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Title
IS GRAVITY DRIVING SPARKLING WINES EXPORTS? A GRAVITY MODEL APPLIED TO ITALIAN AND ARGENTINEAN SPARKLING WINES.

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Conference Presentation

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Keywords
sparkling wine, gravity model, exports, prosecco, italy, argentina

Research Question
Which are the variables influencing sparkling wines exports?

Methods
Gravity model

Results
Under construction

Abstract
World wine supply is undergoing great changes, with new countries producing wine (New World Wine Countries) and traditional countries experiencing important consumption and production changes (Old World Wine Countries). Wine supply has become internationalized and wine trade has increased consequently. Consumption patterns have also changed worldwide. In traditional countries per capita wine consumption has diminished steadily while in countries such as United States, United Kingdom and Japan has grown. More recently a new group of countries has appeared in the world scenario, mainly China and other Asian countries but also some Latin American one such as Brazil, Mexico and Peru. In all these markets new segments have emerged with defined price-quality relations. Nowadays consumers can certainly identify the basic, premium and superpremium segment. Simultaneously,

young consumers are focusing in quality wines with innovative packacking and non traditional distribution channels.
In this open and increasingly international market, great pressure is being excised on producers. Trade growth has meant a great market share of imported wine in all consumption markets. Some wines, such as sparkling ones (champagne, cavas, spumanti, proseccos, sekt, espumosos, etc) have specially contributed to this growth.
This paper casts new ligth on this last phenomenun, looking for a better understanding of international trade for sparkling wines. A gravity model is employed analysing variables such as GDP, geographical distances, shared frontiers, tarrif barriers, exchange rates, language, etnia, etc.
This gravity model will be applied to famous Italian Prosecco and to Argentinean sparkling wine.
To evaluate the impact of the main variables commonly used in a gravity equation, as well as the influence of import duties and exchange rate volatility on sparkling wine exports, a dataset comprising all the main trading countries for the period 2010-2017 was built.
The dataset for our model was built from multiple sources. Data on export values was retrieved from Global Trade Atlas (GTA) at eight-digit level of Harmonized System of Classification (HS). Tariff barriers were retrieved from the WTO Tariff Analysis Online Database, World Integrated Trade Solution (WITS) database and national customs offices. Exchange rate of currencies were collected from Banca d'Italia database. Geographical distance between countries was collected from the Centre d'Études Prospectives et d'Informations Internationales (CEPII) gravity dataset, that calculates distance between countries considering the 25 most populated cities of each country, then weighted by the share of the city in the overall country population. Share of a common official language has been also obtained from CEPII dataset. GDP was retrieved from the World Bank, and it is estimated in purchasing parity terms power at a current prices (PPP GDP). Finally, wine production of the importer country comes from the Organisation Internationale de la Vigne et du Vin (OIV) statistical database (StatOIV Extracts). All information was retrieved for the period 1997-2010.
Tariff barriers have been calculated basing on the MFN tariffs, chosen as reference of the national tariff levels, then adjusted according to the duty defined by FTAs, if any. If the importer applies a specific tariff, these have been converted into an ad valorem equivalent (AVE) making use of the average import price as reference.
The empirical model developed adopt a standard CES specification. It accounts for the most common variables included in the gravity equation (GDP, distance, language), but also explore the role of other variables (exchange rate volatilty, tariff, consumption of similar products) and importers wine production as a repulsive force to import.
For the gravity model, the standard equation was employed, which links trade flows to economic masses and distances (Tinbergen, 1962). Consensus has been reached on the use of countries' GDP as a proxy for economic masses and physical distance as a proxy for distances. For a wine gravity model, according to Dal Bianco et al. (2015), it seems fair to add wine production volume as a proxy for the importer's domestic supply.
The following standard CES specification was employed:

$$X_{ijt}=\mu P_{jt}^{\alpha} I_{jt}^{\beta} D_{ij}^{*\delta} \quad (1)$$

Where X_{ijt} stands for wine trade flows from country i to country j at time t; P_{it} represents the importer's production at time t, I_{jt} stands for importer's GDP at time t and D_{ij} proxies the geographical distance. After log-linearization the model becomes:

$$\ln X_{ijt}=\mu^{*}+\alpha \ln P_{jt}+\beta \ln I_{jt}+\delta \ln D_{ij}^{*}+\varepsilon_{ijt} \quad (2)$$

Where $\mu^{*}=\ln \mu$ and the additive error ε_{ijt} is assumed to be identically and independently distributed.
Trade effects induced by exchange rates and tariffs are also modeled assuming a multiplicative form; in analogy with previous studies (Jayasinghe et al., 2010), we augmented geographical distance including tariffs:

$$D_{ijt}^{*}=(1+DT_{ij})+(1+DE_{ij})+(1+t_{jt}) \quad (3)$$

where D_{ij}^{*} stands for the total economic distance, including physical distance and trade regulations. DT_{ij} represents the pair-wise geographical distance between i and j; t_j stands for the j-specific tariff in year t, while DE_j represents exchange rate volatility of importing country in year t,. In particular, exchange rate volatility has been assessed through an econometric analysis grounded on the theory of cointegration, and the estimates are carried out using Johansenis multivariate procedure. Moreover, an Autoregressive Conditional Heteroskedasticity ARCH model is used for measuring the observed of volatility in time series. In this procedure, proposed by Robert Engle (1982), error term is modeled as having a normal distribution with null average and a variance that depends by the past values of the error. After log-linearization the model can be expressed as follows:

$$X_{ijt}=\mu^*+\alpha \ln P_{jt}+\beta \ln I_{jt}+\delta_1 \ln(1+DT_{ij})+\delta_2 \ln(1+DT_{ij})+\delta_3 \ln(1+t_{jt})+\varepsilon_{ijt} \quad (4)$$

