The Role of Culture, Language and Trade Agreements in Global Wine Trade

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Abstract

In the progressively globalising world, wine trade is changing shape. In recent decades, major wine producers have suffered a remarkable drop in their domestic wine consumption, while New World wine producers have increased their production potential and induced new demand in foreign markets. These changes have been accompanied by a geographical relocation of wine consumption and trade. The aim of our paper is to analyse the effect of cultural-geographical proximity, free trade and the role of linguistic similarity on bilateral wine trade in the world major wine producer countries, employing balanced panel gravity model. Regression results suggest that larger countries export more wine, while transport costs increase in line with geographical distance, especially for landlocked trading partners. Moreover, global wine export costs are lower if trading partners are culturally similar; have the same religion or both are members of the WTO or have regional trade agreements.

Keywords

Wine trade, cultural proximity, language clusters, gravity model.

Introduction

In the last century, global wine market has progressively been developed. Approximately one million winemakers are producing around 3 billion cases of wine each year (Stanley, 2013) at the global level. The international demand for wine is rising year by year and the world wine industry has also changed to a great extent.

However, European traditional wine producers such as France, Italy and Spain have suffered a remarkable drop in their domestic wine consumption since the 1980s, mainly due to changing wine policy regulations, while New World wine producers have increased their production potential and induced new demand in foreign markets (Cembalo et al., 2014). Consequently, the USA, Australia, Chile, New Zealand, and South Africa have gained increasing market shares both in volumes and in values exported (Morrison and Rabellotti, 2014) in the global wine market.

These changes have been accompanied by a geographical relocation of demand (Aizenman and Brooks, 2008), creating new challenges and opportunities for international trade. To date, almost half of the wines are consumed outside of a country of production that is rarely associated with an extra trade cost (Dal Bianco et al., 2015).

Consequently, the objective of our paper is to investigate the factors influencing international trade among the major global wine market players and their trading partners as well as to reveal the cultural-linguistic factors behind wine trade flows.

According to Tinbergen (1962), the size of bilateral trade flows can be approximated by the so-called "gravity equation", mimicking Newton's famous gravity theory. The gravity equation provides evidence for the relationship between the size of economies, the distance between them and the number of products traded.

There are a number of research dealing with international wine trade using gravity equation models (Pinilla and Serrano 2008, Dascal et al., 2002, De Blasi et al., 2007, Dal Bianco et al., 2013; 2015, Lombardi et al., 2016). However, these models are generally using the basic model with common variables. In this paper, we aim

to use a more sophisticated model as we are especially interested in the effect of cultural and geographical variables as well as language clusters on bilateral wine trade of major global wine producer countries.

We estimate the standard gravity equation for the analysis and employ several different estimation methods such as OLS, Random Effects, Pseudo Poisson Maximum Likelihood (PPML) and Heckman two-stage approach suggested by the literature in order to estimate the gravity regression for the wine trade.

The aim of our paper is to analyse the effect of cultural-geographical proximity, free trade and the role of linguistic similarity on bilateral wine trade in the world major wine producer countries, employing balanced panel gravity model.

In doing so, the paper is structured as follows. The first section describes the theoretical background behind gravity models, including its application to the wine trade, followed by the demonstration of our methods used. The fourth section shows our econometric specification, followed by the discussion of the results. The last section concludes.

Materials and methods

Gravity models have been used to refer to a variety of different specifications to determine bilateral trade flows and estimate factors influencing trade costs. A number of slightly different specifications of the gravity equation exist in the trade literature. Moreover, the gravity equation can be derived from several theory-consistent estimation methods.

Most of the gravity models work with a single factor of production, factor income and hence Gross Domestic Products (GDP). Gravity models can be divided into the category of "demand-side" or "supply-side" derivations (Head and Mayer, 2013). The earliest modern application of the gravity equation for trade was made by Anderson (1979). The gravity equation is based on standard symmetric Dixit-Stiglitz-Krugman monopolistic competition assumptions derived by multiple authors. It assumes that each country has firms supplying one variety to the world from a home-country production site. Utility features a constant elasticity of substitution between all varieties available in the world (Head and Mayer, 2013). Eaton and Kortum (2002) derive a gravity equation from the constant elasticity of substitution based on the approaches in approximately every respect and the results they

obtain show a remarkable similarity. According to Bergstrand (1985, 1989), the gravity model is a direct implication of the monopolistic competition model of Paul Krugman (1980). Helpman et al. (2008) and Chaney (2008) obtained gravity model from a theoretical model of international trade in differentiated goods with firm heterogeneity.

