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Are the major European wine exporters able to price discriminate across their EU extra wine export destinations?

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Are the major European wine exporters able to price discriminate across their EU extra wine export destinations?

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Abstract

In recent decades, New World has increased its wine export to European markets and became considerable in the global wine competition. However, the export share of traditional wine producers has decreased; Europe still remained market leader on world wine market. Moreover, the global wine market is characterised by progressively concentrated production, France, Italy and Spain accounting for about 50% of world wine production. Consequently, it is important to investigate what kind of pricing strategy the largest wine exporters of the world including France, Italy, Spain, Portugal and Germany can employ in their foreign wine export markets. The pricing behavior of five European wine exporters in their major destination markets is examined using a pricing-to-market (PTM) model for noncompetitive and exchange rate related pricing behaviour between 2000 and 2013. The results suggest that France and Italy were able to pursue price discrimination in many wine export destinations by contrast this advantage was not observable in a case of Spain, Portugal and Germany. The analysis of the asymmetric effects of exchange rates on wine export prices suggests that in many cases the depreciation of Australian, Hong Kong's; Singapore's dollar relating to euro had a greater impact than the appreciation while appreciation of Canadian and Singaporean dollar exceeded the effect of depreciation.

JEL: Q17, F13, F14

Keywords: price discrimination, pricing to market (PTM), wine industry

Képesek-e az európai vezető bortermelők árdiszkriminációt alkalmazni az EU-n kívüli borexport-piacaikon?

Fertő Imre, Balogh Jeremiás Máté

Összefoglaló

Az utóbbi évtizedben a világ borpiacán jelentős változások figyelhetők meg. Az újvilági bortermelő országok jelentős mértékben növelték borexportjukat az európai piacokon és jelentős erőfölényre tettek szert a globális borpiaci versenyben is. Ezzel összhangban az európai, tradicionális bortermelők exportrészesedése folyamatosan csökkent a világpiacon. Jóllehet az európai borexportőrök még továbbra is versenyképesek maradtak, az újvilági országok borexport-részesedése folyamatosan növekszik. Emellett megállapítható, hogy a világ borpiaca erősen koncentrált, a termelés közel 50 százaléka Franciaországra, Olaszországra és Spanyolországra korlátozódik. A tanulmányban öt nagy európai bortermelő ország árazási viselkedését vizsgáljuk meg a legfontosabb exportpiacaikon a piaci árazás modelljének (PTM) segítségével 2000 és 2013 között. Eredményeink szerint Franciaország és Olaszország képes árdiszkriminációt gyakorolni több borexport piacán, ezzel ellentétben Spanyolország, Portugália és Németország esetében a piaci dominancia nem volt megfigyelhető. A valutaárfolyamok borexportárakra gyakorolt aszimmetrikus hatásainak az elemzése kapcsán megállapítható, hogy az ausztrál, a hongkongi és a szingapúri dollár euróárfolyamhoz képest mért leértékelődésének hatása magasabb volt, mint a helyi valuták felértékelődése.

JEL: Q17, F13, F14

Tárgyszavak: piaci árazás modellje (pricing to market – PTM), borexport, európai bortermelők, aszimmetrikus hatás

INTRODUCTION

Significant changes have taken place in the world wine market in recent decades. First, New World wine producer countries have increased their wine export to European markets and they became considerable market players. Second, the export share of European wine producers has decreased simultaneously, however, despite the strong competition of New World winemakers, the traditional wine producing countries still remain the largest suppliers and play important role at the global market. Third, the world wine market is characterised by progressively concentrated production.

According to the British Liv-ex Fine Wine Index, 84 of the 100 most famous wine brands in the world are French. The 12 leading wine-growing countries account for 84% of worldwide production, estimated at 247 million hectolitres. France, Italy and Spain have been alternating in first place, together accounting for about 50% of world wine production (BNP Paribas, 2015). On the other hand the concentration in the wine industry differs across countries. However, in New World producers the wine industry is much more concentrated than in Old World producers, in France, Spain or Italy, the first 8 largest firms represent 30% of the total country production (Coelho and Couderc, 2006, p. 15).

In the Old World one-eighth of sales are from the four largest firms and the large publicly listed firms dominate the wine markets of New World (Anderson and Nelgen, 2011, p. 30). Consequently the major traditional European wine exporters enjoy market power in New World. In addition, New World countries import notable wine from the top European wine exporters, for example USA import more than 45% of its wines from Europe. Based on these facts, it important to analyse that? Are the European wine exporters able to exploit its market power at the New World market? What are the characteristics of these wine export markets?

