Effects of political-economic integration and trade liberalization on exports of Italian Quality Wines Produced in Determined Regions (QWPDR)

Antonio Seccia and Fabio Gaetano Santeramo and Giuseppe De Blasi and Domenico Carlucci

University of Bari, University of Naples "Federico II"

June 2007

Effects of political-economic integration and trade liberalization on exports of Italian Quality Wines Produced in Determined Regions (QWPDR)

G. De Blasi, A. Seccia, D. Carlucci, F. G. Santeramo

Department of Agricultural Economics and Policy, Evaluation and Rural Planning
University of Bari - via Amendola, 165/A 70126 - Bari - Italy
Tel. ++39 080 544 2889–3072; Fax ++39 080 544 2527 e-mail: seccia@agr.uniba.it

Keywords: Italy, Exports, QWPDR, Integration, Gravity Model

Abstract

The aim of this work is to explain the magnitude of the trade flows for high quality wine from Italy to its main importing countries. This objective has been reached by establishing an appropriate econometric model derived from an extended form of the "Gravity Model". This model has been broadly applied to the analysis of international trade because it provides robust estimates.

The results obtained and the model itself are useful in forecasting potential trends in the exportation of high quality Italian wines. In particular, these estimates give a quantitative evaluation of the export gains that could result from the enlargement of the EU and from an increasing liberalization in international trade. Moreover, it is possible to identify the growing markets where Italian ventures could exploit certain promotional and communication strategies.

1. Introduction

The last decade has seen a significantly increasing in the value (at constant prices) of Italian wine exports and, at the same time, a modification of its composition: in 1995 high quality wine exports represented almost 40 percent of total wine exports and by 2001 they accounted for 57 percent of the mix. With regard to the international marketplace, Italy exports its quality wine to almost all countries in the world; however, 8 countries account for 80 percent of Italy's total high quality wine exports (the USA, Germany, the United Kingdom, Switzerland, Canada, Japan, Denmark and Austria).

Competition in international wine markets has become more intense due to the progressive and consistent reduction in world-wide wine consumption coupled with the addition of new wine producing countries. Australia, Chile, the USA and South Africa (the so called New World wine producers) have quickly entered the international arena, challenging the market share held by traditional wine exporters, such as Italy, France and Spain (Old World wine producers). It is necessary to underscore that, while the total world-wide consumption of wine has been declining, the demand for high quality wine, which comprises a large number of Italian wines, is in fact increasing.

This paper will elaborate on and estimate an econometric model which will explain the size of Quality Wines Produced in Determined Regions (QWPDR) trade flows from Italy to its main importing countries using the "Gravity Model" approach. Both the results obtained and the model itself are useful for forecasting potential trends in the exportation of high quality Italian wines, taking into consideration some macro-variables, such as wine production, GDP, population, agreements on trades, etc. In particular, the model allows a quantitative evaluation of the effects that EU enlargement and growing international trade liberalization can have on export performances of Italian high quality wine. Moreover, this model illustrates the possibility of identifying the main growing markets where all participants in the wine supply-chain can unite to concentrate product communication and promotional efforts.

2. The Gravity Model and its application to the analysis of Italian QWPDR exports

Many economists believe that the Gravity Model is a very powerful tool for international trade analysis. Timbergen (1962) and Pöyhönen (1963) were the first to propose the idea, and later it was extended by several other researchers. After these decisive contributions, the Gravity Model was used in many empirical studies for bilateral trade analysis (Prentice et al., 1998) and for the estimation of the impact of a variety of policy issues.

The basic concept of the Gravity Model for trade analysis borrows the gravity equation from physics: the volume of trade between two countries is proportional to their economic "mass" and inversely proportional to their respective distance. The analytical relation of the basic Gravity Model is expressed as follows:

$$(1) \quad F_{ij} = G \frac{M_i^{\alpha} M_j^{\beta}}{D_{ij}^{\gamma}}$$

where, F_{ij} is the export flow from origin country *i* to destination country *j*; M_i and M_j are the economic size of the two countries; D_{ij} is the distance between the two countries; G is a constant that depends on the units used to measure the other variables.

