RESEACH PAPER

Analysis of international competitive positioning of quality wine from Spain

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Abstract

J.S. Castillo, and M.C. García. 2013. Analysis of international competitive positioning of quality wine from Spain. Cien. Inv. Agr. 40(3):xxx-xxx. The global vitiviniculture sector is undergoing systemic and thorough changes. Spain occupies a privileged position in the global industry, ranking first in surface area, third in production and second in export volume. In recent years, domestic consumption has experienced a clear and pronounced decline, as observed in France and Italy. Therefore, exportation has become the main commercial avenue for table and quality wine. In Spain, designated quality wine represents 50% of total production and has experienced commercial dynamics in international markets that differ from those affecting table wine. The object of this paper is to analyze the factors influencing the competitiveness of quality wine, represented by designations of origin, in international markets. After defining a competitiveness index, adapted from the Balassa index, and using environmental and internal variables, three panel data models of the most representative Designations were specified for the 2000/2001 to 2009/2010 seasons. The results demonstrated that environmental variables were more influential in explaining the weak international competitive positioning of the poorer performing Designations. European regulations resulting from the Common Agricultural Policy (CAP) and the economic crisis were significant and influential in this respect. Economies of scale, quality, and unit cost were the most influential internal factors for each D.O.factors for the most competitive quality-wine production areas.

Key words: Agricultural economics, competitiveness, designation of origin, foreign trade, panel data, quality wine.

Introduction

Analyzing quality wine implies assessing what such an abstract concept means. In the case of Spain, this designation is determined by the territorial origin of the wine, along the lines of *terroir* in the French tradition. Maher (2001),

Bouamra-Mechemache and Chaaban (2010), Deselnicu *et al.* (2011), and Valenciano and Roman (2011) agree that quality is a means of product differentiation. In Spain, the fertility and variety of the soil and the climate have favored the presence of a number of wines, each with a characteristic personality (Jones and Davis, 2000). Therefore, an important number of Designations of Origin (D.O.s) were recognized as a product identification

mark (Thode and Maskulka, 1998; Ribeiro *et al.*, 2002; Martínez-Carrasco *et al.*, 2005).

D.O.s represented 50% of Spanish vitiviniculture production in the 2010/2011 season, near the standards of the other two great global wine producers, France and Italy. At the international level, exports increased by 32% over the past decade (Figure 1). The Cava, Rioja, Valencia and La Mancha D.O.s stand out with over 50% of the market quota (Figure 2). The EU is the main destination for exports, receiving 71%, followed by the USA with 9% and, in recent years, China with 2% (Figure 3).

These initial data show the clear dynamism of quality wine exports that, according to Markusen (1992), indicates an increase in competitiveness. For the purposes of this article, competitiveness is understood in Markusen's terms, defined as an industry's increasing market share of exports to a specific market. As Balassa (1965), Araoz (1998) and Roldan (2000) indicate, increased competitiveness reflects ongoing efforts to acquire differentiating attributes and gain advantages. Therefore, the objective of this paper is to measure that notion of competitiveness in Markusen's terms (1992) and study its determinants.

An index adapted from that developed by Balassa was employed to measure competitiveness, a concept that has been used by researchers such as Van Rooyen *et al.* (2000), Valentine and Krasnik (2000), Pitts *et al.* (2001) and Esterhuizen (2005) to examine the South African wine industry. Boriraj (2008) applied it to the Australian wine industry; Cerda *et al.* (2008) used it to study the competitiveness of Chilean wine exports; Medina and Martínez (2012) applied it to the main exporting countries (France, Italy, Spain, Portugal, Germany, Argentina, Australia, Chile, the USA, and South Africa), and Martínez and Medina (2013) used it to analyze the Spanish wine sector.

