43.750.1	31.718.4	7.365.5
Australia	-163.475.0	108.891.3	-221.037.8	-51.328.4
Chile	-22.521.0	48.680.1	-57.783.0	-13.418.1
Spain	61.303.0	42.207.3	15.497.1	3.598.7
France	309.017.0	138.200.4	138.625.6	32.191.0
Italy	244.067.0	215.560.9	23.134.0	5.372.1
New Zealand	143.801.0	29.324.9	92.902.7	21.573.5
Portugal	28.140.0	12.139.8	12.984.9	3.015.3

Source: Authors, based on data from COMTRADE



**Table 4**  
**Wine CMS in the US market, main exporters, second level, 2009-2016 (miles US\$)**

	Growth effect	Market effect	Pure residual	Static structural residual	Pure second-order effect	Dynamic structural residual
Germany	34 489.7	-6 016.3	-18 432.2	-17 609.6	-5 504.7	-2 864.7
Argentina	24 144.1	19 606.0	13 757.6	17 960.8	4 844.4	2 521.1
Australia	63 825.5	45 065.7	-59 032.0	-162 005.8	-33 759.5	-17 568.9
Chile	49 105.0	-425.0	31 125.2	-88 908.1	-8 825.3	-4 592.8
Spain	64 217.3	-22 010.0	28 661.5	-13 164.4	2 366.9	1 231.8
France	209 209.5	-71 009.2	-6 040.6	144 666.2	21 172.5	11 018.5
Italy	165 556.0	50 004.9	-6 814.0	29 948.0	3 533.3	1 838.8
New Zealand	24 509.5	4 815.4	36 148.7	56 754.0	14 189.2	7 384.3
Portugal	32 171.3	-20 031.5	-19 374.1	32 359.0	1 983.2	1 032.1

*Source:* Authors, based on data from COMTRADE

The second level of decomposition (Table 4) shows 6 possible effects. The growth effect shows a positive result for all exporters under study. This is the result of the growth experienced by wine exports worldwide between 2009 and 2016. This should benefit in greater measure the largest exporters such as France, Italy and Spain. The market effect shows a negative impact in France, Spain, Germany and Chile, which means that these countries prioritize other world markets. Italy, on its part, is the country with greatest concentration towards the US market. This is also done by Australia, Argentina and New Zealand.

The effect of general competitiveness change (pure residual) negatively impacted Australia, Portugal, Italy and France. Furthermore, New Zealand, Chile, Spain and Argentina stand out as the countries with the greatest competitiveness in the world markets. It is interesting to note that Chile has a negative competitiveness in the US market, and one could think that Chile has prioritized other markets in detriment of its US market share. This is the static residual effect, by which Chilean wine exports are impacted in a negative manner due to the competitiveness loss in the US. Australia, Germany and Spain were also harmed by this effect. On the rest of the countries it had a positive impact, especially on France and New Zealand.

The interaction between the change in the exporter's participation in the US market and the change in world demand (pure second order effect) has a negative influence on Australia, Chile and Germany. This means these countries have lost market share in the US when world demand is growing (Ahmadi-Esfahani, 1995). On the contrary, the rest of the countries under analysis have managed to increase their wine exports to the US under the expansive effect of global wine exports. Last, the structural dynamic residual effect is negative for Australia, Chile and Germany. This means that global demand for wine from these countries is not benefited

from the interaction that each of them have in terms of the variation in market share and the growth of the US market. That is, their relationship with the US market did not lead to an increase in their exports in the global market. This effect did contribute to an increase in exports by the rest of the countries under study.

Note that the sum of all the effects from the second level of decomposition (Table 4) must be equal to the change in exports by the producer in the market under analysis (column 1, Table 3).

## Conclusions

Although the price of Chile's wine exports grows, it does not reach a significant value that would allow for a similarly significant increase in competitiveness. Therefore, the strategy of Chilean exporters should focus on improving the price through an alliance with those markets which pay better, such as that of the USA. To boost the sector, the country must position itself as a market that produces top notch wines. This goal requires an alliance between the public and private sectors in such a way as to elicit the design of powerful strategies of international marketing (Felzensztein, 2014) to create an image of brand-country and to value the wine. Hence, to increase the investment in technology and innovation that lead to quality improvement (Berríos and Saens, 2012).

The wine market analysis through the CMS method shows that Chile, Australia and Germany have lost competitiveness in the US market. This result confirms also that exports from these countries did not reach all of their potential in the global market as a result of the loss of competitiveness in that specific market. Chilean wine exporters should intensify their exports to the US by taking advantage of the trade agreements between both countries. With this aim, trade missions

in the US should pay special attention to the identification of wine exporting prospects and, likewise, the generation of a favorable framework for its promotion.

Nonwithstanding the loss of competitiveness and the modest growth in price of its wines, Chile stands out for its revealed comparative advantages, surpassed only by New Zealand. This shows the specialization, importance and solidity of this industry in Chile. On the other hand, the strength of this sector is reflected in the penetration rate, since the internal consumption is satisfied with local brands alone.

The aim of this investigation is to determine the reach of competitiveness by the relevant actors in the global wine market. Thus, the relevance of carrying out a future investigation that deepens the analysis of tariff barriers and other factors that explain the results embodied in this study.

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Received January, 28, 2018; accepted for printing May, 3, 2018