The multiplicative nature of the gravity equation means that it is possible to take natural logarithms and obtain a linear relationship between the log of trade flows and the log of economy sizes and distances as follows:

$$(2) \quad \ln F_{ij} = \alpha_0 + \alpha \ln M_i + \beta \ln M_j - \gamma \ln D_{ij} + \varepsilon_{ij}$$

This equation is estimated by the Ordinary Least Square (OLS).

Linnemann (1966) was the first to include several additional variables to the basic Gravity Model, obtaining what has been successively called the "Augmented Gravity Model". In fact, empirical estimations may add other variables like population, income per capita, exchange rates, and dummy variables for the presence of common language, colonial links or commercial agreements among the trading countries.

Several authors have argued that the application of the basic Gravity Model can sometimes provide biased results of its estimates because of heterogeneous relationships between trading countries. This heterogeneity can be related to historical, cultural, ethnic, political or geographical factors that simultaneously explain the trade volume between countries in pairs, although these factors are often difficult to observe and quantify. Because of this, according to the authors, it is possible to control these factors by introducing the so-called "country-pair fixed effects" into the gravity equation in order to capture the unobserved heterogeneity. The Gravity Model with country-pair fixed effects assumes the following analytical form :

$$(3) \quad \ln F_{ij} = \alpha_0 + \alpha_{ij} + \alpha \ln M_i + \beta \ln M_j - \gamma \ln D_{ij} + \varepsilon_{ij}$$

Note that the intercept has two parts: one common to all country pairs (α_0) and one specific for each country pair (α_{ij}). This is a classical regression model that can be estimated using the Least Square Estimator, and includes a Dummy Variable for each of the country pairs (LSDV). The fixed-effects introduction is a result of ignorance; in fact, as there is still no concrete idea as to the variables responsible for this heterogeneity, each country pair is differentiated by its own dummy variable which is able to capture the uniqueness within the pairs (Cheng et al., 2005).

In many studies, the Gravity Model estimation is made using panel data that provides several advantages such as more variability in the data-set and the possibility of identifying the effects of time-varying variables (e.g. progressive reduction of trade barriers). More precisely, the use of panel data allows for the incorporation into the Gravity Model of another type of fixed effects, namely "year-specific fixed effects", as indicated by the following notation:

(4) $\ln F_{ijt} = \alpha_0 + \alpha_{ij} + \alpha_t + \alpha \ln M_{it} + \beta \ln M_{jt} - \gamma \ln D_{ij} + \varepsilon_{ijt}$

Note that, in this last case, the intercept has three parts: one common to all years and country pairs (α_0); one specific to each country pair and common to all years (α_{ij}); and one specific to each year and common to all country pairs (α_t). This regression model is able to capture the relationship between relevant variables over time, as well as to identify the overall business cycle through the proper selection of dummy variables (*t*) for annual variations in trade flows.

In the present work, the value of the exportation for high quality wine from Italy to its main partner countries is explained through an extended form of the Gravity Model which includes specific "fixed effects". Among all the models tested, the one that exhibits the best outcome is the following:

(3) $\ln Exp_{jt} = \alpha_0 + \alpha_j + \alpha_t + \alpha \ln QwProd_{it} + \beta \ln PcGDP_{jt} + \gamma EU + \delta EUAN + \varepsilon_{jt}$

Where:
Exp_{jt} is the value of QWPDR exports from Italy to country *j* in the year *t*, expressed in Euro at constant prices; α_0 is a constant; α_j is the specific "country-effect" for country *j*; α_t is the specific "year-effect" for year *t*; $QwProd_{it}$ is Italian QWPDR production in the year *t*, expressed in hectoliters; $PcGDP_{jt}$ is per capita GDP of importing country *j* in the year *t*, expressed in U.S. dollars at constant prices; EU is a dummy variable that assumes the value of 1 if the country *j* is member of European Union in the year *t*, 0 otherwise; EUAN is a dummy variable that assumes the value of 1 if the country *j* has started EU Accession Negotiations in the year *t*, 0 otherwise; ε_{jt} is the error term related to the observation with the country *j* and the year *t*.