The main aim of the study is to investigate the pricing behaviour of the major European wine exporters (France, Italy, Spain, Portugal and Germany) in the New World market between 2000 and 2013. There are three specific objectives for the paper. First, whether European exporters are able to price discriminate across various markets. Second, we analyse the nature of price discrimination, whether it is market specific or exchange rate influenced, or both. Finally, we investigate the asymmetric effects of exchange rate changes on export prices.

A number of empirical studies have been conducted based on the PTM model in international trade literature. On the other hand, these models are quietly missing in wine trade that is why we focus on the literature of agri-food trade. Early empirical PTM studies focused on manufactured goods and there has been limited research on agro-food products (Pick and Park, 1991; Lavoie, 2005; Jin, 2008; Pall et al., 2014; Pall et al., 2013).

Krugman (1986) used US-German trade data and concludes that PTM occurs but its research was limited to transportation equipment and machinery industries. Consequent work by Knetter (1993) suggested that PTM altered between industries and exporting countries. However, policy-makers have become increasingly interested in pricing behaviour in agri-food trade (Gafarova et. al., 2015; Varma-Issar, 2016; Pall et al., 2014) as well, the OECD (2013 p. 29) notes that competition issues in the food sector are complex and require further research.

Articles applying PTM models in agri-food industries refer to commodity or manufactured products. PTM studies on agri-food commodity products incorporate grain products such as Japonica rice (Griffith and Mullen, 2001), Canadian wheat (Lavoie, 2005), Russian wheat export (Pall et al., 2014) as well as the analysis of wheat export in Kazakhstan, Russia and Ukraine (Gafarova et al., 2015) and in the European Union (Dawson et al., 2014).

As concerns the processed products, the PTM research investigated the US meet sector (Saghaian and Reed, 2004) and German beer industry (Fedoseeva and Werner, 2016).

By contrast, the monopolistic competition and potential market power of wine sector are not investigated in the international trade literature; especially in case of major European wine exporters.

METHODOLOGY

Krugman (1987) introduced the model of price discrimination induced by changes in bilateral exchange rates called pricing to market (PTM). The perfect competition assumes that prices equal marginal cost (p=MC). On the contrary, in the case of imperfect competition prices are not always equal marginal cost (p≠MC). If the exporting country's currency depreciates, import prices do not change equivalently and thus, relative world prices can be affected. As a result, the export price implicitly contains a destination-specific mark-up over marginal cost; exporters can charge the importing countries based on their demand characteristics (Pall et al., 2013).

Pricing to market (PTM) refers to the "destination-specific adjustment of mark-ups in response to exchange-rate changes" Knetter (1993, p. 473). This implies that currency changes are not fully transmitted into export prices with divergent movements in different markets (Krugman, 1986).

The price discrimination can be considered as the optimal decision of a profit maximising exporter. A profit maximising exporter has a chance to exercise price discrimination in an import market only when the importer's residual demand elasticity is inelastic. Otherwise, in the case of elastic residual demand, price discrimination cannot occur (Goldberg and Knetter, 1997; 1999).

The PTM model has received considerable attention as it tests whether exporters can differentiate their prices between destinations markets, providing an insight into the degree to which trade is characterised by a lack of convergence in market prices across export markets (Krugman, 1986; Jin, 2008).

To investigate the relationship between export prices and destination specific exchange rates and to determine the presence of price discrimination in international trade, we employ the PTM model developed by Krugman (1987). The regression equation for pricing to market model can be calculated as follow (Knetter, 1993):

$$lnPit= \beta i \ lnERit + \theta t+\lambda i+ uit \qquad i=1,\ldots,N \ t=1,\ldots,T \qquad (1)$$

where lnPit is the wine export unit value in euro to importing country i in period t in logarithm form, lnERit represents the destination-specific exchange rates expressed as units of the domestic currency in euro in logarithm form,
θt are common time-specific effects,
λi are country-specific effects,
βi are the PTM-coefficients or the elasticity of the export price with respect to exchange rate changes.

Since the model is estimated in logarithmic terms, represents the elasticity of the domestic currency export price with respect to the exchange rate. The estimated parameters βi and λi can be used to distinguish between different scenarios of export pricing behaviour (Knetter, 1993), see Table 1. If the estimated coefficients (βi and λi) are statistically significant, imperfect competition and price discrimination across destination countries exist (PTM effects occur). As follows two different case of price discrimination can be distinguished.

