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Modelling the impact of exchange rate movements on the world's wine markets, 2007-2011

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November 2012

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Modelling the impact of exchange rate movements on the world's wine markets, 2007-2011

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Abstract

A model of the world's wine markets is revised, updated and enhanced to examine the impact of changes in real exchange rates during the global financial crisis on national wine markets and bilateral trades in five wine quality categories. The model results help explain the non-trivial realignment of fortunes for grape growers, wine producers and wine consumers around the world since 2007.

Keywords: Global wine market modelling; bilateral exchange rate movements; grape and wine price shocks

JEL codes: F11, F14, F47, Q13

Highlights:

- Globalization of wine markets means producers are vulnerable to currency movements;
- Real exchange rates of key wine countries altered dramatically during 2007-2011;
- Producers' international competitiveness improved in some countries, fell sharply in others;
- Model results explain a substantial share of those changes in winery competitiveness;
- Results suggest wine producers could benefit from currency hedging.

1. Introduction

The wine industry has become far more globalized in the past two decades. The share of global wine production exported more than doubled between 1989 and 2009, rising from 15 to 32 percent. That export propensity rose over those two decades from 20 to 35 percent for the four big European wine-exporting countries, and from almost nothing (4 percent) to 37 percent for New World exporters (Anderson and Nelgen 2011). Grapegrowers and winemakers in both country groups are thus far more exposed to exchange rate movements and net import demand shocks now than in earlier decades. The extent of direct exposure varies among the main wine-exporting countries according to the share of their production that is exported (shown in Figure 1), but even those countries with a relatively low export-to-production ratio, such as the United States, are indirectly exposed to the extent their wine markets are open to imports. Producers in these countries have therefore been affected non-trivially by the substantial changes in bilateral exchange rates as well as the decline in demand for wine during the recent global financial crisis. The exchange rate changes since 2007 have been especially large for natural resource-rich countries such as Australia, whose terms of trade have improved dramatically as a consequence of rapid economic growth in China and other emerging Asian economies.

This paper makes use of a newly revised and updated model of the world's wine markets to estimate the impact of real exchange rate movements over the 2007 to 2011 period, ignoring all other changes. To motivate the paper, it begins in Section 2 by documenting the changes in nominal and real exchange rates during that period. Section 3 then outlines the revised model of the world's wine markets, to which changes in real exchange rates are applied as shocks, holding all other things constant. The model's results are summarized in Section 4. The final section

discusses the extent to which the results help explain the dramatic realignment of fortunes for grape growers, wine producers and wine consumers around the world since 2007, and draws out implications of the findings for wine markets and their participants in the years ahead.

2. Exchange Rate Changes, 2007 to 2011

Table 1 summarizes observed changes in international competitiveness in 45 key wine-producing and wine-consuming nations between 2007 and 2011. Nominal exchange rate percentage changes during the period 2007 to 2011, relative to the US dollar, are reported in column 1. Columns 2 and 3 show the GDP price index and consumer price index movements, respectively. The final column shows the real exchange rate movements relative to the US dollar in this period, computed using equation (16) from Section 2 below.

It is clear from column (4) of Table 1 that both rapidly growing East Asia (i.e., China, Taiwan and, to a lesser extent, Japan and Southeast Asia) and its natural resource-rich trading partners (notably Australia, along with Brazil and Africa) have appreciated their real exchange rates heavily against the US dollar (by 20-45 percent). For other New World wine exporters (Argentina, Chile, New Zealand, South Africa), the real exchange rates have appreciated more moderately (by 9-24 percent). By contrast, the UK pound sterling has depreciated (by 18 percent) while other West European currencies have remained close to the US dollar in real terms. It is these major changes that are to be introduced as shocks in the model of the world's wine markets, described in the next section.

3. Revised Model of the World's Wine Markets

We have revised and updated a model of the world's wine markets that was first published by Wittwer, Berger and Anderson (2003). There are several significant enhancements to that original model.[1] Wine types have been disaggregated from two into five types, namely non-premium (including bulk), commercial-premium, super-premium and iconic still wines, and sparkling wine.[2] As in the original model, there are two types of grapes, premium and non-premium. Non-premium wine uses non-premium grapes exclusively, super-premium and iconic wines use premium grapes exclusively, and commercial-premium and sparkling wines use both types of grapes. In the regional dimension, the number of countries and country groups has expanded from ten in the original model to 51 now: 44 individual nations and 7 composite regions. The model's database is calibrated to 2009, based on the data provided in Anderson and Nelgen (2011, especially Sections V, VI and VII).