This regression model has been estimated by Ordinary Least Squares, and includes a Dummy Variable for each partner country and each year (LSDV).

The classic Gravity Model uses total GDP as a proxy for output capacity of the exporting country. Nevertheless, while total GDP is appropriate for studies using aggregated export data, in the case of a specific agro-food product such as quality wine, this variable would overestimate the country's output capacity. For this reason, the physical production of the specific good analyzed was considered as the most suitable proxy of the output capacity for the exporting country. The parameter of this variable is expected to be positive because it is expected that the higher the quality wine production, the higher its exportation volume, especially in the case of Italy where production of all wine exceeds total internal consumption.

At the same time, the income effect for the importing countries is considered by including total GDP in the standard Gravity Model. However, the countries that import high quality wine from Italy have substantial differences in terms of the size of their economies, living costs and income per capita. Therefore, GDP per capita has been included in this model as it is a stronger variable for explaining the income effect in importing countries. Using GDP per capita, we expect a positive parameter since the higher a country's income, the higher their demand for a higher quality of wine.

In this empirical model, the distance between Italy and each importing country has been omitted because of difficulties concerning the proper measure of the economic distance that would have encompassed transportation and communication costs (Cheng et al., 2005). On the other hand, the model with specific "country-effects" eliminates the need to include the distance variable.

The most common method to estimate the effects of regional integration in a Gravity Model is to include dummy variables for each integration regime during the sample period (Cheng et al., 2005). In this empirical model two dummy variables were included to estimate the regional integration effects: one related to the EU member countries (EU) and another related to some Central and Eastern European countries (EUAN) which started in the EU Accession Negotiations during the sample period. As is widely known, there are no customs barriers within the EU countries but instead there is a common customs tariff applied to imports from non-EU countries; at

the same time, EU Accession Negotiations have involved a progressive reduction (up to a cancellation) of customs barriers to all EU imports.

Finally, it is important to note that in this empirical model the intercept has three parts: one common to all years and country pairs (α_0); one specific to each country pair and common to all years (α_j); and one specific to each year and common to all country pairs (α_t). In particular, year-effects (one for each year) can be considered as indicators of globalization that capture export variations over time independently from other explanatory variables included in the model.

The data-set for this analysis has 605 observations over a period of 11 years (1995–2005). There are 55 countries included in the analysis and they encompass the largest importers of QWPDR from Italy. The volume of Italian high quality wine exported to these countries in 2005 accounted for more than 92 percent of the total. Data on Italian QWPDR exports (dependent variable) was extracted from the database of the Italian Institute of Statistics (ISTAT). Exports are expressed in thousands of Euros at current prices. This data was deflated using Consumer Price Indexes (CPI) given by ISTAT. Data for Italian QWPDR production was also obtained from the ISTAT database in thousands of hectoliters. Finally, data for "per capita GDP" was obtained from the World Economic Outlook Database of International Monetary Fund and is expressed in current U.S. dollars which were deflated using Consumer Price Indexes (CPI) from the U.S. Bureau of Labor Statistics.

3. Estimation Results

Estimation results for Equation 3 are reported in Table 1 that includes the most important performance indicators for the empirical model. In particular, it is important to highlight that the F-statistic is 1,073.52 with a p-value that is less than 0.01, which means a good overall significance of the model, while the R-squared measure is 0.968, which indicates an almost perfect fit to the observed data.