The first one assumes a constant elasticity of demand with respect to the domestic currency price in each importing country leading to constant mark-up over marginal cost (βi= 0). This mark-up can differ across destination countries, which implies λi≠0. The country effect variable (λi) captures the constant quality differences. Therefore, a significant estimate of the country effect (λi≠0) does not necessarily indicate imperfect competition. The second case of PTM behaviour is that the optimal mark-up by a price-discriminating entity varies across destinations (λi≠0) with changes in bilateral exchange rates (βi≠0).

Table 1

Relationship between estimated parameters and different market scenarios

λi	**βi**	**Market scenarios**
Not significant	Not significant	Perfect competition, imperfect competition with common mark-up
Significant	Not significant	Constant elasticity of demand higher than constant mark-up, which can differ across countries
Significant	Significant	Varying elasticity of demand higher than varying mark-up, which can differ across countries (imperfect competition)
	Positive	Amplification of exchange-rate effects (PTM effects)
	Negative	Local-currency price stability (LCPS) higher than PTM effects

Source: Knetter (1993)

In addition, Knetter (1993) distinguishes between a positive (βi>0) versus a negative (βi<0) coefficients of exchange rates (βi). A negative βi coefficient implies that exporters do not pursue a constant mark-up policy, but rather stabilise prices in the buyer currency (indicating behaviour of local-currency price stability - LCPS). Otherwise, a positive βi coefficient signals that exporters intensify the effect of destination-specific exchange-rate changes through destination-specific changes in the mark-up. If both, country effects (λi≠0) and destination-specific exchange-rate changes (βi≠0) are significant plus exchange rate effects are positive (βi>0) it signal PTM effect and imply that exporter country is able to price discriminate on their export destinations.

The equation (1) could be re-specified to test for asymmetries in the response of export prices to exchange rate changes. Interaction terms of the dummy variable with the exchange rate can be included in the model to capture the differential impact of appreciation and depreciation (Knetter, 1993; Vergil, 2011). The interaction of the dummy variable with the exchange rate is specified as follows:

$$Et = (\beta 1 + \beta\alpha 2\ Dt\ )Et = \beta 1\ Et + \beta 2\ Dt \times Et \qquad (2)$$

A dummy variable assumes a value of 1 for periods of appreciation (a fall in Et) and 0 for periods of depreciation and is specified in the following manner:

$Dt = 1$ *if* $\Delta Et > 0$ (i.e. the appreciation of the exporter's currency);
$Dt = 0$ if $\Delta Et < 0$ (i.e. depreciation of the exporter's currency).

Accordingly, equation (1) can be specified as follows:

$$ln\ pit = \theta t + \lambda i + \beta 1\ (ln\ e1t\ ) + \beta 2\ (ln\ e2t\ ) + uit \quad (3)$$

$$ln\ pit = \theta t + \lambda i + \beta 1\ (ln\ e1t\ ) + \beta 2\ (ln\ e2t \times Dt\ ) + uit \quad (4)$$

In the equation (3) and (4), the interaction term is expressed to capture asymmetry in the exchange rate fluctuations. If its coefficient is statistically significant and has a positive sign, the effect of appreciation of exporter's currency exchange rates on export prices is greater than in depreciation. Similarly, a negative significant coefficient implies that the effect of depreciation of exchange rates on export prices is greater than appreciation (Byrne et al., 2010).

Our sample comprises monthly wine export panel data of top 5 European wine exporters for EU extra wine export destination markets, from January 2000 to December 2013. The strongly balanced panel includes a number of export destination countries and 14 years period. The wine export data of the analysis derived from EUROSTAT international trade database in HS 6-digit level, product code 2204211 given in Euro and in kg. Exchange rates come from the European Central Bank, Statistical Data Warehouse database (local foreign currency in euro). The wine export prices (lnxuv) as dependent variables are represented by wine export unit value (euro/kg) and the exchange rates expressed as units of the importer's currency per unit of the exporter's currency (lnxrate).