An enhancement of importance to the present study is the inclusion of exchange rate variables in the model. This enables us to distinguish between price impacts as observed in local currency units from those observed in US dollars.

[1] As with the original model, the present model is solved using GEMPACK software (Harrison and Pearson 1996).

[2] Commercial-premium still wines are defined by Anderson and Nelgen (2011) to be those between US$2.50 and $7.50 per litre pre-tax at a country's border or wholesale. Iconic still wines are considered here to be a small subset of super-premium wines, assigned an average producer price of $80 per litre and accounting for just 0.45% of global wine production.

In the model, the grape and wine sectors minimize costs of intermediate inputs subject to weak CES substitutability between inputs. By assumption, no intermediate inputs are imported from other countries. Hence:

$$X_{id}^{c} = f(X1_{id}, CES[P_{id}^{c} / P1_{id}]) \tag{1}$$

$$P1_{id}.X1_{id} = \sum_{c} X_{id}^{c}.P_{id}^{c} \tag{2}$$

where X_{id}^{c} is the quantity demanded of commodity *c* by grape or wine industry *i* in region *d*, P_{id}^{c} is the corresponding price, and $X1_{id}$ and $P1_{id}$ are the respective intermediate composite quantities and prices.

There are two primary factors employed in the sector, labour (the quantity of which is endogenous with perfectly elastic supply), and capital. Capital is usually treated as exogenous in quantity, with rates of return bearing all the adjustment in the various scenarios. This reflects the fact that both grapes (a perennial crop) and wine plant capacity adjust slowly to market signals:

$$L_{id} = f(F_{id}, CES[W1_{id} / PF_{id}]) \tag{3}$$

$$K_{id} = f(F_{id}, CES(R_{id} / PF_{id}]) \tag{4}$$

$$PF_{id}.F_{id} = LL1_{id}.W1_{id} + K_{id}.R_{id} \tag{5}$$

Grape and wine producers are assumed to minimize costs subject to CES substitution between capital and labour. Equations (3) to (5) show primary factor demands for the labour composite $L1_{id}$ and capital K_{id} subject to a composite factor demand F_{id} by industry *i* in region *d*. The factor prices are $W1_{id}$ for composite labour, R_{id} for capital rentals and PF_{id} for composite prices.

The composite factor demand F_{id} is proportional to total output Q_{id} subject to a primary-factor using technology A_{id}. Hence

$$F_{id} = Q_{id}.A_{id} \tag{6}$$

The perfectly competitive zero pure profit condition is that total revenue, valued at the output price P_i^{0s} multiplied by Q_{id}, equals the total production cost:

$$P_i^{0s}.Q_{id} = \sum_c P_{id}^c.X1_{id}^c + \sum_o W_{id}^o.L_{id}^o + R_{id}.K_{id} \tag{7}$$

Household demands follow a linear expenditure system in each region. We reduce the optimizing problem for household consumption of each commodity, subject to a budget constraint, to equations describing subsistence and discretionary demands. Aggregate subsistence expenditure $WSUB_d$ depends only on consumer prices $P3_{cd}$ for each commodity, and the number of households N, as per capita subsistence quantities $XSUB_{cd}$ subject to given preferences are constant.

$$WSUB_d = \sum_c P3_{cd}.XSUB_{cd}.N_d \tag{8}$$

Discretionary expenditures for each commodity (the left-hand side of equation (9)) are determined by the marginal budget share (β_{cd}) of aggregate discretionary expenditure. This aggregate is the bracketed term on the right-hand side of equation of (9), where $W3TOT_d$ is aggregate nominal expenditure:

$$P3_{cd}(X3_{cd} - XSUB_{cd}.N_d) = \beta_{cd}(W3TOT_d - WSUB_d) \tag{9}$$

Since real aggregate consumption is usually exogenous in our partial equilibrium simulations, the linear expenditure system determines the consumption shares of individual final commodities (i.e., the five wine types plus a composite of all other consumption items), driven by changes in relative prices as faced by domestic consumers. The income elasticity of demand for each commodity is equal to the marginal budget share divided by the expenditure share. This varies from 0.5 for non-premium wine to 2.5 for iconic still wine. The income elasticity of

demand for other consumption is very close to 1.0, because wine accounts for an average of only 0.3 percent of aggregate expenditure globally and no more than 1.1 percent in any country (Anderson and Nelgen 2011, Table 166).