This paper also calculated a competitiveness index, adapted from the Balassa index and formulated

as $IC_{DO} = \dfrac{x_{DO,j} / \sum_{j=1}^{N} x_{DO,j}}{c_{DO,j} / \sum_{j=1}^{N} c_{DO,j}}$ where $X_{DO,j}$ represents exports; $C_{DO,j}$, total trade; and N, total D.O.s (i=1,…j). The mean IC_{DO} was 0.65 over the past decade, with a rising trend exhibited throughout the period, increasing more due to the increased share exported to international markets than with the interior market (Figure 4). However, the growth in international trade has not been homogeneous. There are outstanding differences among D.O.s in the IC_{DO} (Figure 5).

Having defined competitiveness, it is necessary to analyze the factors that influenced the competitive international positioning of different D.O. areas. From the emergence of the discipline, the topic of commercial positioning has concerned international trade researchers. In a more recent, brief and superficial revision, Porter (1985) noted that low costs and product differentiation allow an organization to achieve a competitive advantage. For Mathison *et al.* (2007) and Gwynne (2008), the degree of innovation was responsible for competitive advantage. Rumelt (1991), Roquebert *et al.* (1996), and Mauri and Michaels (1998) argued that the talent and ability to acquire and manage resources explained competitive advantage, while Clifford and Cavanagh (1985) advocated the existing history and culture of the product. However, Aragón and Rubio (2005) stated that the capacity to achieve market success reflects a combination of factors: financial capacity, technological position, innovation, good marketing, human resources and information and communications technology (ICT).

This paper is more in line with the approach advocated by Moreira *et al.* (2011) that the current wine supply increases competition and there are many, diverse factors determining the level of competitiveness of an organization. In this paper, factors were grouped into two categories: 1) environmental factors affecting all Designations, and 2) internal factors specific to each D.O. The first group includes the effects of the economic since 2007 and the reform of the *Common Market Organisation (*CMO) in 2008,

two incidents from the first decade of the 2000s that affected the sector. Internal factors include: a) economies of scale, b) product differentiation, c) export destinations and d) price.

The theory and conceptual framework on which this research is based begins with economies of scale, the implications of which for international trade are due to seminal contributions by Porter (1985). Previous papers considering economies of scale as an explanatory factor for competitiveness in the wine sector include Esterhuizen and Van Rooyen (2006) for the South African wine industry, Skorpikova (2002) for wine from the Check Republic and Martin and Heien (2004) for the Californian wine industry. These researchers, together with Reinert (1995), Eyler (2001) and Rebelo *et al.* (2007), indicate that economies of scale have a positive effect on export competiveness. In addition to Porter (1985), Krugman (1989) also emphasized that economies of scale must be considered as a factor affecting trade imbalances: "introducing economies of scale as a determinant of trade seemed to resolve the puzzles uncovered by empirical work."

Porter (1985) and Oster (1999) consider product differentiation as a positive factor in an environment characterized by intense competitive rivalry. Therefore, producers should search for goods and services that are differentiated in terms of variety and/or quality to meet consumer demand (Martínez-Sandoval, 2005). Product differentiation is significant in explaining competitiveness in Australian wine (Eyler, 2001), Californian wine (Gilinsky *et al.*, 2006) and wine from the United States (Canning and Perez, 2008).

Export destinations are an important factor when studying competitiveness because, as Myro (2012) notes, a substantial increase in exports entails an increase in competitiveness.

The final variable considered is the price required by the theories of comparative advantage. In this traditional approach, the export prices of a country determine competitiveness in the market (Avondet and Pinero, 2007). Cancino del Castillo (2004) highlighted that in an analysis of export competitiveness, price must be considered, as prices and export shares move together. Medina and Martínez (2012) consider price in the Spanish context, while Bozsik (2005) does so for Hungarian wine on the international market; Cerda *et al.* (2008) use price to analyze the determinants of the competitiveness of Chilean wine exports, Vlahovic *et al.* (2009) does so for the wine industry in the Republic of Serbia and Van Rooyen *et al.* (2011) apply it to the South African wine industry. These authors find that a lower price is associated with increased competitiveness.