EMPIRICAL RESULTS

Regarding the EU-27 major wine exporter countries, France, Italy, Spain, Germany and Portugal had the highest export share comparing to EU-27 extra wine trade, between 2000 and 2013. The top 5 market leaders in the EU represented 91% of EU-27 total wine export targeted to the EU extra markets during the analysed period (Table 2). These countries can be considered as the largest European wine producers and exporters, especially France at 42% and Italy at 30% at export share

[1]wine of fresh grapes, incl. fortified wines, and grape must whose fermentation has been arrested by the addition of alcohol, in containers of smaller than 2 litre, excl. sparkling wine

Table 2

Wine export share of major European wine exporters, 2000-2013

Wine exporter country	Export share in EU-27 extra wine export (%)
France	42%
Italy	30%
Spain	10%
Germany	5%
Portugal	4%
Total	91%

Source: own composition based on EUROSTAT (2015) database

Based on the sample data the United States, Canada, Switzerland, Japan, Hong Kong and China can be entitled as the largest European (EU-27) wine export destinations during the analysed period (Table 3). These destinations represented the 87% of the EU-27 extra wine export. Table 3 illustrates that vast amount of European wine was shipped mainly to long distance and Asian countries such as USA, Canada, Hong Kong and China.

Table 3

The top 10 largest EU extra wine export destination of EU-27, 2000-2013

Export destinations	Export share in EU-27 extra wine export
United States	36%
Canada	11%
Switzerland	11%
Japan	11%
Hong Kong	5%
China	5%
Russia	4%
Norway	3%
Brazil	1%
Singapore	1%
Total	87%

Source: own composition based on EUROSTAT (2015) database

Regarding the wine export share across destination markets, we can conclude that USA, Canada, Switzerland and Japan were the biggest demand market for European wines (Table 4).

Table 4

Wine export share by export destinations, in per cent, 2000-2013

Export destination	France	Italy	Spain	Portugal	Germany
Australia	1%	1%	1%		1%
Canada	14%	14%	11%	31%	7%
Hong Kong	9%	1%	1%		
Japan	20%	7%	8%	4%	12%
Malaysia	0%				
Mexico	1%	1%	9%		
Norway		3%	5%	5%	14%
Philippines		0%	1%		
Russia	2%	2%	3%		11%
Singapore	2%	0%	0%		1%
South Africa		0%			
Switzerland	12%	13%	22%	14%	10%
Thailand	1%	0%			
United States	37%	58%	39%	46%	45%
Total	100%	100%	100%	100%	100%

Source: own composition based on EUROSTAT (2015) database

Table 5 shows those wine export destinations that imported notable wine from top 5 European wine exporters. 43.1 % of US, 14.2 % of Japanese, 10.8% of Canadian and 12.5% of Swiss wines were imported from the top European wine producers. French and Italian wines have a dominant role in the USA (with import market share at 18%) and they are moderately present in Japanese and Swiss wine market. Spain has only 10 % import market share in importer countries. Finally, we can conclude that the German and Portuguese wines were less significant in these export destinations.

This result confirms the relevance of our research question and the problem to be investigated. In the following part, we test the convergence of panel data and seek to investigate whether European wine exporters can price discriminate across its export destinations and how the competition can be characterised in these markets (market structure).

Table 5

The wine import of destination countries from top 5 European wine producers, in percent, 2000-2013

Wine importers	France	Italy	Spain	Portugal	Germany	Total
Australia	1.6%	0.4%	0.1%	0.0%	0.0%	2.2%
Canada	5.1%	3.8%	0.9%	0.6%	0.4%	10.8%
Hong Kong	2.4%	0.2%	0.1%	0.0%	0.1%	2.8%
Japan	10.5%	2.3%	0.9%	0.1%	0.4%	14.2%
Malaysia	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%
Mexico	0.4%	0.2%	0.6%	0.0%	0.1%	1.3%
Norway	1.3%	1.1%	0.6%	0.1%	0.3%	3.4%
Philippines	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Russia	2.1%	1.9%	1.1%	0.1%	0.4%	5.6%
Singapore	3.4%	0.1%	0.0%	0.0%	0.0%	3.6%
South Africa	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%
Switzerland	5.6%	4.4%	1.9%	0.3%	0.4%	12.5%
Thailand	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%
United States	18.6%	18.1%	3.7%	1.0%	1.7%	43.1%
Total	51%	33%	10%	2%	4%	100%

Source: own composition based on World Bank WITS database (2014a)

REGRESSION RESULTS

Before estimating the PTM regression, variables was pre-tested for serial correlation and cross-sectional dependence (CD). The Wooldridge (2002) tests confirm the existence of serial correlation in case of France and Germany. Pesaran (2004) CD test reveals cross-sectional dependence in all variables (Table 6).