Table 1 - Regression results (country-specific fixed effects are omitted)

Variable	*Coefficient*	*Std Error*	*T-Statistic*	*p-value*	*Significant*
Constant	-2.8320	1.1356	-2.4940	0.01293	**
ln_QwProd	1.0824	0.4410	2.4547	0.01442	**
ln_PcGDP	1.6058	0.1798	8.9316	<0.00001	***
EU	0.8591	0.1666	5.1571	<0.00001	***
EUAN	0.3044	0.1232	2.4703	0.01381	**
Year-specific effects					
1996	0.0853	0.1109	0.7689	0.44226	
1997	0.1528	0.0862	1.7719	0.07698	*
1998	0.2565	0.0738	3.4740	0.00055	***
1999	0.2976	0.0801	3.7156	0.00022	***
2000	0.4964	0.0820	6.0566	<0.00001	***
2001	0.6025	0.0838	7.1899	<0.00001	***
2002	0.6209	0.0890	6.9766	<0.00001	***
2003	0.2555	0.0883	2.8954	0.00394	***
2004	0.1459	0.0937	1.5569	0.12008	
2005	0.1327	0.0823	1.3549	0.24512	
Dependent Variable = $\ln\_Exp_{jt}$					
Number of observations = 605					
F-Statistic (67, 537) = 1,073.52 (p-value < 0.00001)					
R^2 = 0.971897					
Adjusted R^2 = 0.968391					
Log-likelihood = -302.692					
Significant: *** at 1% ; ** at 5% ; * at 10%					

The size of Italian QWPDR production is a variable with a significant effect (at 1%) on Italian quality wine exports and its coefficient is positive, as expected. Considering the logarithmic form of the equation, this coefficient can be read directly as elasticity. Therefore, a coefficient slightly

higher than one (1.08) can be interpreted that an increase or a decrease in Italian quality wine production will lead, respectively, to a proportional increase or decrease in Italian quality wine exports. This can be explained by taking into account that consumption of high quality wine in Italy represents only a small share of internal production, thus a production variation generates directly proportional effects on exports. This has two important implications: first, Italy shows an export-oriented nature regarding the analyzed good and, second, there is a real possibility that a strong increase in Italian quality wine production could be absorbed by the international market.

GDP per capita in importing countries also has a significant effect (level of 1%). This variable is a measure of demand in the importing countries and its effect is positive. One percent increase in per capita GDP in a given importing country could have as a consequence an increase of 1.6 percent in the value of quality wine imports from Italy, if other variables remain constant. Therefore, according to these results, the value of Italian quality wine exports is income elastic. Consequently, if Italian producers of high quality wine intend to expand their exportations, it is natural to look to those countries where income growth is constant and solid. It is also important to observe that any decrease in income for the trade partners, would have serious negative consequences on the volume of Italian quality wine exports. According to the IMF estimates for annual percent change of GDP per capita, among countries with the highest income growth rates, there are three very populous countries, China, Russia and India, where expansion possibilities for Italian quality wine exports are very attractive.

During the period considered, the European Union has passed an historical enlargement: on 1 May 2004, ten new countries of Central and Eastern Europe have joined the fifteen existing member States. The EU dummy variable included in the model has a positive and statistically significant coefficient (at 1%). More precisely, the model suggests an increase of 136 percent ($e^{0.859} - 1 = 1.36$) on Italian quality wine exports towards EU countries with respect to non-EU countries, ceteris paribus. This is easily understandable if it is taken into account that there are no customs barriers within EU countries and, that these countries are also physically closer to Italy.

Before their EU adhesion, some Central and Eastern European countries had started EU Accession Negotiations to consider a progressive reduction of customs barriers on EU imports, including those from Italy. More precisely, EU Accession Negotiations began on 31 March 1998 with the six best-prepared countries and on 15 February 2000 were expanded to include all other candidate countries. The coefficient of EUAN dummy variable is positive and statistically significant (a little over 1%). Furthermore, the model shows an increase of 36 percent ($e^{0.304} - 1 = 0.36$) of the exports of Italian high quality wine towards all the Central and Eastern European countries that have started EU Accession Negotiations, if all conditions remain the same. In addition, it is interesting to note that all new EU members and, in particular, the Baltic Republics, show high income growth rates. Therefore, these countries represent very interesting, and as yet untapped, markets.

