

## **Free trade agreements and other determinants of Slovak wine exports: a gravity model approach**

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### **Abstract**

In recent years, the Slovak wine export has been growing constantly. Not only the amount of transactions is bigger, but also new markets are approaching. In general, the following factors are considered to be significant in influencing the amount of exported goods: GDP per capita and number of inhabitants in importing countries, distance between trade partners, amount of domestic production of the goods and its consumption in receiving countries. According to studies dealing with identification of trade determinants, there are also other factors that can have an impact on export of goods: agricultural policies, membership in international and trade organizations, common characteristics and similarities between the domestic country and business partners. The objective of this article is to identify determinants of Slovak wine export in the period 2004-2014 using the gravity model approach and to determine effect of free trade agreements on exports. The results show that foreign consumers consider Slovak wine to be inferior goods. Slovak wine exporters tended to export more to non-WTO countries. No significant effect of EU, EU monetary union and OECD membership was identified. No evidence of impact of the free trade agreements on the wine export value was determined. The coefficient of the similarity index was estimated to be significant but negative. This implies that Slovak wine export grew with increasing dissimilarity between Slovakia and importing countries.

**Keywords:** foreign trade, export determinants, wine, gravity model, FTA

**JEL Classification:** Q17, F14, C23

### **Introduction**

Slovakia is a relatively small producer of wine; domestic production represents only about 0.2% of production of the European Union. The tradition of wine production, however, dates to the 9th century AD. The Slovak wine sector is currently characterised by reduction of domestic production, which fell from 515 000 hl in 2004 to 294 000 hl in 2015. It is expected that this trend will continue. This situation opens the door to foreign producers. The share of imported wines in Slovak total supply of wine increased from 20% (2004) to around 65% (2012-2014). Slovak consumers prefer particularly table wines, but domestic production is mainly focused on high quality wines. As demand for domestic production is relatively small, part of the production is exported abroad. The value of exported wine is growing on average. The share of exported wine in the amount of domestic produced wine is very high. In 2015, as much as 75% of domestic wine production was exported (see Figure 1).

During the period 2004-2014, Slovak wine was exported into 52 countries. A significant portion of exports was carried out to European countries (e.g. Czech Republic, Germany, Hungary, Ukraine, Romania), but mainly to Czech Republic (85% of all exports). This is due the fact that Slovakia and Czech Republic share a common history as they were part of one state till 1993. Still, there is a very close economic relation between the two countries. 2.1% of export volume is oriented to Asian countries (e.g. China, Japan, Vietnam), and the rest is traded to American, African and Australian countries (e.g. US, Canada, Benin, Egypt, Australia and others).

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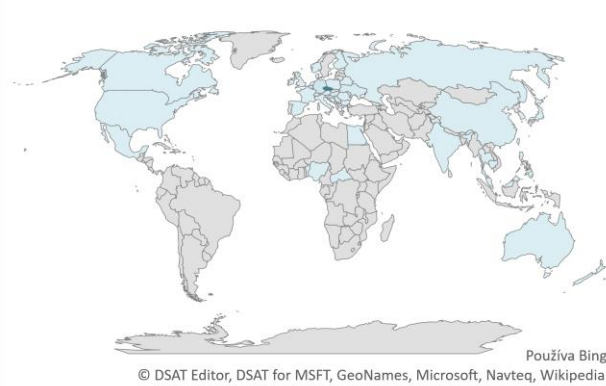
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Figure 1: Share of Slovak wine export in domestic wine production in thousands hl



Source: National Agricultural and Food Centre, Slovak Rep.

Figure 2: Geographic orientation of Slovak wine exports (2004-2014)



Note: Importing countries are colored blue.

Source: own calculation based on INTRASTAT Slovak Rep.