Table 6

Tests for serial correlation and cross section dependence

	France		Italy		Spain		Germany		Portugal	
	lnxuv	lnxrate	lnxuv	lnxrate	lnxuv	lnxrate	lnxuv	lnxrate	lnxuv	lnxrate
Wooldridge (2002) test	0.0040		0.1520		0.8470		0.0182		0.0611	
Pesaran (2004) CD test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Own calculations based EUROSTAT (2015) and European Central Bank, Statistical Data Warehouse database (2015)

Before estimating the panel regression models, the main model variables are pre-tested for unit root tests. We performed second generation panel unit root tests to take into account the impacts of cross-sectional dependence (CD) employing 0-4 time lags (Maddala and Wu, 1999; Peseran 2007). The second generation panel unit root tests reject the hypothesis of non-stationary (Annex 1) for French wine unit values and exchange rates variables. As concerns Italy, Spain, Germany and Portugal, the wine unit values do not contain unit roots while the exchange rates do, except French data. Consequently, we have found evidence against the existence of panel unit root in export unit values. In other words, the main variables are stationary. Therefore, we employed panel corrected standard error models (PCSE) - which controls for heteroscedasticity - with AR(1) type of autocorrelation for France and Germany and PCSE without AR(1) for Spain, Italy and Portugal.

Table 7 presents the estimation results analysing the exchanges rate effect on wine export prices (detailed data can be found in Annex 2). Based on the estimation results, France was able to apply price discrimination across Australian, Hong Kong's, Mexican and United States' wine export markets (positive significant exchange rate effects - βi; and significant country effects - λi). Moreover, beside France, Italy was also able to control their wine export prices in Japanese, Mexican and the American markets (positive PTM effects). The other countries such as Spain, Portugal and Germany could not pursue price discrimination in their EU extra wine export destinations. Accordingly the H1 hypothesis can be only partly confirmed.

Concerning the coefficients of Canada, Russia, South Africa, Switzerland (French wine prices), Singapore, Hong Kong (Italian wine prices) and Philippines (Spanish wine prices), they have significant country (λi) and a negative significant exchange rate effects (negative βi), revealing that local-currency price stability (LCPS) was higher than PTM effects in this countries, for entire period (Table 7).

Table 7

PTM regression result for top five EU wine exporter

	France			Italy			Spain			Portugal			Germany		
Destination country	exchange rate effect	country effect	asymmetric effect	exchange rate effect	country effect	asymmetric effect	exchange rate effect	country effect	asymmetric effect	exchange rate effect	country effect	asymmetric effect	exchange rate effect	country effect	asymmetric effect
AUSTRALIA	PTM effect	+***	depreciation	-***	+	appreciation	-	-	-	NA	NA	NA	-***	-	+
CANADA	LCPS	+***	appreciation	-***	+	+	-***	-	appreciation	-***	-	+	-**	-	depreciation
HONG KONG	PTM effect	-***	depreciation	LCPS	+	-	-	-	-						
JAPAN	+	+**	+	PTM effect	-**	-	-	-	+	+	-	-	+	-	-
MALAYSIA	+***	omitted	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MEXICO	PTM effect	+**	+	PTM effect	-***	+	-***	-	+	NA	NA	NA	NA	NA	NA
NORWAY	NA	NA	NA	-**	omitted	+	-	omitted	+	-	omitted	+	-	omitted	+
PHILIPPINES	NA	NA	NA	+	-	-	LCPS	+***	+	NA	NA	NA	NA	NA	NA
RUSSIA	LCPS	+***	+	-	-	-	-***	+	+	NA	NA	NA	-***	+	-
SINGAPORE	+	+***	depreciation	LCPS	+***	+	-*	-	appreciation	NA	NA	NA	-	-	-
SOUTH AFRICA	LCPS	+***	+	+*	+	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
SWITZERLAND	LCPS	+***	+	-*	+	+	-***	-	-	-	-	+	+***	-	+
THAILAND	+**	-	+	+***	-	+	NA	NA	NA	NA	NA	NA	NA	NA	NA
UNITED STATES	PTM effect	+***	-	PTM effect	-**	+	-***	-	+	-***	-	+	+***	-	+

Note: In case of France, Malaysia in all other cases Norway was treated as intercept.
NA – because of the lack of observations balanced panel data were not available.
If the coefficient of asymmetric effect is statistically significant and has a positive sign, the effect of appreciation of exporter's currency exchange rates on export prices is greater than in depreciation. Similarly, a significant and negative coefficient of asymmetric effect implies that the effect of depreciation of exchange rates on export prices is greater than appreciation (Byrne et al., 2010).
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Own calculations based EUROSTAT (2015) and European Central Bank, Statistical Data Warehouse database (2015)

The analysis of the asymmetric effects of exchange rates on wine export prices indicates that in some cases (in relation of France and Germany) the depreciation of Australian, Hong Kong's; Singapore's dollar had a greater impact than the appreciation relative to the Euro.