Where δ_1, δ_2 and δ_3 replace the parameter δ of equation 1. In order to control for multilateral resistance, we introduced importer fixed effects as an explanatory covariate. Equation (4) then become as follows:

$$X_{ijt}=\mu^*+\alpha \ln P_{jt}+\beta \ln I_{jt}+\delta_1 \ln(1+D_{ij})+\delta_2 \ln(1+t_{jt})+\mu_j^*+\varepsilon_{ijt} \quad (5)$$

Where μ_j^* represent the importer fixed effects.
Inserting the fixed effects allows the econometric model to account for multilateral resistance (Feenstra, 2004), avoiding thus bias. Another issue deriving from the log-linearized model estimated by OLS is that the interpretation of coefficients as elasticities could be highly misleading in the presence of heteroskedasticity. We addressed this issues estimating equation (5) both with OLS and a Poisson Pseudo-Maximum Likelihood (PPML) estimator, originally proposed by Silva and Tenreyro (2006). The PPML estimator has been widely adopted in recent studies (Jayasinghe, et al., 2010; Raimondi and Olper, 2011; Xiong and Beghin, 2011); the analysis consists in assuming an additive error in specification (1) and estimating the model by the PPML estimator.

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IS GRAVITY DRIVING SPARKLING WINES EXPORTS? A GRAVITY MODEL APPLIED TO ITALIAN AND ARGENTINEAN SPARKLING WINES.

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1.- Background

World wine supply is undergoing great changes, with new countries producing wine (New World Wine Countries) and traditional countries experiencing important consumption and production changes (Old World Wine Countries). Wine supply has become internationalized and wine trade has increased consequently. Consumption patterns have also changed worldwide. In traditional countries per capita wine consumption has diminished steadily while in countries such as United States, United Kingdom and Japan has grown. More recently a new group of countries has appeared in the world scenario, mainly China and other Asian countries but also some Latin American one such as Brazil, Mexico and Peru. In all these markets new segments have emerged with defined price-quality relations. Nowadays consumers can certainly identify the basic, premium and superpremium segment. Simultaneously, young consumers are focusing in quality wines with innovative packacking and non traditional distribution channels.

In this open and increasingly international market, great pressure is being excised on producers. Trade growth has meant a great market share of imported wine in all consumption markets. Some wines, such as sparkling ones (champagne, cavas, spumanti, proseccos, sekt, espumosos, etc) have specially contributed to this growth.

This paper casts new ligth on this last phenomenun, looking for a better understanding of international trade for sparkling wines. A gravity model is employed analysing variables such as GDP, geographical distances, shared frontiers, tarrif barriers, exchange rates, language, etnia, etc.

This gravity model will be applied to famous Italian Prosecco and to Argentinean sparkling wine.

2.- Aims and Contributions.

Sparkling wines in the last years have dramatically increased their market share over total wine consumption, showing also different consumption pattern compared to still wines. Despite that, there are no studies that have considered this typology of wines when assessing the dynamics of trade. This research aims to shed more light on the variables that influence international trade of sparkling wines, investigating the rise of the exports of Prosecco, the most exported and consumed sparkling wine in the world.

The results of this research could be useful for policy maker, consortiums, wineries and trading companies.

3.- DATA

To evaluate the impact of the main variables commonly used in a gravity equation, as well as the influence of import duties and exchange rate volatility on sparkling wine exports, a dataset comprising all the main trading countries for the period 2010-2017 was built.

The dataset for our model was built from multiple sources. Data on export values was retrieved from Global Trade Atlas (GTA) at eight-digit level of Harmonized System of Classification (HS). Tariff barriers were retrieved from the WTO Tariff Analysis Online Database, World Integrated Trade Solution (WITS) database and national customs offices. Exchange rate of currencies were collected from Banca d'Italia database. Geographical distance between countries was collected from the Centre d'Études Prospectives et d'Informations Internationales (CEPII) gravity dataset, that calculates distance between countries considering the 25 most populated cities of each country, then weighted by the share of the city in the overall country population. Share of a common official language has been also obtained from CEPII dataset. GDP was retrieved from the World Bank, and it is estimated in purchasing parity terms power at a current prices (PPP GDP). Finally, wine production of the importer country comes from the Organisation Internationale de la Vigne et du Vin (OIV) statistical database (StatOIV Extracts). All information was retrieved for the period 1997-2010.

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4.- Methodology

The empirical model developed adopt a standard CES specification. It accounts for the most common variables included in the gravity equation (GDP, distance, language), but also explore the role of other variables (exchange rate volatilty, tariff, consumption of similar products) and importers wine production as a repulsive force to import.

For the gravity model, the standard equation was employed, which links trade flows to economic masses and distances (Tinbergen, 1962). Consensus has been reached on the use of countries' GDP as a proxy for economic masses and physical distance as a proxy for distances. For a wine gravity model, according to Dal Bianco et al. (2015), it seems fair to add wine production volume as a proxy for the importer's domestic supply.

The following standard CES specification was employed:

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Where X_{ijt} stands for wine trade flows from country *i* to country *j* at time *t*; P_{it} represents the importer's production at time t, I_{jt} stands for importer's GDP at time *t* and D_{ij} proxies the geographical distance. After log-linearization the model becomes:

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Where δ_1, δ_2 and δ_3 replace the parameter δ of equation 1. In order to control for multilateral resistance, we introduced importer fixed effects as an explanatory covariate. Equation (4) then become as follows:

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Where μ_j^{*} represent the importer fixed effects.

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