### Literature review

Decision to sell wine to foreign markets should be made with respect to characteristics of these markets. One method of identifying the factors stimulating foreign trade is the gravity model. Most studies using gravity model deal with the simulation of total foreign trade of countries: Wang, Wei, and Liu (2010) analyse bilateral trade flows in OECD countries; Pietrzak and Linska (2015) EU's determinants of trade; Wani, Dhani, and Rehman (2016) determinants of India's imports. A smaller number of studies is focused on foreign trade of specific commodities such as wine. For example, the study of Pinilla and Serrano (2012) highlights the role of trade policies in determination of Spanish table wine export possibilities; the analysis of Maurel (2009) indicates a significant role of business partnerships, innovation and greater size of French wine SMEs in positive development of their export performance; Balogh (2017) examined global wine trade flows and concluded that common cultural relations and trade agreements between trading partners lower the cost of wine export. Carlucci, De Blasi, Santeramo, and Seccia (2008) used the gravity model results to formulate recommendations for orientation of Italian wine production. They recommended that Italy should increase production of high quality wines, because there are favourable conditions for increasing exports of this segment, and should decrease production of table wines, whose international demand is falling. Koutroupi, Natos, and Karelakis (2014) analysed the competitiveness of Greek wines in the European market. According to them, the key factors of business success are the level of consumption per capita in the EU countries, the existence of common borders and use of a common language among the trading countries, and geographical range of mutual trading partners. One of the gravity model's basic variables, the distance between trade partners, is considered to be a trade barrier (Chang, Polachek, & Robst, 2004; Castillo, Villanueva, & Garcia-Cortijo, 2016).

However, Dal Bianco, Boatto, Caracciolo, and Santeramo (2014) found out that the effect of distance is not as strong in the wine sector as in other sectors. It is because wine has a long shelf life, and therefore, it does not create additional variable costs related to product's delivery speed. Moreover, the impact of transport costs and their proxy variable (distance) on development of trade relations is limited because it plays an increasingly significant role in product differentiation. Imported wines cannot be fully substituted, and consequently, the distant importers do not substitute wines imported from distant markets with wines of close business partners. Interesting results are given by the study of Lombardi, Dal Bianco, Freda, Caracciolo, and Cembalo (2016), who assessed intra-EU flows of world's major wine exporters: Italy, France and Spain. Authors found out that export of bottled wine and bulk wine was affected by the considered factors differently. For example, the negative impact of distance was grater in case of bulk wine than in case of bottled wine. In addition, official language significantly affected export of bottled wine but not bulk wine. This estimation result is supported by the fact that a label of bottled wine needs to include extensive information regarding the product, while no such constraint exists in case of bulk wine.

In this paper, we aim to find and evaluate factors affecting trade orientation of Slovak wine exports. In addition to other determinants, we will also consider the effect of agricultural policies. According OECD (2016), the main goal of current agricultural policies is to achieve a productive, sustainable and resilient global food system which is able to provide all consumers with reliable access to safe, healthy and nutritious food; to enable producers to operate in an open and transparent global trading system; and to contribute to sustainable productivity and to inclusive growth and development within and across countries. The EU has been heavily criticized for its agricultural policy that induced overproduction, export dumping and distorting of markets due to employing of trade tariffs. But on the other hand, EU members are signatories of many free (FTA) and regional (RTA) trade agreements. The FTAs can be used to negotiate a reduction of tariff and non-tariff barriers (Wesselink & Boschma, 2012; Dijoux, 2017), and they can be employed by countries to create competitive advantages for their export of goods. In this paper, the effect of agricultural policies on Slovak wine exports is determined by estimating the relationship between free trade agreements (of which Slovakia is a signatory) and the value of Slovak wine export. As published by Baier and Bergstrand (2007), the empirical results suggest that the effects of FTAs on trade flow estimated using standard cross-section gravity equation are biased. The best method to estimate the FTA effect is to employ differenced panel data, moreover, the authors proposed to add fixed and random effects into the model. However, the recent studies do not provide unambiguous evidence on positive effects of the free trade agreements on trade stimulation; as in case of Soloaga and Wintersb (2001), who investigated the potential of FTA between EU and EFTA. Hatab, Romstad, and Huo (2010) estimated the effect of RTA on Egypt's agricultural export and found out that the RTA variable was not significant but positive. The fact that a country is a member of RTA with Egypt did not influence its export volume. Eger (2004) states that FTAs are not expected to have a short-term effect on trade volumes, but in the long run, he predicted a 15% increase for NAFTA member countries.