Only a limited number of articles are available in international trade literature that investigates wine trade by gravity equation models concerning the European Union or South American wine trade.

Pinilla and Serrano (2008) analysed the long-term determinants of Spanish table wine exports by gravity panel data estimation technique between 1871 and 1935. The results of their model showed that Spanish table wine was exported to countries with large growing markets that were close both culturally and geographically.

Dascal et al. (2002) employed a gravity model approach in order to analyse the main factors affecting the trade flows of wine in EU-12 countries for the period 1989-1997. Their results revealed that wine trade was positively influenced by an increase of GDP per capita, since greater income promotes trade.

De Blasi et al. (2007) examined the magnitude of trade flows for high quality wine from Italy to its main importing countries analysed by the gravity model. They concluded that the enlargement of the EU provided better opportunities for high quality Italian wine exporters.

Dal Bianco et al. (2013) analysed the Argentinean wine industry also by using the gravity model. They concluded that wine flows can be basically explained by the importer countries' economic and political characteristics. In addition, the lack of free trade agreements with the European Union and North America revealed a significant weakness for Argentinean wineries.

Dal Bianco et al. (2015) investigated the impact of trade barriers on the world wine trade focusing on trade costs impeding exports, including transport, tariffs, technical barriers and sanitary and phytosanitary standards. Their gravity model was estimated using data from the main importing and exporting countries between 1997 and 2010. Their results identify which regulations can adversely affect trade providing useful information to policy-makers involved in negotiations on trade frictions.

Lombardi et al. (2016) analysed the intra-EU trade of the world's major wine exporters such as Italy,

France, and Spain employing augmented version of the gravity model. They took into account effects of transportation costs, as well as demand and supply gaps between origin and destination countries, on the size of bilateral trade flows.

However, these studies analysed only a region or a part of the world wine trade and they did not take into account the wine trade of the major world wine exporter countries. In addition, the effect of cultural similarity on wine trade has not yet been investigated either.

We employ a standard gravity model for a sample of world wine trade. The standard formula of gravity equation can be calculated as follows (Anderson and van Wincoop's, 2003):

$$X_{ij} = G * S_i * M_j * \varphi_{ij} \qquad (1)$$

where X_{ij} is the value of exports from i to j,

M_j denotes importing country's GDP,

S_i comprises exporter's GDP,

G is a variable that does not depend on i or j such as the level of world liberalization,

φ_{ij} represents the ease of exporter i to access the market of j.

The log-linear model of gravity equation can be calculated by taking the natural logarithms of these variables (Bacchetta et al., 2012):

$$lnX_{ij} = lnG + lnS_i + lnM_j + ln\varphi_{ij} \qquad (2)$$

A number of variables are generally used to capture trade costs such as bilateral distance, islands-landlocked countries, common borders, common language or cultural features such as colonial history, common religion that are usually thought to be stable over time (Bacchetta et al., 2012).

As culture shifts over time, it may change more when countries are more exposed to international trade - therefore, it is important to consider culture-based measures (Head and Mayer, 2013). In addition, trade costs are probably lower for countries whose have a common language or other relevant cultural character because they are likely to know more about each other and understand better each other's culture or business practices (Bacchetta et al., 2012).

Sharing a religion has also been shown to raise trade (Kang and Fratianni 2006, Linders and de Groot 2006). Religious similarity is a variable created from data on religion by La Porta et al. (1999), who provide the percentage of a country's residents

identified as Catholic, Protestant, Muslim, or Other.

The relationship between physical and cultural distance also deserves attention in gravity models. Countries tend to group together geographically because culture spreads first to those areas nearest to its origin (Ronen and Shenkar, 1985).

However, cultural proximity and geographic proximity are not necessarily related. Three countries pertaining to the Anglo-Saxon cluster such as Australia, the UK, and the United States are located in three different continents due to colonization and immigration (Ronen and Shenkar, 1985).