Although all of these variables are important when studying competitiveness, Schumpeter (1942) established that they should be considered jointly. Schumpeterian thinking advocates a wider perspective on the modus operandi for obtaining a dominant position in international markets, where quality competition, product differentiation, innovation in new markets and sales efforts are jointly considered with the traditional price variable.

In our case, following this central idea, we developed a model in which the competitiveness (according to Markusen, 1992) of Spanish quality wine was explained through Schumpeterian thinking using the above-mentioned factors. Our aim was to discover the most significant factors explaining the competitive positioning of D.O.s and the effectiveness of their positioning strategies in the international market.

Materials and methods

This study considered Spanish D.O.s representative of the period from 2000 to 2010 that had complete information available according to the reports edited by the Ministerio de Agricultura, Alimentación y Medio Ambiente. A balanced panel was formed with 38 production areas and

10 seasons. The sample was representative of the population with an estimation error of 0.13, for a confidence level of 95%, after applying the formula $n = \dfrac{z^2 \cdot p \cdot (p \cdot)}{(-1 \cdot e) + Z^2 \cdot p \cdot (p)}$, corresponding to a finite sample size.

The micro-econometric technique of Panel Data Modeling and associated tests were used to obtain the results. The independent variables included in the Panel Data Model were: 1) economies of scale (represented by surface area and the number of wineries), 2) product differentiation (symbolized by type of wine, type of bottle and a quality index), 3) export destination and 4) the price of bottled wine. Finally, two dichotomous variables were included: one to capture the effect of the crisis and the other to capture the change in European regulation affecting the sector, made in 2008, which we call the CMO 2008 effect.

The dependent variable represents the competitiveness of D.O. wine in foreign markets ($IC_{DO} = \frac{x_{DO,j}/\Sigma_{j=1}^{N} x_{DO,j}}{x_{DO,j}/\Sigma_{j=1}^{N} c_{DO,j}}$). Table 1 summarizes the variables used, the units in which they are expressed, the statistical source from which they were obtained and their denotation in the model.

Before proceeding to the model specification, we applied the Equality Test by Classification; it revealed different reactions and behaviors among D.O.s. Therefore, three Balanced Panel Data Models were specified. The first (1) is a general model, including all D.O.s in the sample ($i=38$, $t=10$), independent of the IC_{DO} value.

$$IC_{DO,it} = \beta_0 + \Sigma_{k=1}^{12} \beta_k X_{k,it} + \Sigma_{f=1}^{2} \delta_f F_{f,it} + u_{it} \qquad (1)$$

The second (2) is a model centered on competitive D.O.s abroad, that is, those with an $IC_{DO} \geq 1$, ($i=14$, $t=10$).

$$IC_{DO,it} = \beta_0 + \Sigma_{k=1}^{12} \beta_k X_{k,it} + \Sigma_{f=1}^{2} \delta_f F_{f,it} + u_{it} \qquad (2)$$

with $IC_{DO,it} \geq 1$

The third (3) includes the Designations of Origin that had an index value lower than one, $IC_{DO} < 1$, ($i=24$, $t=10$). The analytical equation for each is:

$$IC_{DO,it} = \beta_0 + \Sigma_{k=1}^{12} \beta_k X_{k,it} + \Sigma_{f=1}^{2} \delta_f F_{f,it} + u_{it} \qquad (3)$$

with $IC_{DO,it} < 1$

In equations (1), (2) and (3), IC_{DO} is a linear equation of the $Q=14$ explanatory variables ($i=1,..., N$ units and $t=1,...,T$ observations over time). The error term, u_{it}, follows a normal distribution with $E(u_{it}) = 0$ and $Var(u_{it}) = \sigma^2$. In the Panel Data models, the structure of u_{it} comprises three components:

$$u_{it} = \alpha_i + \Phi + \varepsilon_{it} \qquad (4)$$

where α is the individual component, constant over time; Φ is the temporal component, constant across individuals; and ε_{it} is the random component representing the effect of all other variables that change across individuals and over time.