## Methodology

The gravity model can be used for modelling the trading allocation of goods sent from exporting country ( $i$ ) to destination - importing countries ( $j$ ). The objective of this article is to identify determinants of Slovak wine export in the period 2004-2014 using the gravity model approach, and to determine effect of FTAs on wine exports.

In this period, Slovak wine was globally exported into 52 countries. To eliminate outliers, we exclude observations for countries, where export occurred only once. The final data set consists of observations for 42 countries. As a base, we use model developed by Carlucci, De Blasi, Santeramo, and Seccia (2008):

$$\ln Exp_{it} = \alpha_0 + \alpha \ln Prod_{it} + \beta \ln PcGDP_{it} + \gamma \ln Pop_{it} + \delta \ln Dist_{it} + \lambda Group_{it} + \varepsilon_{it} \quad (1)$$

Where:

Exp<sub>it</sub> – value of Italian wine exports to country  $j$  in year  $t$  in EUR (constant prices)

$\alpha_0$  – constant term

$Prod_{it}$  – production of Italian quality wine in year  $t$  in hl

$PcGDP_{jt}$  – GDP (gross domestic product) per capita of importing country  $j$  in year  $t$  in USD (constant prices)

$Pop_{jt}$  – population of importing country  $j$  in year  $t$  in mil. of inhabitants

$Dist_j$  – distance between importing country  $j$  and the exporting country  $i$  (Italy) in km

$Group_k$  – dummy variable, which takes the value 1 if country  $j$  belongs to group  $k$

$\varepsilon_{jt}$  – error term

We extend model (1) by including other variables, which are expected to influence Slovak wine exports. To identify the relationship of dependent variable and independent variables, we estimate several models. Then, we select the best fitting model. Criteria for evaluation of models are described later in this paper.

The gravity equation has a logarithmic form. In a given year, dependent variable (value of Slovak wine export) can reach zero values, but logarithm of 0 is not mathematically defined. One way to solve this problem is to add the constant 1 to all values of the dependent variable ( $Exp_{jt}+1$ ); such model remains balanced. The second method assumes omitting all observations with zero dependent variable,  $Exp_{jt} \neq 0$ , (Koren & Tenreyro, 2005). Hence, an unbalanced model is created.

The first estimated model (balanced model A) is a simple extension of a typical linear regression analysis to a panel data model, i.e. pooled regression model. It is an estimation method, where the heterogeneity of countries is not identified. The equation for model A is as following:

$$\ln Exp_{it} = \alpha_0 + \alpha \ln Prod_{it} + \beta \ln PcGDP_{it} + \gamma \ln Pop_{it} + \delta \ln Cons_{it} + \xi \ln Dist_{it} + \eta \ln RFE_{it} + \theta \ln SIM_{it} + \lambda_1 EU_{it} + \lambda_2 OECD_{it} + \lambda_3 WTO_{it} + \lambda_4 Curr_{it} + \lambda_5 FTA_{it} + \lambda_6 Hist_i + \lambda_7 Bord_i + \lambda_8 Lang_i + \varepsilon_{it} \quad (2)$$

Where:

$Exp_{jt}$  – value of Slovak wine exports to importing country  $j$  in year  $t$  in EUR (constant prices)

$\alpha_0$  – constant term

$Prod_{it}$  – production of Slovak wine in year  $t$  in 1000 hl

$PcGDP_{jt}$  – GDP per capita of importing country  $j$  in year  $t$  in USD (constant prices)

$Pop_{jt}$  – population of importing country  $j$  in year  $t$  in mil. of inhabitants

$Cons_{jt}$  – consumption per capita of importing country  $j$  in year  $t$  in litres

$Dist_j$  – distance between importing country  $j$  and the exporting country  $i$  in km

$RFE_{jt}$  – relative factor endowments between the trading countries  $i$  and  $j$

$SIM_{jt}$  – similarity index of the trading countries  $i$  and  $j$

$EU_{jt}$ ,  $OECD_{jt}$ ,  $WTO_{jt}$  – dummy variable, which takes the value 1 if a country pair  $ij$  belongs to these organizations

$Curr_{jt}$  – dummy variable, which takes the value 1 if a country pair  $ij$  has a common currency