To measure cultural distance between the home and the host country, Ronen and Shenkar (1985) and Triandis (1994) clustered countries based on their relative similarities along four different dimensions, i.e., language, geography, wealth, and religion. In addition, Ronen and Shenkar synthesize eight previous studies that classify countries according to aspects such as prevalent needs, values, and work attitudes. We used clusters of countries that present similar cultural characteristics to home country by the work of Filippaios and Rama (2011).

Tariff barriers are also generally included in the form of dummies for the existence of regional trade agreements (RTAs) or use of WTO membership.

Literature suggests several ways to estimate gravity models from linear pooled OLS to nonlinear PPML. The standard gravity equation and other multiplicative models (such as the Cobb-Douglas production function) can be estimated with OLS. However, Santos and Tenreyro (2006) found many problems of this simple approach and argued that Pseudo-Poisson maximum likelihood (PPML) was a smart alternative to linear-in-logs OLS for multiplicative models like the gravity equation. A useful feature of the PPML is that it permits the inclusion of zero trade values as well. In this paper, we employ heteroscedasticity robust panel estimation, including zero trade flows and country-time fixed effects for bilateral wine export.

Based on the empirical evidence of wine gravity literature the following hypotheses are tested here:

H1: The standard gravity model can be applied to world wine trade.

Standard gravity models generally argue that bilateral trade is inversely related to geographical distance, e.g. trade volumes decrease with distance.

However, it is also interesting to analyse how geographical distance is related to the costs of trade, especially in the case of a landlocked country. This situation makes trade cost higher because sea access enables water transport to reduce costs (Bacchetta et al., 2012). We employ simple distance of most populated cities in km as a proxy for geographical distance, while we use a dummy variable for landlocked countries. Data come from the CEPII database and a positive relationship is expected.

H2: Culturally similar countries trade more wine.

Lower trade barriers stimulate trade by reducing trade costs (Bacchetta et al., 2012, p. 106). We test this argument for wine trade by using proxies for cultural similarities like the common language, past colonial history or common religion, available at the CEPII database. Again, a positive relationship is expected.

H3: Members of the same language cluster will trade more wine with each other.

It seems to be evident that a common language generally makes trade easier. This assumption is tested here by using the language clusters available in the CEPII database. A religion variable derived from data of La Porta et al. (1999). To measure the cultural distance between the home and the host country, we employed language classification variables (see Appendix 1) from the work of Ronen and Shenkar (1985) in Filippaios and Rama (2011). A positive relationship is expected, too.

H4: Trade agreements encourage global wine trade.

The liberalisation of global wine trade leads to a higher number of different quality wines available on shelves. Here we test whether this relationship holds for all the major wine exporter countries. A dummy variable is used for WTO membership and the existence of regional trade agreements between trading partners. Information on WTO membership can be found on the WTO website (WTO, 2013). Data on the regional trade agreement (RTA) variable comes from International Economics Data and Programs of José de Sousa (De Sousa, 2014). We expect to have a positive relationship here.

Our strongly balanced panel dataset includes bilateral trade data of 32 considerable wine exporter countries and their 216 trading partners (Appendix 2) between 2000-2012, giving 48 802 observations. The dependent variable of the model comes

from bilateral wine export data of the World Bank World Integrated Trade Solution (WITS) database in HS-6 level, for product code 2204: wine of fresh grapes, including fortified wines; grape must (World Bank, 2014a). Table 1 summarises all the variables used.

We employ four different estimation methods: pooled OLS and Random Effects suggested by Baier and Bergstrand (2009), PPML by Santos and Tenreyro (2006) and the Heckman two-stage approach (Heckman, 1979). In all models, country fixed effect are included by country-pairs and time fixed effects by year dummies. To avoid dropping zero trade values by using logarithm form, we added a small value of 1 dollar to zero trade flows. The following models were estimated (note that in PPML models wine export are used in levels instead of the logarithm form):

$$\ln wine\ export_{ij} = \alpha + \beta_1 \ln GDPexp_i + \beta_2 \ln GDPimp_j + \beta_3\ lndist_{ij} + \beta_4 comlang\_off_{ij} + \beta_5\ comcol_{ij} + \beta_6 colony_{ij} + \beta_7 religion + \beta_8\ landlocked_{ij} + \beta_9 WTO_{ij} + \beta_{10}\ RTA_{ij} + D_i\ exp\ dummies_i + D_j\ imp\ dummies_j + D_i\ time\ dummies_{ij} + uij \quad (3)$$