The models were specified using the cross-sectional, fixed effects method, and hence equation (4) becomes:

$$u_{it} = \alpha_i + \varepsilon_{it} \qquad (5)$$

with $\quad \alpha_i = \sum_{i=1}^{N-1} \alpha_i d_i$

Following this estimation, tests of significance and basic hypothesis tests were performed for validation purposes and subsequent economic interpretation.

Results and discussion

The Equality Test by Classification on the $IC_{DO,i}$ variable yielded a *p-value* below 0.05 for the ANOVA F-statistic (P=0) and the Levene (P=0.0016) and the Brown-Forsythe (P=0.0010) tests. This means that Spanish D.O.s exhibit different behaviors. Consequently, all three models,

Table 1. Description of variables.

Variables		Unit	Abbreviation	Source
Internal Factors				
Area		ha	X1	
Winery		No.	X2	
	White		X3	
Type of wine	Rosé	hl	X4	
	Red		X5	MAGRAMA[1]
				MAGRAMA[1]
	Bottled		X6	MAGRAMA[1]
Type of container		hl		MAGRAMA[1]
	In bulk		X7	MAGRAMA[1]
				MAGRAMA[1]
	Europe		X8	
Export destination	North America (USA, Canada and Mexico)	hl	X9 X10	
	Asia			
Price of bottled wine		1€	X11	
Quality Index	Excellent, Very Good, Good, Average and Unsatisfactory	Qualitative Variable quantified on a scale from 1 to 5: Excellent (5), Very Good (4), Good (3), Average (2) and Unsatisfactory (1)	X12	http://www. elcorteingles.es/ vinos/anadas/anadas. asp Website accessed: March 2012.
Competitiveness Index			IC	Prepared by authors
Environmental Factors				
Effect of Crisis		Value 1: 2007, 2008, 2009 Value 0: others	F1	
Effect of CMO 2008 Law		Value 1: 2008 and 2009 Value 0: others	F2	Prepared by authors Prepared by authors

[1]Ministerio de Agricultura, Alimentación y Medio Ambiente.

(1), (2), and (3), were employed in the estimation to obtain general and particular conclusions on competitiveness.

The parameters of equations (1), (2) and (3), when estimated using *Eviews 6.0.* econometric software, became equations (6), (7) and (8), respectively.

$$
\begin{aligned}
\widehat{IC}_{DO,it} = {}& 0.44 + 1.34e-5X_1 + 0.003X_2 - 7.51e-6X_3 - 5.25e-6X_4 - 1.19e \\
& -5X_5 + 1.15e-5X_6 + 1.08e-5X_7 + 1.65e-6X_8 + 6.83e \\
& -7X_9 - 6.53e-6X_{10} - 0.0003X_{11} + 0.0222X_{12} + 0.0046F_1 \\
& + 0.092F_2 + [CX = F]
\end{aligned} \tag{6}
$$

$$
\begin{aligned}
\widehat{IC}_{DO,it} = {}& 0.18 + 2.49e-5X_1 - 0.0017X_2 + 4.57e-6X_3 + 2.99e-6X_4 + 5.73e \\
& -8X_5 + 3.84e-6X_6 + 4.05e-6X_7 - 3,79e-6X_8 + 5.32e-6X_9 \\
& -5.83e-6X_{10} + 0.0002X_{11} + 0.0595X_{12} - 0.0024F_1 - 0.0279F_2 \\
& + [CX = F]
\end{aligned} \tag{7}
$$

$$\widehat{IC}_{DO,it} = 0.7359 - 3.91e - 5X_1 + 0,0003X_2 - 2,99e - 6X_3 - 8.09e - 6X_4 - 1.90e$$
$$- 5X_5 + 1.39e - 5X_6 + 6.71e - 8X_7 + 9.04e - 6X_8 - 5.82e - 6X_9$$
$$- 2.33e - 5X_{10} - 0.0004X_{11} - 0.0005X_{12} - 0.0375F_1 + 0.17F_2$$
$$+ [CX = F] \tag{8}$$