$FTA_{jt}$  – dummy variable, which takes the value 1 if the country pair  $ij$  has a signed free trade agreement

$Hist_j$  – dummy variable, which takes the value 1 if a country pair  $ij$  has a common territorial history

$Bord_j$  – dummy variable, which takes the value 1 if a country pair  $ij$  has a common state border

$Lang_j$  – dummy variable, which takes the value 1 if a country pair  $ij$  has a common language base

$\varepsilon_{jt}$  – error term

$\alpha - \eta$ ;  $\lambda_1 - \lambda_8$  – the sensitivity change of the dependent variable to changes in independent variables.

The second estimated model (mode B) is unbalanced pooled regression model with the same equation as for model A (2).

According to studies done on the topic of international trade, e.g. De Blasi, Seccia, Carlucci, and Santeramo (2007), to capture unobserved heterogeneity, it is suggested to consider adding fixed effects into the panel model. Here, country-specific effects or time effects can be considered. These effects could have a fixed or a random characteristic. The Hausman test was performed to define whether the supposed effects are random or fixed. A presence of fixed effects in the panel data was determined. For this reason, we estimate also models C-F with fixed effects.

The balanced model C and the unbalanced model D include country-specific fixed effects and are explained in equation 3:

$$\ln Exp_{it} = \alpha_0 + \alpha \ln Prod_{it} + \beta \ln PcGDP_{it} + \gamma \ln Pop_{it} + \delta \ln Cons_{it} + \xi \ln RFE_{it} + \eta \ln SIM_{it} + \lambda_1 EU_{it} + \lambda_2 OECD_{it} + \lambda_3 WTO_{it} + \lambda_4 Curr_{it} + \lambda_5 FTA_{it} + \varepsilon_{it} \quad (3)$$

It should be noted that non-time varying variables cannot be estimated in a model with country-specific fixed effects. Because of that, variables common language base, common territorial history, common state borders and distance between trade partners had to be excluded from models C and D. Models E (balanced) and F (unbalanced) include both country-specific and time fixed effects. Because of the presence of time-specific fixed effects, also non-country varying variable production of country  $i$  had to be excluded from the model. Final models E and F are defined by the equation 4:

$$\ln Exp_{it} = \alpha_0 + \alpha_1 \ln PcGDP_{it} + \beta \ln Pop_{it} + \gamma \ln Cons_{it} + \delta \ln RFE_{it} + \xi \ln SIM_{it} + \lambda_1 EU_{it} + \lambda_2 OECD_{it} + \lambda_3 WTO_{it} + \lambda_4 Curr_{it} + \lambda_5 FTA_{it} + \varepsilon_{it} \quad (4)$$

All fixed-effects models were estimated by OLS, and dummy variables for all partner countries and years (LSDV) were included. The best fitted model was selected by comparing the following characteristics (König & Schulze, 2008):

- Measure of adjusted R-squared coefficient; the higher is the coefficient, the more variability in dependent variable is explained through the model.
- Mean square error (MSE), where the better model is the one with lower MSE.
- Akaike information criterion (AIC), where the model with the lower AIC is the better one.

### Description of variables

In this chapter, we characterised variables selected to explain the development of Slovak wine exports. Independent variables were selected in accordance with the results of related studies and considering the current situation in the Slovak wine market.

Due to the orientation of Slovak consumers on table wines, which are mostly imported, we assume that changes in domestic wine production affect the size of its export. Therefore, we estimate the impact of variable *Prod* on Slovak wine exports.

GDP per capita of importing country represents the income elasticity of foreign demand for Slovak wine. We expect that an increase in income of importing countries affects the size of Slovak wine export positively. We also expect a positive effect of increase in population and increase in wine consumption of these countries on Slovak wine exports.

Regarding the variable *Dist*, trade theory largely assumes that distance between business partners influences trade among countries negatively. On the other hand, the strength of this relation may be limited due to type of the commodity traded, as reported by some studies.

Slovakia is a member of international organizations that have formed a legislative framework within which the implementation of business activities occurs. These rules can have a stimulating effect on trade when simplifying business operations between member states. Additionally, the membership creates economic connections that can lead to strengthening of trade relations. However, we can assume that trade with non-member countries is to some extent restricted.