A new feature of our revised model of world wine markets is the inclusion of nominal exchange rates. These appear directly in the equation linking retail prices ($P3^s_{cd}$) to producer prices by country of origin (P^{0s}_c) where *c* denotes the wine type:

$$P3^s_{cd} = P^{0s}_c \frac{\phi_d}{\phi_s} T^{tar}_{cd} T^{tax}_{cd} + P^m_{cd} \tag{10}$$

The exchange rates in the consuming and producing regions are ϕ_d and ϕ_s respectively, expressed as local currency units per \$US. T^{tar}_{cd} is the power of the tariff in the consuming region and T^{tax}_{cd} the power of the domestic consumption (or excise) tax over and above any generic value-added or goods-and-services tax. P^m_{cd} is the price of margin *m*, assumed to be locally supplied, nontradable and therefore unaffected by the exchange rate.

A given level of consumption for wine type *c* ($X3_{cd}$) is satisfied using the Armington assumption, in which wine from different countries of origin are imperfectly substitutable. First, domestic wine is imperfectly substitutable with a composite of imports:

$$X3^{ss}_{cd} = f(X3_{cd}, CES(P3^{ss}_{cd} / P3_{cd})) \quad ss = \text{domestic, imports} \tag{11}$$

Imports by origin ($X3^s_{cd}$) are determined in a second CES equation:

$$X3^s_{cd} = f(X3^{ss="imports"}_{cd}, CES(P3^s_{cd} / P3^{ss="imports"}_{cd})) \tag{12}$$

The focus of our study is on how changes in international competitiveness affect the world's wine markets. A crucial part of this exercise is explaining how prices determined outside the grape and wine markets influence these markets. Since the model is partial equilibrium, in

order to depict the impacts of changes in international competitiveness, outside price changes need to be imposed as shocks on the model. The price of intermediate inputs shown in equations (1) and (2) is set equal to the price of GDP (P_d^g) multiplied by a shifter F_d^c .

$$P_{id}^c = F_d^c P_d^g \tag{13}$$

If no specific price observations are available, the shifter F_d^c remains exogenous and unshocked, with the change in price being determined by a shock to the price of GDP. If observations are available for specific input price movements, the shifter F_d^c becomes endogenous, with P_{id}^c now exogenous and shocked.

$$W1_{id} = F_d^w P_d^g \tag{14}$$

Wage rates are treated similarly. In equation (14), if the wage shifter F_d^w is exogenous, changes in wage rates $W1_{id}$ are determined by changes in the price of GDP. If wage rate data are available, F_d^w becomes endogenous and wage rates are shocked directly.

$$P_{cd}^m = F_d^m P_d^g \tag{15}$$

The prices of trade and transport margins are also determined by the price of GDP if the shifter F_d^m in equation (15) is exogenous.

Changes in international competitiveness depend on changes in relative price levels and changes in nominal exchange rates. In equation (16), ϕ_s^R denotes real exchange rate movements relative to the US dollar:

$$\phi_s^R = P_s^g / [P_{"USA"}^g * \phi_s] \tag{16}$$

In (16), the nominal exchange rate for the United States is always unchanged, because nominal and real exchange rates are expressed relative to the US currency.

Changes in international market conditions may have impacts in one direction on producer prices as expressed in US dollars P_i^{0s} and potentially in the opposite direction in local currency units. Hence, we calculate real producer prices $P_{i,loc}^{0s}$ in local currency terms (i.e., the price most relevant to domestic producers):

$$P_{i,loc}^{0s} = P_i^{0s} * \phi_s \ / \ P_s^g \tag{17}$$

To obtain real price changes in local currency terms, we convert US dollar prices ($P3_{cd}^s$ for source-specific and $P3_{cd}$ for the source composite price) to real local currency prices ($P3_{id,loc}^s$ and $P3_{id,loc}^s$) using the CPI (P_d^c) as the deflator:

$$P3_{cd,loc}^s = P3_{cd}^s * \phi_d \ / \ P_d^c \tag{18}$$

and

$$P3_{cd,loc} = P3_{cd} * \phi_d \ / \ P_d^c \tag{19}$$

This revised model of the world's wine markets is calibrated to market conditions in 2009, as detailed in Anderson and Nelgen (2011, Section VI). This was only one vintage after the beginning of the global financial crisis and is assumed to provide a reasonable benchmark against which to examine the impact of the real exchange rate changes described in Section 2 above.