$$\ln wine\ exportij = \alpha + \beta_1 \ln GDPexp_i + \beta_2 \ln GDPimp_j + \beta_3\ lndist_{ij} + \beta_4\ comlang\_off_{ij} + \beta_5 comcol_{ij} + \beta_6\ colony_{ij} + \beta_7\ religion + \beta_8\ landlocked_{ij} + \beta_9 WTO_{ij} + \beta_{10}\ RTA_{ij} + \beta_{11}\ Anglo\text{-}saxon_{ij} + \beta_{12}\ Germanic_{ij} + \beta_{13}\ LatinAm_{ij} + \beta_{14}\ LatinEU_{ij} + D_i\ exp\ dummies_i + D_j\ imp\ dummies_j + D_i\ time\ dummies_{ij} + u_{ij} \quad (4)$$

$$\ln wine\ export_{ij} = \alpha + \beta_1 \ln GDPexp_i + \beta_2 \ln GDPimp_j + \beta_3\ lndist_{ij} + \beta_4 comcol_{ij} + \beta_5 colony_{ij} + \beta_6 religion + \beta_7\ landlocked_{ij} + \beta_8\ WTO_{ij} + \beta_9\ RTA_{ij} + \beta_{10} Anglo\text{-}saxon_{ij} + \beta11\ Germanicij + \beta_{12} LatinAm_{ij} + \beta_{13} LatinEU_{ij} + D_i\ exp\ dummies_i + D_j\ imp\ dummies_j + D_i\ time\ dummies_{ij} + u_{ij} \quad (5)$$

Independent variables	Description	Data sources	Exp. sign
lnGDPexp	GDP of wine exporter (GDP in current US dollar)	World Bank (2014b)	+
lnGDPimp	GDP of wine importer (GDP in current US dollar)	World Bank (2014b)	+
lndist	distance: simple distance of most populated cities in km	CEPII (2013)	-
Independent dummy variables	**Description**	**Data sources**	**Exp. sign**
comlang_off	common official language: 1 if trader countries have common official primary language, 0 otherwise	CEPII (2013)	+
comcol	common colonizer: 1 for common colonizer post 1945, 0 otherwise	CEPII (2013)	+
colony	1 if traders were ever in colonial relationship, 0 otherwise	CEPII (2013)	+
landlocked	landlocked country: 1 if both traders are landlocked, 0 otherwise	CEPII (2013)	-
religion	1 if common main religion for both countries, 0 otherwise	La Porta et al. (1999)	+
RTA	1 if traders have regional trade agreements, 0 otherwise	José de Sousa (2014)	+
WTO	WTO: 1 if both traders are member of WTO, 0 otherwise	WTO (2013)	+
Language classification	**Description**	**Data sources**	**Exp. sign**
Anglo-Saxon	1 if trader countries belonging to Anglo-Saxon cluster, 0 otherwise (Filippaios and Rama 2011)	Ronen and Shenkar (1985)	+
Germanic	1 if trader countries belonging to Anglo-Saxon cluster, 0 otherwise (Filippaios and Rama 2011)	Ronen and Shenkar (1985)	+
Latin American	1 if trader countries belonging to Latin American cluster, 0 otherwise (Filippaios and Rama 2011)	Ronen and Shenkar (1985)	+
Latin European	1 if trader countries belonging to Latin European cluster, 0 otherwise (Filippaios and Rama 2011)	Ronen and Shenkar (1985)	+

Source: own composition

Table 1: Description of independent variables.

Results and discussion

Table 2 summarises the results obtained by OLS and random effect estimations. The majority of the variables are highly significant. Regarding the first hypothesis, the common general gravity model applies for global wine trade with positive values for GDP and negative ones for distance. This means that economically bigger countries trade more with each other and as usual, distance and trade values are negatively related. According to our results, this also holds for our sample, meaning that distance discourages global wine trade.

As to the second hypothesis, cultural similarity seems to have a positive impact on wine trade in both models as expected. In other words, countries having similar cultural backgrounds trade more wine compared to those with different cultural background. However, language cluster results do not appear to be evident as just the Latin American cluster provides positive and significant results, questioning the original hypothesis.

Last but not least, the effects of regional trade agreements are positive and significant in the OLS model but not in the RE model. This is especially important in times when the role of free trade agreements has continuously been increasing. It seems that wine has been more traded regionally than globally. Generally, our results are in line with the literature except for language clusters.