Other variables with an expected influence on the Slovak wine export are common territorial history, common national borders and common language elements of trading countries, common currency and country membership in international organizations. We want to determine whether these factors influence the Slovak wine export positively, and therefore, which countries it is advantageous for Slovak exporters to focus on.

Indexes *RFE* and *SIM* represent the rate of economic similarity between the exporting country and importing countries. *RFE* coefficient is a proxy for the level of country's equipment with production factors. If *RFE* has the value of 0, country  $i$  and country  $j$  show the same level of equipment with production factors.

The higher the *RFE*, the greater the difference in country's equipment with production factors. We assume that the differences in production factors' equipment motivate countries to mutual trade. For calculating *RFE*, we use equation introduced by Baltagi, Egger, and Pfaffermayr (2003):

$$RFE_{ijt} = |\ln PcGDP_{it} - \ln PcGDP_{jt}| \tag{5}$$

*SIM* index determines the similarity between *i* and *j* in size of their economy measured by GDP (Kabir & Salim, 2010):

$$SIM_{ijt} = 1 - \left( \frac{\ln GDP_i}{\ln(GDP_i + GDP_j)} \right)^2 - \left( \frac{\ln GDP_j}{\ln(GDP_i + GDP_j)} \right)^2 \tag{6}$$

*SIM* index takes values from 0 to 0.5, where the value of 0.5 means that the size of the trading countries' economy is the same, and 0 indicates the absolute difference in the size of economy.

FTA represents the free trade agreements between countries that signed such agreement. Considering the results of some studies, we expect a slightly positive sign of the FTA coefficient, which would mean that Slovak wine exports between the member states improved.

The source of data on population and GDP of each country is the World Bank database. Wine consumption per capita of importing countries is drawn from data portal Wineinstitute.org. Distance between Slovakia and importing countries was calculated based on the air distance between their capital cities. Data on the Slovak wine production is obtained from Eurostat, and data on value of the Slovak wine exports from INTRASTAT database of the Slovak Republic. The list of FTAs is obtained from RTA database of the World Trade Organization.

**Results**

As mentioned in the Methodology, we estimated 6 models, which, under different conditions, describe the relationship between the Slovak wine exports in the period 2004-2014 and factors affecting its value. In Table 1 we summarise the characteristics of estimated models, and we list the order according to their suitability to explain the variability of the dependent variable.

In summary, the unbalanced models are more suitable to describe variability of the dependent variable. The best model is the unbalanced model F with fixed effects, which consist of both country-specific and time-specific effects. Based on the value of adjusted determination coefficients, we can say that the model and selected determinants explain variability of the dependent variable to 68.44%. The Durbin-Watson statistic tests the residuals to determine if there is any significant correlation based on the order in which they occur in the data file. Since the P-value is greater than 0.05, there is no indication of serial autocorrelation in the residuals at the 95.0% confidence level.

Table 1: Comparison of estimated models according to selected criteria

model	type*	rank	AIC	adj. R <sup>2</sup>	MSE
A	bal (pooled)	6	291.808	25.824	17.49
B	unbal (pooled)	3	202.237	33.585	7.143
C	bal (country FE)	5	268.096	41.513	13.80
D	unbal (country FE)	2	132.113	67.060	3.543
E	bal (country, time FE)	4	267.434	41.839	13.70
F	unbal (country, time FE)	1	127.378	68.584	3.379

\*bal – balanced model  
 unbal – unbalanced model  
 FE – fixed-effects model

Source: own calculation

With exception of 4 coefficients, the coefficients of country-specific fixed effects are significant at the 99.0% confidence level. The estimated equation for model F (7) and model's estimation results (Table 2) are shown below<sup>1</sup>:

$$\ln Exp_{it} = 56.1874 - 3.7408 \ln PcGDP_{it} - 4.0381 \ln Pop_{it} + 2.5889 \ln Cons_{it} - 0.279 \ln RFE_{it} - 6.012 \ln SIM_{it} + 1.7969 EU_{it} + 3.2888 OECD_{it} - 2.071 WTO_{it} - 0.6433 FTA_{it}$$