Between France and Canada as well as France and Australia, the appreciation of Euro to the Canadian and Australian dollar had higher effect than depreciation. Regarding Italy, the appreciation of Australian dollar in Euro exceeded the effect of depreciation, respectively in relation of Canada-Germany. Positive and statistically significant asymmetric effects were estimated for France and Canada, between Italy and Australia, Spain and Canada together with Singapore.

Results indicate that many French and Italian wine export markets were not competitive during the period analysed, in other words, these countries were able to price discriminate across their EU extra destination markets suggesting monopolistic competition. In Canada, Russia, South Africa, Switzerland, Hong Kong, Singapore and Philippines the local currency price stability was higher than PTM effects between 2000 and 2013.

The analysis of the asymmetric effects of exchange rates on wine export prices revealed that in many cases (France, Portugal, and Germany) the depreciation Euro relative to Australian, Hong Kong's; Singaporean dollar had a greater effect than the appreciation while in other cases (France-Canada, Australia-Italy, Spain-Canada, Spain-Singapore) appreciation of Euro exceeded the effect of depreciation. The PTM model indicates the presence of non-competitive pricing behaviour of major EU wine exporters due to both the market specific characteristics as well as exchange rate effects.

CONCLUSION

Despite of the empirical evidence in agri-food sector, analysing the pricing to market behaviour in wine trade has understudied yet. However, it is crucial to investigate whether the world largest EU wine exporter countries are able to price discriminate across their wine export destinations. Our study investigated the price discrimination behaviour of France, Italy, Spain, Portugal and Germany applying PTM model for a period of 2000 and 2013. Moreover, the asymmetric effects of exchange rates were also investigated. We elaborated a strongly balanced panel data set including monthly wine export data for EU extra wine export destination countries.

In sum, our estimations suggest that France was able to apply price discrimination in Australia, Hong Kong, Mexico and United States. Beside France, Italy had market dominance in Japanese, Mexican and the American markets (positive PTM effects). In the case of other countries such as Spain, Portugal and Germany, the price discrimination behaviour in EU extra wine export markets could not observed.

The local-currency price stability was higher than PTM effect during the entire period in case of Canada, Russia, South Africa, Switzerland (French wine), Singapore, Hong Kong (Italian wine) and Philippines' (Spanish wine). The results for asymmetric effects of exchange rates on wine export prices revealed that in many cases (in relation of France, Portugal, Germany) the depreciation of Euro (relative to Australian, Hong Kong's; Singaporean and Canadian dollar) had a greater impact than the appreciation while appreciation of Euro to Australian dollar, Canadian dollar and Singaporean dollar exceeded the effect of depreciation.

Further research can be extended to take into account the PTM behaviour of New Word wine exporter countries on European markets.

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Annex 1: Second Generation unit root test and PTM regression results

Second Generation Panel Unit Root Tests for France

		Maddala and Wu (1999) Panel Unit Root test (MW)		Pesaran (2007) Panel Unit Root test (CIPS)	
		without trend	with trend	without trend	with trend
Variable	**lags**	**p-value**		**p-value**	
lnuvx	1	0.0000	0.0000	0.0000	0.0000
lnuvx	2	0.0000	0.0000	0.0000	0.0000
lnuvx	3	0.0000	0.0000	0.0000	0.0000
lnuvx	4	0.0000	0.0000	0.0000	0.0000
lnxrate	1	0.0000	0.0000	0.0000	0.0000
lnxrate	2	0.0000	0.0000	0.0000	0.0000
lnxrate	3	0.0000	0.0000	0.0000	0.0000
lnxrate	4	0.0000	0.0000	0.0000	0.0000

Own calculations based EUROSTAT (2015) and European Central Bank, Statistical Data Warehouse database (2015)

Second Generation Panel Unit Root Tests for Italy

		Maddala and Wu (1999) Panel Unit Root test (MW)		Pesaran (2007) Panel Unit Root test (CIPS)	
		without trend	with trend	without trend	with trend
Variable	**lags**	**p-value**		**p-value**	
lnuvx	1	0.000	0.000	0.000	0.000
lnuvx	2	0.000	0.000	0.000	0.000
lnuvx	3	0.000	0.000	0.000	0.000
lnuvx	4	0.000	0.000	0.000	0.000
lnxrate	1	0.000	0.000	0.006	0.000
lnxrate	2	0.272	0.822	0.834	0.091
lnxrate	3	0.580	0.981	0.953	0.401
lnxrate	4	0.757	0.989	0.960	0.361