The estimated equations, (6), (7) and (8), do not exhibit heteroscedasticity, as they were corrected using the White Cross-section method. They also do not exhibit autocorrelation according to the Durbin-Watson test, having values close to 2. The F-Snedecor statistic, with an associated p-value of 0, indicated significant models with a 100% probability in the set of independent variables. Regarding individual analysis of the variables for the general model (6), the t-Student statistic, at 95% confidence, was significant: surface area and the number of wineries (economies of scale), price of wine, quality index (product differentiation) and the CMO 2008 effect. The same test for the second model (7) yields the following significant variables: surface area and the number of wineries (economies of scale) and the quality index (product differentiation). For the third model (8), they were: the price of bottled wine, the CMO effect and the impact of the crisis. Table 2 summarizes the results from each panel.

In summary, the models were econometrically and statistically valid, and ideal for use in the economic analysis.

The results indicate that Spanish quality wines with a territorial reference (D.O.s) focused their competitive positioning strategy on three aspects. The first was to produce low-cost wine, thus achieving important reductions in unit costs, as reflected in the traditional approach to comparative advantage. The second was a distinctive policy of segmenting with respect to quality and maintaining high standards without affecting costs through aggressive investments on innovation (Schumpeter and Porter's product differentiation). The third were economies of scale, which were decisive due to the large number of wineries with a large surface area (Krugman, 1989; Porter, 1985).

As open systems, their environment also conditioned their strategies: the changes in European regulation and the direct effect of the current economic crisis. The choice of destination markets was not a relevant strategy. The following represent important aspects of competitive strategy in the Spanish wine sector:

a) The presence and significance of economies of scale was a decisive factor determining the strategy

Table 2. Panel data results.

	Model 1	Model 2	Model 3
Prob (F-statistic)	P=0*	P=0*	P=0*
R-squared	0.88	0.63	0.8
Durbin-Watson	1.67	1.8	1.7
Prob (t-Student) Area	P=0.002**	P=0**	P=0.23
Winery	P=0.0747*	P=0.007**	P=0.20
Price	P=0.0174*	P=0.69	P=0.0046**
Quality Index	P=0**	P=0.0096**	P=0.97
Crisis	P=0.87	P=0.97	P=0.08*
CMO 2008	P=0**	P=0.28	P=0

**Significant at 1%.
*Significant at 5%.

of supporting quality maintenance without marginal cost increases, as Porter (1985) and Krugman (1989) indicate and demonstrated in recent papers by Skorpikova (2002) for wine from the Czech Republic, Martin and Heien (2004) for the California wine industry, Castaldi *et al.* (2006) in an analysis of competitiveness of the wine industry in general, and Kassier *et al.* (2008) for the South African wine industry. Economies of scale were significant in the dynamics of economic growth, but our results also extend this confirmation of significance to periods of economic recession, where the need to contain unit costs is decisive. We found that economies of scale were more significant in the more competitive D.O.s, which are the most extensive and have larger companies and a greater volume of commercialized wine.

b) In addition to competitiveness in substantial trade volumes, holding a strong competitive position with respect to price is particularly important. The results demonstrate that price is not as significant for the most competitive D.O.s, as it is for D.O.s that began to participate in international trade more recently. This indicates that providing high quality while containing prices is the primary positioning strategy for Spanish quality wine in foreign markets. Medina and Martínez (2012) also observed this correlation in the Spanish context. In the international context, Bozsik (2005) observed this result for Hungarian wine, Vlahović *et al.* (2009) for the wine industry in the Republic of Serbia, and Van Rooyen *et al.* (2011) did so for the wine industry in South Africa.