(7)

Table 2: Regression results, model F

Parameter	Estimate	Standard Error	T Statistic	P-Value	Significant
Constant	56.1874	16.6479	3.3751	0.0009	***
GDP per capita	-3.7408	1.8232	-2.0518	0.0419	**
Consumption	2.5889	0.6692	3.8690	0.0002	***
Population	-4.0381	1.3487	-2.9942	0.0032	***
RFE	-0.2794	0.2347	-1.1905	0.2357	
SIM	-6.0126	1.8316	-3.2827	0.0013	***
EU	1.7969	1.5759	1.1402	0.2560	
OECD	3.2888	2.7608	1.1913	0.2354	
WTO	-2.0710	1.1643	-1.7787	0.0773	*
FTA	-0.6433	0.9955	-0.6462	0.5191	

R-squared = 77.3068 percent  
R-squared (adjusted for d.f.) = 68.4399 percent  
Standard error of est. = 1.84233  
Mean absolute error = 1.14152  
Durbin-Watson statistic = 2.06349 (P=0.6771)  
Lag 1 residual autocorrelation = -0.0317808  
Significant: \*\*\* at 1%; \*\* at 5%; \* at 10%

Source: own calculation

GDP per capita represents the income elasticity of foreign demand for the Slovak wine. The estimated coefficient of the variable is significant at a significance level of 95%; we can say that one percent increase in GDP per capita of the importing country would cause a decline in the value of Slovak wine exports by 3.74%, ceteris paribus. It points to the fact that foreign consumers perceive Slovak wines as inferior goods. This could be related to further result that even the increase in population of importing countries did not have a positive impact on the Slovak wine exports value. Compared to our assumptions, this fact is surprising. An explanation could be that in bigger countries, there is usually a wider range of wine products, which people can choose from, and it is likely that foreign consumers preferred other than Slovak wines more.

Based on the estimation we can say that an increase in wine consumption per capita of importing countries increased the value of wine exports from Slovakia.

In 2004, there was a relatively large expansion of the European Union. The expectation was that this situation would affect Slovak wine exports positively. However, the results show that the EU membership of Slovak trade partners did not affect the changes in Slovak wine exports significantly. Moreover, the variable common currency (*Curr*) in the European Monetary Union (EMU) was finally eliminated from the model due to the high insignificance of its coefficient.

<sup>1</sup>Coefficients of the fixed effects are omitted. In the equation 7, a simplified model is presented (the most insignificant variables were eliminated from the model).

We can say at the 90.0% confidence level that membership of trading partners ( $i$  and  $j$ ) in the WTO did not influence the Slovak wine exports positively. Comparable results were determined also in the study of Lissovolik and Lissovolik (2004). According to them, some of the exporting countries tend to export more to non-WTO countries than to WTO countries. However, to be able to explain these facts better, it is needed to explore the issue further and in more detail.

*RFE* index indicating the level of country's  $i$  and  $j$  equipment with factors of production is not significant. On the contrary, the index of similarity is highly significant, i.e., the differences in size of the Slovak economy and economies of its trading partners encouraged the Slovak wine exports. Countries that in terms of economy size differ from Slovakia the most are the US, Japan, Germany, China, Malta, France and the United Kingdom. Empirical data in the observed period confirm results of the estimated model, where the value of exports to mentioned countries exceeded the value of exports to countries with similarity index close to 0.5 (excluding the Czech Republic that in this case is considered an outlier).

Given the fact that the most suitable model to describe relationship between the dependent and independent variables is the model with both country-specific and time-specific fixed effects, it was not possible to examine the effect of time and country non-varying variables: common language base, shared territorial history, common national borders and distance between trading partners and Slovakia.

## Conclusion

The aim of this paper was to identify the determinants of Slovak wine export to 42 countries worldwide in the period 2004-2014 using the gravity model approach, and to determine the effect of FTAs. We found out that most suitable, in terms of the goal of this paper, are unbalanced panel models with fixed effects.

As expected, the growth of wine consumption per capita of the importing countries has resulted in an increase of the Slovak wine exports. This means that for Slovak exporters it is necessary to monitor the preferences of foreign consumers and to focus on markets that have the potential to absorb the additional supply.