Own calculations based EUROSTAT (2015) and European Central Bank, Statistical Data Warehouse database (2015)

Second Generation Panel Unit Root Tests for Spain

		Maddala and Wu (1999) Panel Unit Root test (MW)		Pesaran (2007) Panel Unit Root test (CIPS)	
		without trend	with trend	without trend	with trend
Variable	**lags**	**p-value**		**p-value**	
lnuvx	1	0.000	0.000	0.000	0.000
lnuvx	2	0.000	0.000	0.000	0.000
lnuvx	3	0.000	0.000	0.000	0.000
lnuvx	4	0.000	0.000	0.000	0.000
lnxrate	1	0.283	0.935	0.988	0.967
lnxrate	2	0.372	0.981	0.995	0.994
lnxrate	3	0.211	0.953	0.989	0.990
lnxrate	4	0.072	0.811	0.996	0.995

Own calculations based EUROSTAT (2015) and European Central Bank, Statistical Data Warehouse database (2015)

Second Generation Panel Unit Root Tests for Portugal

		Maddala and Wu (1999) Panel Unit Root test (MW)		Pesaran (2007) Panel Unit Root test (CIPS)	
		without trend	with trend	without trend	with trend
Variable	**lags**	**p-value**		**p-value**	
lnuvx	1	0.000	0.000	0.000	0.000
lnuvx	2	0.000	0.000	0.000	0.000
lnuvx	3	0.000	0.000	0.000	0.000
lnuvx	4	0.000	0.000	0.000	0.000
lnxrate	1	0.260	0.742	0.742	0.368
lnxrate	2	0.356	0.857	0.857	0.167
lnxrate	3	0.219	0.730	0.730	0.138
lnxrate	4	0.282	0.805	0.805	0.170

Own calculations based EUROSTAT (2015) and European Central Bank, Statistical Data Warehouse database (2015)

Second Generation Panel Unit Root Tests for Germany

		Maddala and Wu (1999) Panel Unit Root test (MW)		Pesaran (2007) Panel Unit Root test (CIPS)	
		without trend	with trend	without trend	with trend
Variable	**lags**	**p-value**		**p-value**	
lnuvx	1	0.000	0.000	0.000	0.000
lnuvx	2	0.000	0.000	0.000	0.000
lnuvx	3	0.000	0.000	0.000	0.000
lnuvx	4	0.000	0.000	0.001	0.000
lnxrate	1	0.448	0.689	0.719	0.137
lnxrate	2	0.594	0.897	0.756	0.216
lnxrate	3	0.432	0.862	0.721	0.198
lnxrate	4	0.434	0.848	0.769	0.241

Own calculations based EUROSTAT (2015) and European Central Bank, Statistical Data Warehouse database (2015)