The analysis of year-specific fixed effects shows an increase of the exportation volume of Italian high quality wine over time which is independent with respect to the variations of all the other variables. More precisely, the year-specific effects are positive and significant for the years included in the period of 1997–2003 and they show a regular increase over time with the exception of 2003 which shows a considerable decline. Note that, for comparison, the year dummies are measured relative to 1995, which has been omitted. Between 1995 and 2002, the export of Italian high quality wine increased by 86 percent ($e^{0.62} - 1 = 0.86$) independently with respect to the variations of all the other variables. This could be considered as the "globalization effect", taking into account that most of the WTO agreements are the result of the Uruguay Round Negotiations signed in 1994. However, the high rate of Italian quality wine export growth could also be derived from other factors, such as the increase in international demand as it relates to a change in consumer preference. The drop in 2003 could probably be explained by the introduction of the Euro currency and its rapid strengthening with respect to other major international

currencies, in particular the U.S. dollar, which resulted in unfavourable softening of Italian exports.

Finally, the results for country-specific fixed effects shows that all fixed effects are positive and statistically significant at one percent. Some of the countries with the highest fixed effects are very populous countries such as China, India, United States, Brazil, Russia, Mexico and Japan, so in these countries the larger Italian quality wine exports can be related to the high number of consumers. Other countries with high fixed effects are geographically close to Italy and are also some of the most important Italian trade partners, such as Germany, the United Kingdom and Switzerland. On the other hand, some of the countries with the lowest fixed effects are very small countries such as Cyprus, Slovakia, Israel and Latvia, so in these countries the slighter Italian quality wine exports can be related with the low number of consumers. Other countries with low fixed effects such as Portugal, Greece, Hungary, New Zealand and Spain are wine producing countries.

4. Conclusions

The production of Italian high quality wine should be increased because there are advantageous opportunities in international markets.

This work has allowed to evaluate both the effects of regional integration and the impact of the international trade liberalization on the exporting performance of Italian high quality wine. According to the model, the enlargement of the EU presents a great opportunity for the exporters of high quality Italian wine. In fact, there is a high probability that these Italian exporters could penetrate the Central and Eastern European markets which are rapidly growing. In this way they would exploit a significant commercial advantage related to the absence of customs barriers, even if it is also important to strengthen their own presence in these markets before the eventual and greater trade liberalization which would effectively reduce this advantage. At the same time, considering the possible connection to WTO agreements signed at the end of Uruguay Round Negotiations, we can observe that these agreements have positively influenced the exportation of high quality Italian wine.

Finally, considering that the exportation of this product is income elastic, as shown by the empirical model, Italian producers should diversify their targeted export markets/countries taking into account their income growth. In particular, they should focus their own efforts on countries with high income growth rates, in order to take advantage of the income growth effect on exports. However, it should also include countries with moderate but stable income growth rates in order to maintain market share. In this way, it should be possible to reduce the risk of a negative impact on the demand of high income growth countries, given that these economies could be less stable in the long run.

References

Cheng, I-H., Wall, H. J. (2005). Controlling for heterogeneity in Gravity Models of trade and integration. Federal reserve Bank of St. Louis Review, 87 (1): 49-63

Linnemann, H. (1966). An econometric study of international trade flows. Amsterdam: North-Holland Pub. Co

Pöyhönen, P. (1963). A tentative model for volume in trade between countries. Weltwirtschaftliches Archiv, 90 (1): 93-100

Prentice, B.E., Wang, Z., Urbina, H.J. (1998). Derived demand for refrigerated truck transport: a Gravity Model analysis of Canadian pork exports to the United States. Canadian Journal of Agricultural Economics, 46 (3):317-328

Tinbergen, J. (1962). Shaping the World Economy: Suggestions for an international economic policy. New York, The Twentieth Century Fund