A surprising result is that Slovak wines are considered inferior goods by foreign consumers. It is likely that countries where income per capita grew faster would gradually reduce the consumption of Slovak wines. Therefore, it is preferable to direct the wine exports to countries with stable incomes than to faster growing economies. On the other hand, Slovak wine producers should look for ways how to make the wine product more attractive in the eyes of foreign consumers, or how to increase its added value. Moreover, with appropriate marketing tools, it is desirable to stimulate the interest of domestic wine consumers too. For example, through organization of wine roads and wine tourism globally, tastings and through partaking in national and international exhibitions in order to win awards that would make the product more attractive for buyers.

Using the best model estimated, we were unable to identify a significant impact of membership in the EU and EMU on the value of exported wine. We also found out that Slovak wine exporters tend to trade more with countries with different sized economies such as Germany, USA, United Kingdom, China and Japan.

We did not find any evidence of impact of free trade agreements signed by the Slovak Republic on the value of wine exported to member states. The reason may be that the period was too short for the FTA's effect to manifest itself.

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## References

Baier, S. L., & Bergstrand, J. H. (2007). Do free trade agreements actually increase members' International trade? *Journal of International Economics*, 71(1), 72-95. DOI: 10.1016/j.jinteco.2006.02.005



- Balogh, J. M. (2017, June). How can wine trade costs be characterised between culturally similar trading partners? Paper presented at the *XXIV EuAWE Conference in Bologna, Italy*. Retrieved from [http://www.vdqs.net/2017Bologna/DOCUMENTS/Publications/text/3A\\_Balogh.pdf](http://www.vdqs.net/2017Bologna/DOCUMENTS/Publications/text/3A_Balogh.pdf)
- Baltagi, B. H., Egger, P., & Pfaffermayr, M. (2003). A generalized design for bilateral trade flow models. *Economics Letters*, 80(3), 391–397. DOI: 10.1016/S0165-1765(03)00115-0
- Carlucci, D., De Blasi, G., Santeramo, F. G., & Seccia, A. (2008). *New challenges and opportunities for Italian exports of table wines and high quality wines* (MPRA Paper No. 8728). Retrieved from [http://mpra.ub.uni-muenchen.de/8728/1/MPRA\\_paper\\_8728.pdf](http://mpra.ub.uni-muenchen.de/8728/1/MPRA_paper_8728.pdf)
- Castillo, J. S., Villanueva, E. C., & Garcia-Cortijo, M. (2016). The International Wine Trade and Its New Export Dynamics (1988–2012): A Gravity Model Approach. *Agribusiness*, 32(4), 466-481. DOI: 10.1002/agr.21463
- Chang, Y.-C., Polachek, S.W., & Robst, J. (2004). Conflict and trade: The relationship between geographic distance and international interactions. *Journal of Socio-Economics*, 33(4), 491–509. DOI: 10.1016/j.socec.2004.04.004
- Dal Bianco, A., Boatto, V., Caracciolo, F., & Santeramo, F. G. (2014). *Tariffs and non-tariff frictions in the world wine trade* (Working Paper No. 61813). Retrieved from [https://mpra.ub.uni-muenchen.de/61813/1/MPRA\\_paper\\_61813.pdf](https://mpra.ub.uni-muenchen.de/61813/1/MPRA_paper_61813.pdf)
- De Blasi, G., Seccia, A., Carlucci, D., & Santeramo, F. G. (2007, March). Analysis of Italian high quality wine exports using the gravity model approach. Paper presented at the 105th EAAE Seminar *International Marketing and International Trade of Quality Food Products*. Retrieved from <http://ageconsearch.umn.edu/record/7901/files/cp070026.pdf>
- Dijoux, S. R. (2017). *Developing intra-regional exchanges through the abolition of commercial and tariff barriers*. Brussels, Belgium: Peter Lang.
- Egger, P. (2004). Estimating regional trading bloc effects with panel data. *Review of World Economics*, 140(1), 151-166. Retrieved from <https://link.springer.com/content/pdf/10.1007%2FBF02659714.pdf>
- Hatab, A. A., Romstad, E., & Huo, X. (2010). Determinants of Egyptian agricultural exports: A gravity model approach. *Modern Economy*, 1(3), 134-143. DOI: 10.4236/me.2010.13015
- Kabir, M., & Salim, R. (2010). Can gravity model explain BIMSTEC's trade? *Journal of Economic Integration*, 25(1), 144-166. Retrieved from <http://www.ejei.org/upload/W17332525G5054V7.pdf>
- Koren, M., & Tenreyro, S. (2005). *Volatility and development* (CEP Discussion Paper No. 706). Retrieved from [http://eprints.lse.ac.uk/3743/1/Volatility\\_and\\_Development.pdf](http://eprints.lse.ac.uk/3743/1/Volatility_and_Development.pdf)
- Koutroupi, E., Natos, D., & Karelakis, Ch. (2015). Assessing exports market dynamics: The case of Greek wine exports. *Procedia Economics and Finance*, vol. 19, 184-192. DOI: 10.1016/S2212-5671(15)00020-9
- König, J., & Schulze, P. M. (2008). *Zur Analyse rheinland-pfälzischer Exportemittels Gravitations model* (Working Paper No. 34). Retrieved from [http://www.statoek.vwl.uni-mainz.de/Dateien/Arbeitspapier\\_Nr\\_34\\_Gravitationsmodell.pdf](http://www.statoek.vwl.uni-mainz.de/Dateien/Arbeitspapier_Nr_34_Gravitationsmodell.pdf)
- Lissovolik, B., & Lissovolik, Y. (2004). *Russia and the WTO: The “gravity” of outsider status* (Working Paper No. WP/04/159). Retrieved from <https://www.imf.org/external/pubs/ft/wp/2004/wp04159.pdf>
- Lombardi, P., Dal Bianco, A., Freda, R., Caracciolo, F., & Cembalo, L. (2016). Development and trade competitiveness of the European wine sector: A gravity analysis of intra-EU flows. *Wine Economics and Policy*, 5(1), 50-59. DOI: 10.1016/j.wep.2015.12.002
- Maurel, C. (2009). Determinants of export performance in French wine SMEs. *International Journal of Wine Business Research*, 21(2), 118-142. DOI: 10.1108/17511060910967971
- OECD. (2016). Declaration on better policies to achieve a productive, sustainable and resilient global food system. Retrieved from <https://www.oecd.org/agriculture/ministerial/statements/>
- Pietrzak, M. B., & Lapinska, J. (2015) Determinants of the European Union's trade – evidence from a panel estimation of the gravity model. *Ekonomie a Management*, 18(1), 18-27. DOI: 10.15240/tul/001/2015-1-002