Results obtained by the PPML estimation are summarised in Table 3 and they are consistent with the OLS model results described above. However, the PPML models highly confirm a positive role of language clusters and less trading costs between Anglo-Saxon, Germanic, Latin American and Latin European countries, supporting our third hypothesis. In other words, countries speaking similar languages tend to have traded more wine between 2000 and 2012 than those speaking a different language. Moreover, it seems that similar languages are also associated with less trade costs. The additional effect of language clusters (PPML model 2) reveals that in the case of Latin American countries, trade effect is the highest in line with OLS and random effect models.

VARIABLES	(1) OLS lnexport_adj	(2) OLS lnexport_adj	(3) OLS lnexport_adj	(4) Random lnexport_adj	(5) Random lnexport_adj	(6) Random lnexport_adj
lnGDPexp	0.227*	0.228*	0.228*	0.202	0.202	0.203
	(0.121)	(0.121)	(0.122)	(0.136)	(0.136)	(0.136)
lnGDPimp	1.346***	1.347***	1.349***	1.299***	1.300***	1.300***
	(0.101)	(0.101)	(0.102)	(0.122)	(0.122)	(0.122)
lndist	-1.894***	-1.856***	-1.983***	-2.040***	-2.005***	-2.140***
	(0.0358)	(0.0387)	(0.0385)	(0.0893)	(0.0969)	(0.0974)
comlang_off	1.697***	1.603***		1.731***	1.640***	
	(0.0732)	(0.0766)		(0.191)	(0.199)	
comcol	2.960***	2.965***	2.978***	3.062***	3.070***	3.090***
	(0.248)	(0.248)	(0.247)	(0.732)	(0.732)	(0.730)
colony	2.512***	2.571***	3.335***	2.515***	2.577***	3.360***
	(0.0965)	(0.0980)	(0.0910)	(0.252)	(0.256)	(0.248)
religion	1.168***	1.140***	1.264***	1.185***	1.156***	1.284***
	(0.0737)	(0.0739)	(0.0741)	(0.185)	(0.186)	(0.188)
landlocked	-0.540***	-0.565***	-0.519***	-0.481	-0.512	-0.463
	(0.145)	(0.148)	(0.149)	(0.371)	(0.373)	(0.378)
WTO	1.477***	1.529***	1.651***	1.707	1.766	1.945
	(0.457)	(0.459)	(0.480)	(1.292)	(1.303)	(1.409)
RTA	0.606***	0.615***	0.654***	-0.105	-0.103	-0.0983
	(0.0703)	(0.0704)	(0.0707)	(0.109)	(0.109)	(0.109)
AngloSaxon		0.0402	0.778***		-0.0250	0.732
		(0.153)	(0.152)		(0.462)	(0.462)
Germanic		-0.0658	-0.0116		-0.0877	-0.0323
		(0.146)	(0.148)		(0.397)	(0.406)
LatinAmerican		1.285***	2.072***		1.304***	2.113***
		(0.155)	(0.152)		(0.380)	(0.378)
LatinEuropean		-0.192	-0.185		-0.198	-0.191
		(0.120)	(0.121)		(0.286)	(0.290)
Constant	-24.56***	-24.89***	-23.91***	-19.38***	-19.71***	-17.99***
	(3.954)	(3.952)	(3.981)	(5.096)	(5.114)	(5.156)
Observations	45,421	45,421	45,421	45,421	45,421	45,421
R-squared	0.593	0.593	0.589	0.592	0.592	0.587
Number of country pairs				3,539	3,539	3,539
exporter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
importer fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: to avoid dropping zero trade flows lnexport_adj was calculated by adding 1 USD to 0 trade values.
Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1
Source: own calculation based on Word Bank (2014a, 2014b), CEPII (2013), De Sousa (2014), La Porta et al. (1999), Filippaios and Rama (2011) and WTO (2013) databases

Table 2: Results of OLS and Random effects estimation.