Annex 2 PTM regression results

Exporter countries	France (AR1)			Italy			Spain			Portugal			Germany (AR1)		
Destination country VARIABLES	exchange rate effect	country effect	asymmetric effect	exchange rate effect	country effect	asymmetric effect	exchange rate effect	country effect	asymmetric effect	exchange rate effect	country effect	asymmetric effect	exchange rate effect	country effect	asymmetric effect
AUSTRALIA	0.261*	1.165***	-0.172***	-1.087***	0.159	0.158*	-0.107	-0.527	-0.0263	NA	NA	NA	-0.528***	-1.480	0.0522
	(0.140)	(0.334)	(0.0602)	(0.182)	(0.204)	(0.0834)	(0.180)	(0.498)	(0.0865)				(0.170)	(1.384)	(0.0768)
CANADA	-0.642***	1.247***	0.0668*	-0.849***	0.102	-0.0212	-1.546***	-0.183	0.144**	-0.547***	-0.121	0.0343	-0.602**	-1.570	0.0939***
	(0.134)	(0.329)	(0.0392)	(0.207)	(0.200)	(0.0774)	(0.167)	(0.492)	(0.0644)	(0.177)	(0.551)	(0.0684)	(0.274)	(1.383)	(0.0360)
HONG KONG	1.107***	-1.005***	-0.0519***	-0.525***	0.374**	-0.0115	-0.224	-0.693	-0.0356	NA	NA	NA	NA	NA	NA
	(0.111)	(0.370)	(0.0118)	(0.0929)	(0.189)	(0.0458)	(0.269)	(0.783)	(0.0344)						
JAPAN	0.0304	1.014**	0.000244	0.588***	-0.941***	-0.0200	-0.0157	-1.130	0.00309	0.106	-0.876	-0.00222	0.134	-2.158	-0.00691
	(0.0560)	(0.412)	(0.00262)	(0.137)	(0.357)	(0.0195)	(0.0995)	(0.710)	(0.0062)	(0.101)	(0.741)	(0.00621)	(0.159)	(1.580)	(0.00503)
MALAYSIA	0.657***	omitted	-0.0424	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	(0.237)		(0.0322)												
MEXICO	0.115*	0.772**	0.00645	0.368***	-2.049***	0.00314	-0.163***	-0.230	0.0182	NA	NA	NA	NA	NA	NA
	(0.0635)	(0.368)	(0.0107)	(0.0570)	(0.322)	(0.00347)	(0.0620)	(0.526)	(0.0112)						
NORWAY	NA	NA	NA	-0.200***	omitted	0.0197	-0.359	omitted	0.0086	-0.412	omitted	0.00191	-0.722	omitted	0.00324
				(0.0717)		(0.0144)	(0.240)		(0.0101)	(0.267)		(0.0119)	(0.661)		(0.00747)
PHILIPPINES	NA	NA	NA	-0.113	0.0239	-0.0176	-0.996***	2.331***	0.00495	NA	NA	NA	NA	NA	NA
				(0.364)	(0.773)	(0.0162)	(0.140)	(0.736)	(0.0103)						
RUSSIA	-0.556***	2.539***	0.00654	-0.0997	-0.0826	-0.00520	-0.721***	0.663	0.0206	NA	NA	NA	-1.108***	1.600	-0.000526
	(0.172)	(0.683)	(0.0113)	(0.207)	(0.858)	(0.0162)	(0.131)	(0.684)	(0.0130)				(0.138)	(1.466)	(0.00874)
SINGAPORE	0.204	1.292***	-0.122***	-0.800***	2.442***	0.0213	-0.603*	-0.178	0.199*	NA	NA	NA	-0.274	-0.959	-0.0314
	(0.172)	(0.323)	(0.0449)	(0.161)	(0.559)	(0.0148)	(0.340)	(0.560)	(0.117)				(0.395)	(1.400)	(0.130)
SOUTH AFRICA	-0.518***	1.583***	0.0154	0.354**	0.247	-0.0399	NA	NA	NA	NA	NA	NA	NA	NA	NA
	(0.120)	(0.334)	(0.0389)	(0.171)	(0.212)	(0.0584)									

SWITZERLAND	-0.518***	1.583***	0.0154	-0.664*	1.687	0.00964	-0.678***	-0.253	-0.0787	-0.00489	-0.564	0.0364	0.747***	-1.431	0.000836
	(0.120)	(0.334)	(0.0389)	(0.374)	(1.429)	(0.0196)	(0.0917)	(0.498)	(0.0499)	(0.122)	(0.548)	(0.0596)	(0.276)	(1.385)	(0.108)
THAILAND	0.589**	-1.212	0.00867	0.251***	-0.292	0.0269	NA	NA	NA	NA	NA	NA	NA	NA	NA
	(0.297)	(1.100)	(0.0112)	(0.0458)	(0.184)	(0.0476)									
UNITED STATES	0.161***	1.228***	-0.0165	0.341**	-1.143***	0.000487	-0.626***	-0.448	0.0505	-0.932***	-0.204	0.127	0.316***	-1.710	0.0493
	(0.0414)	(0.330)	(0.0400)	(0.157)	(0.387)	(0.0271)	(0.0443)	(0.501)	(0.0428)	(0.0941)	(0.553)	(0.0991)	(0.0676)	(1.381)	(0.0482)
Constant	-0.621*			1.435***			2.000***			1.854***			2.872**		
	(0.331)			(0.187)			(0.501)			(0.553)			(1.381)		
Observations	1,848			2,184			1,848			840			1,344		
Number of cid	11			13			11			5			8		
R-squared	0.527			0.599			0.755			0.614			0.804		

Note: In case of France, Malaysia in all other cases Norway was treated as intercept.
NA – because of the lack of observations balanced panel data were not available.
If the coefficient of asymmetric effect is statistically significant and has a positive sign, the effect of appreciation of exporter’s currency exchange rates on export prices is greater than in depreciation. Similarly, a significant and negative coefficient of asymmetric effect implies that the effect of depreciation of exchange rates on export prices is greater than appreciation (Byrne et al., 2010).

*Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

Source: Own calculations based EUROSTAT (2015) and European Central Bank, Statistical Data Warehouse database (2015)