- Pinilla, V., & Serrano, R. (2008). The agricultural and food trade in the first globalization: Spanish table wine exports 1871 to 1935 – A case study. *Journal of Wine Economics*, 3(2), 132-148. DOI: 10.1017/S1931436100001176.
- Soloaga, I., & Wintersb, L. A. (2001). Regionalism in the nineties: What effect on trade? *The North American Journal of Economics and Finance*, 12(1), 1-29. DOI: 10.1016/S1062-9408(01)00042-0
- Wang, C., Wei, Y., & Liu, X. (2010). Determinants of bilateral trade flows in OECD countries: evidence from gravity panel data models. *The World Economy*, 33(7), 894-915. DOI: 10.1111/j.1467-9701.2009.01245.x
- Wani, N. U. H. W, Dhama, J. K., & Rehman, A. U. (2016). *The determinants of India's imports: a gravity model approach* (Working Paper No. 74700). Retrieved from [https://mpra.ub.uni-muenchen.de/74700/1/MPRA\\_paper\\_74700.pdf](https://mpra.ub.uni-muenchen.de/74700/1/MPRA_paper_74700.pdf)
- Wesselink, E., & Boschma, R. (2012). *Overview of the European neighbourhood policy: its history, structure, and implemented policy measures* (Working Paper No. WP1/04). Retrieved from <http://www.ub.edu/searchproject/wp-content/uploads/2012/02/WP-1.4.pdf>