VARIABLES	(1) PPML exportvalue	(2) PPML exportvalue	(3) PPML exportvalue
lnGDPexp	0.152	0.156	0.167
	(0.187)	(0.184)	(0.186)
lnGDPimp	0.948***	0.949***	0.949***
	(0.179)	(0.179)	(0.179)
lndist	-0.352***	-0.330***	-0.375***
	(0.0828)	(0.0879)	(0.0843)
comlang_off	0.763***	0.561***	
	(0.153)	(0.185)	
comcol	2.886***	2.996***	2.973***
	(0.801)	(0.830)	(0.772)
colony	0.514**	0.520**	0.672***
	(0.239)	(0.243)	(0.236)
religion	0.650**	0.573**	0.636**
	(0.261)	(0.279)	(0.259)
landlocked	-1.341**	-0.879	-0.584
	(0.547)	(0.607)	(0.628)
WTO	2.512***	2.503***	2.494***
	(0.855)	(0.882)	(0.922)
RTA	0.441**	0.425**	0.440**
	(0.202)	(0.200)	(0.194)
AngloSaxon		0.344	0.743***
		(0.269)	(0.208)
Germanic		0.626*	0.825**
		(0.372)	(0.408)
LatinAmerican		1.016***	1.170***
		(0.246)	(0.277)
LatinEuropean		0.462*	0.458*
		(0.257)	(0.263)
Constant	-11.46	-12.03*	-11.42*
	(7.047)	(6.969)	(6.907)
Observations	45,421	45,421	45,421
Pseudo R-squared	0.869	0.871	0.862
exporter fixed effects	Yes	Yes	Yes
importer fixed effects	Yes	Yes	Yes
time fixed effects	Yes	Yes	Yes

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: own calculation based on Word Bank (2014a, 2014b), CEPII (2013), De Sousa (2014), La Porta et al. (1999), Filippaios and Rama (2011) and WTO (2013) databases

Table 3: PPML estimation results for wine export.

Table 4 presents the Heckman two-stage estimation using sample selection variable (export dummy variable: it is equal to 1 if the value of export is positive and 0 otherwise). As to the Heckman estimation, the first and second stage produce similar results as the empirical literature suggest: almost all coefficients are significant and have the expected signs. This is probably the most valid model, confirming previous results. However, the mill's lambdas are also significant in all models, suggesting selection bias of zero trade. It implies that zero trade flows may represent missing values instead of the absence of trade in the sample.

	(1) heckman		(2) heckman		(3) heckman	
VARIABLES	lnexport_adj	exportdummy	lnexport_adj	exportdummy	lnexport_adj	exportdummy
lnGDPexp	0.884***	0.162***	0.833***	0.164***	0.581***	0.164***
	(0.0312)	(0.00370)	(0.0255)	(0.00372)	(0.0175)	(0.00372)
lnGDPimp	0.841***	0.154***	0.772***	0.154***	0.501***	0.154***
	(0.0289)	(0.00303)	(0.0234)	(0.00306)	(0.0152)	(0.00306)
lndist	-0.366***	-0.102***	-0.243***	-0.0793***	-0.111***	-0.0793***
	(0.0369)	(0.00889)	(0.0307)	(0.00940)	(0.0226)	(0.00940)
comlang_off	2.218***	0.424***	1.628***	0.366***		0.366***
	(0.103)	(0.0216)	(0.0824)	(0.0224)		(0.0224)
comcol	1.507***	0.0105	1.711***	0.0466	1.797***	0.0466
	(0.254)	(0.0563)	(0.212)	(0.0563)	(0.178)	(0.0563)
colony	1.010***	0.265***	1.141***	0.312***	1.235***	0.312***
	(0.120)	(0.0353)	(0.103)	(0.0356)	(0.0762)	(0.0356)
religion	1.458***	0.293***	1.117***	0.247***	0.780***	0.247***
	(0.0862)	(0.0199)	(0.0680)	(0.0203)	(0.0495)	(0.0203)
landlocked	-1.890***	-0.264***	-1.779***	-0.250***	-1.409***	-0.250***
	(0.0732)	(0.0144)	(0.0611)	(0.0147)	(0.0457)	(0.0147)
WTO	1.303***	0.297***	1.086***	0.284***	0.447***	0.284***
	(0.0970)	(0.0174)	(0.0786)	(0.0175)	(0.0587)	(0.0175)
RTA	1.907***	0.411***	1.764***	0.415***	1.156***	0.415***
	(0.0951)	(0.0194)	(0.0778)	(0.0194)	(0.0551)	(0.0194)
AngloSaxon			1.413***	0.348***	2.100***	0.348***
			(0.181)	(0.0935)	(0.124)	(0.0935)
Germanic			1.153***	0.319***	0.629***	0.319***
			(0.139)	(0.0510)	(0.100)	(0.0510)
LatinAmerican			3.190***	1.277***	2.554***	1.277***
			(0.201)	(0.0951)	(0.145)	(0.0951)
LatinEuropean			0.368***	0.210***	0.0719	0.210***
			(0.115)	(0.0407)	(0.0833)	(0.0407)
mills lambda	4.726***		3.933***		0.553***	
	(0.355)		(0.285)		(0.193)	
Constant	-40.84***	-7.157***	-38.20***	-7.404***	-23.16***	-7.404***
	(1.601)	(0.143)	(1.337)	(0.148)	(0.881)	(0.148)
Observations	45,421	45,421	45,421	45,421	45,421	45,421
Censored obs	16,379		16,379		16,379	
Uncensored obs	29,042		29,042		29,042	
exporter fixed effects	Yes		Yes		Yes	
importer fixed effects	Yes		Yes		Yes	
time fixed effects	Yes		Yes		Yes	