c) As mentioned above, the quality variable was a determinant of competitiveness, both during periods of economic expansion and recessions. The same results have been observed in the quality wine markets of Italy (Begalli *et al*., 2008) and France (Crozet *et al*., 2011). Quality affects the most competitive D.O.s to a greater extent, which is a consequence of their more sustained presence in the international market (Bernet and Stricker, 2003; Mueller *et al.,* 2003). In the Spanish case, it must also be emphasized that this support for

quality differentiation had to be combined with cost containment and, therefore, maintaining low final prices.

Of the environmental factors, the CAP reform of the sector, implemented by the Common Market Organization for wine and approved in 2008, positively influenced international D.O. competitiveness. The impact was more significant among D.O.s with lower competitive index scores. This is in line with one of the objectives of the new CMO, namely liberalization and increased competitiveness for European wine producers.

The elimination of public intervention in the markets that required distillation and subsidies to promote wine consumption in third world countries, widely taken advantage of by Spain, France and Italy, promoted the use of international commercial channels.

Finally, the economic crisis also had a decisive influence on the competitive position of quality wine. Rabobank (2010), analyzing the British wine industry and Larreina (2011), who considered the Rioja D.O, reached the same conclusion. However, the effect was smaller than in other non-quality products (González and Blanco, 2010; Valenciano and Román, 2011). In the case of Spain, this effect was particularly evident in the case of bulk table wine, which has made Spain the world leader for this type of wine. Moreover, the more affected D.O.s are those with lower competitiveness index scores. This explains why their sales are concentrated on the interior market. Therefore, they cannot diversify their business risk across a broader set of market segments or make aggressive investments to enter narrower segments.

In conclusion, in a globalized and competitive world, the search for foreign markets is no longer an option, but rather a necessity for quality wine from Designations of Origin as a guarantee of future growth. Consequently, internationalization is defined not only by the mere fact of exporting

but also by the obligation to be competitive. The most influential factors of such competitiveness are economies of scale, product differentiation and price, along the lines of positioning defended by Schumpeter (1942), Porter (1985) and Krugman (1989).

Acknowledgements

Resumen

J.S. Castillo y M.C. García. 2013. Análisis del posicionamiento internacional competitivo de los vinos de calidad de España. Cien. Inv. Agr. 40(3):xxx-xxx. El sector vitivinícola mundial está inmerso en una profunda y sistémica dinámica de cambios. España, ocupa una posición privilegiada en la escena global, primera posición en el ranking por superficie, tercera en producción y segunda en volumen exportado. El consumo interno, al igual que en los casos de Francia e Italia, ha experimentado un claro y nítido retroceso en los últimos años, con lo que las exportaciones se han configurado como la principal salida comercial para los vinos de calidad y los vinos de mesa. En España, los denominados vinos de calidad representan el 50% de la producción, y han experimentado una dinámica comercial diferenciada respecto a los vinos de mesa en los mercados internacionales. El objetivo de este estudio es analizar los factores que inciden en la competitividad en el mercado internacional de los vinos de calidad, representados por las Denominaciones de Origen. Para ello, tras definir un índice de competitividad, adaptado del índice de Balassa, y con variables de entorno e internas se especificaron tres modelos de datos de panel para las campañas 2000/2001 a 2009/2010 de las Denominaciones más representativas. Los resultados mostraron que las variables de entorno fueron más determinantes para entender el débil posicionamiento competitivo internacional de las Denominaciones más rezagadas. La regulación pública europea de la Política Agraria Común (PAC) y la crisis económica resultaron significativas y explicativas a este respecto. De los factores internos, las economías de escala, la calidad y el precio unitario salieron las más determinantes, para las zonas de producción de vino de calidad más competitivas.

Palabras clave: Economía agrícola, competitividad, denominación de origen comercio exterior, datos de panel, vino de calidad.

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