Note: to avoid dropping zero trade flows lnexport_adj was calculated by adding 1 USD to 0 trade values.
Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1
Source: own calculation based on Word Bank (2014a, 2014b), CEPII (2013), De Sousa (2014), La Porta et al. (1999), Filippaios and Rama (2011) and WTO (2013) databases

Table 4: Results of Heckman estimations.

On the whole, models above validate the expected relationship between wine trade and common cultural, historical and geographical link with the trading partners. Results also confirm the positive role of free trade and regional trade agreements. In addition, the estimations suggest that Anglo-Saxon, Latin European, Latin American and Germanic countries have significant common trade relations that reduce wine trade costs. None of our hypotheses could be rejected.

Conclusion

In recent decades, global wine trade has resulted in increased wine consumption in North America and Asia. Currently, almost every second litre of wine is consumed in a third country, implying extra trade cost for countries.

The paper analysed the effects of cultural and geographical proximity on wine trade by applying a panel gravity model for global wine traders for the period of 2000-2012. It also investigated the role of language clusters in global wine trade costs.

The estimated models confirmed the standard gravity hypothesises in wine trade in line with the gravity literature (Dascal et al., 2002; Bacchetta et al., 2012; Head and Mayer, 2013; Lombardi et al., 2016).

Results suggest that the exporter and importer country's GDP, common official language and colonial history and religion based variables are positively related to wine export. It highlights the importance of country size and cultural similarity in wine export (Pinilla and Serrano, 2008; Dascal et al., 2002).

Results also suggest that costs of wine export could be lower if trading partners have common cultural relations because they know better each other's business culture and practise (Bacchetta et al., 2012; Pinilla and Serrano, 2008).

Estimations also explored a positive role of free trade agreements, i.e. lower trade barriers stimulate wine trade by reducing trade costs (Bacchetta et al., 2012; Bianco et al., 2013).

Regarding language clusters, Anglo-Saxon, Germanic and Latin American countries export wines predominantly to each other's market. The additional effects of language clusters suggest that trade effect lowering trade costs are the highest in Latin American language clusters.

In sum, our empirical evidence proves that common historical, cultural and linguistic background has a significant role in wine trade and culturally similar country groups can benefit from the most significant trade advantage.

However, note that models applied have several limitations and restrictions as usual. Wine trade data are measured at the macro level and models assumed that wine products across countries were homogenous. Further research is needed in order to take into consideration other cultural, historical and geographical factors influencing wine trade.

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Appendix

Anglo-Saxon

Australia, Canada, Hawaii (USA), Island of Man, Ireland, Netherlands Antilles, Netherlands, New Zealand, South Africa, United Kingdom, United States of America

Arabic

Algeria, Bahrain, Brunei, Egypt, Iran, Jordan, Kuwait, Lebanon, Saudi Arabia, Syria, United Arab Emirates

Far East

Bangladesh, Cambodia, China, Fiji, Guam, Hong Kong, Indonesia, Macao, Madagascar, Malawi, Malaysia, Mali, Marianas Islands, Nepal, New Caledonia, New Guinea, Papua N. Guinea, Philippines, Seychelles, Singapore, Solomon Islands, South Korea, Sri Lanka, Surinam, Tahiti, Taiwan, Thailand, Vietnam

Germanic

Austria, Belarus, Bosnia, Czech Republic, Croatia, Estonia, Germany, Hungary, Latvia, Lichtenstein, Lithuania, Luxembourg, Poland, Slovakia, Switzerland, Ukraine

Independent

Israel, India, Japan, Russia

Latin American

Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Equator, Guatemala, Guyana, Honduras, Virgin Island, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Santa Lucia, Salvador, Trinidad & Tobago, Uruguay, Venezuela, Bahamas, Barbados, Bermuda, Cayman Islands.

Latin European

Albania, Belgium, Bulgaria, Cyprus, France, FYROM (Former Yugoslav Republic of Macedonia), Greece, Italy, Malta, Moldova, Monaco, Portugal, Romania, Serbia, Slovenia, Spain

Near East/Africa

Angola, Armenia, Belize, Botswana, Burundi, Cameroon, Congo, Ethiopia, Gabon, Ghana, Guinea, Ivory Coast, Kazakhstan, Kenya, Lesotho, Liberia, Morocco, Maurice, Mauritania, Mozambique, Namibia, Niger, Nigeria, Uganda, Uzbekistan, Pakistan, Reunion, Rwanda, Senegal, Sierra Leone, Soudan, Swaziland, Tanzania, Chad, Tunisia, Turkey, Yemen, Zaire, Zambia, Zimbabwe

Nordic

Denmark, Finland, Greenland, Iceland, Norway, Sweden

Source: Ronen and Shenkar (1985) in Filippaios and Rama (2011)

Appendix 1: Language classification.

Wine exporter countries	Frequency		Frequency
Argentina	145	Italy	195
Australia	171	Lebanon	92
Austria	137	Malta	37
Argentina	145	Moldova	79
Bulgaria	112	New Zealand	123
Canada	81	Portugal	178
Chile	163	Romania	91
China	81	Russia	51
Croatia	71	Slovak Republic	56
Cyprus	70	Slovenia	76
Czech Republic	101	South Africa	189
France	203	Spain	187
Georgia	76	Switzerland	144
Germany	190	Turkey	77
Greece	115	United Kingdom	183
Hungary	103	United States	157

List of export destinations

Afghanistan, Albania, Algeria, Andorra, Angola, Anguilla, Antigua, and, Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, The Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, British, Virgin Islands, Brunei, Bulgaria, Burkina, Faso, Burundi, Cambodia, Cameroon, Canada, Cape, Verde, Cayman, Islands, Central, African, Republic, Chad, Chile, China, Christmas Island, Cocos (Keeling) Islands, Colombia, Comoros, Congo Dem. Rep., Congo Rep., Cook Islands, Costa, Rica, Cote d'Ivoire, Croatia, Cuba, Cyprus, Czech Republic, Denmark, Djibouti, Dominica, Dominican Republic, East Timor, Ecuador, Egypt Arab Rep., El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia(excludes Eritrea), Faeroe Islands, Falkland Island, Fiji, Finland, Sudan, France, French Polynesia, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Greenland, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, China, Hungary, Iceland, India, Indonesia, Iran, Islamic Rep., Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Korea, Dem. Rep., Korea, Rep., Kuwait, Kyrgyz Republic, Lao PDR, Latvia, Lebanon, Lesotho, Liberia, Libya, Lithuania, Luxembourg, Macao, Macedonia FYR, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Fed. States, Moldova, Mongolia, Montserrat, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Netherlands, Netherlands Antilles, New Caledonia, New Zealand, Nicaragua, Niger, Nigeria, Niue, Norfolk Island, Northern Mariana Islands, Norway, Oman, Pakistan, Palau, Panama, Papua, New Guinea, Paraguay, Peru, Philippines, Pitcairn, Poland, Portugal, Qatar, Romania, Russian Federation, Rwanda, Saint Helena, Saint Pierre and Miquelon, Samoa, San Marino, Sao Tome and Principe, Saudi, Arabia, Senegal, Seychelles, Sierra, Leone, Singapore, Slovak Republic, Slovenia, Solomon Islands, Somalia, South Africa, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syrian Arab Republic, Tajikistan, Tanzania, Thailand, Togo, Tokelau, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Turks and Caicos Isl., Tuvalu, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Wallis and Futuna Islands, Yemen, Zambia, Zimbabwe

Source: own composition based on sample data

Appendix 2: Pattern of database.