4. Estimating the Effects of Exchange Rate Shocks

The model described in Section 2 enables us to ascribe shocks to depict changes in international competitiveness with varying levels of information. Consumer price changes for the period 2007 to 2011 are readily available for each region from the World Bank (2012). Consumer prices are

relevant, because if in a scenario wine prices rise/fall relative to CPI in a given nation, the quantity of wine consumed will decrease/increase for a given level of real aggregate household expenditure. Ideally, we would like to obtain nominal wages growth, producer price indexes and margins prices for each nation. If wage observations are available, F_d^w in equation (14) is made endogenous and wages are shocked directly. If more specific producer price indexes are available, we could make F_d^c in equation (13) endogenous and shock the indexes directly. And if we have margins price data, F_d^m becomes endogenous in equation (15) so as to shock margins prices directly. In the absence of more specific price data in our scenario, each of the shifters in equations (13), (14) and (15) remains exogenous so that the GDP price acts as a proxy.

The shocks given to depict the changes in international competitiveness between 2007 and 2011 are shown in the first three columns of Table 1. Column (1) shows nominal exchange rates relative to the US dollar, ϕ_d, column (2) the price of GDP, P_d^g, and column (3) the price of consumer goods, P_d^c. Column (4) shows the resulting real exchange rate movement relative to the US currency, ϕ_d^R. This endogenous variable is calculated in equation (16).

The impacts of aggregate domestic price and exchange rate changes on real producer prices in the sector, in local currency units, are reported in Table 2 for the world's main wine-producing countries. No other wine-producing nation comes close to suffering the same drops in real grape and wine producer prices as Australia. Their declines range from one-quarter to one-third. On average they are about one-third above the declines in Brazil, which are about one-third above those of Chile. South Africa's price declines are smaller again, while in all other wine-producing regions real producer prices rise somewhat. The difference between the changes in Australia versus the United States for prices for low-end wines is almost 40 percent.

One would expect in practice that, over four years, there would be sufficient time for some investment response to translate to changes in capital stocks. For example, the real exchange rate appreciation in Australia would induce disinvestment in this period, while the depreciation in the United States would induce more investment. This would alter capital stocks to some extent: supply in the Australian grape and wine sectors would move inwards, alleviating the downward pressure on rates of return and producer prices, and conversely in the United States. Nevertheless, as noted previously, grape and wine sectors adjust sluggishly to market signals, with substantial changes in rates of return possible in the short to medium term. There are some changes in output because, as in equation (3), wages are determined mainly in non-wine sectors. Given fixed wages, the amount of labour hired in grape and wine sectors will decrease (increase) as the price of industry factor rentals falls (rises) relative to the average of all industries (denoted by the GDP deflator). Reduced labour inputs would reduce industry output, as shown in equation (5).

Table 3 shows the modeled output changes for selected wine-producing nations. Not surprisingly, the real exchange rate changes are responsible for declines in grape and wine production in the southern hemisphere where real exchange rates appreciated, and for production increases in the United States and Europe where real exchange rates changed relatively little.

Table 4 shows the change in real local currency consumer prices using equation (19). The corresponding changes in consumption are shown in Table 5. In regions such as the UK and Australia, where there are substantial changes in the real price of wine, the impacts are clear. In the UK, a major importer of wine, the price of wine rises by much more than the CPI as a consequence of the large real depreciation of the UK pound. In Australia, a major exporter of wine, the price of wine falls relative to the CPI, inducing an increase in consumption of wine. In

Chile, where the local currency price changes are relatively small, the expected impact on the sign of consumption is not clear: the price changes are small enough that negative income and substitution effects, driven by relatively cheaper non-wine imports, slightly dominate even though the real price of wine falls.

The final two columns of Table 5(a) compare modeled and actual changes in wine consumption. In some countries, the two align closely, notably in the UK (-7.7% modeled versus -6.6% actual), Australia (3.2% versus 3.1%) and Germany (-2.3% versus -3.8%). Discrepancies arise when the net effect of economic changes other than in real exchange rates is non-trivial. For example, China's rapid income growth and increasing absorption of western tastes meant that there was a substantial increase in wine demand there between 2007 and 2011, so that observed wine consumption grew by 22 percent over that period despite almost no contribution (0.2 percent) from real exchange rate changes. In the case of nations that went into recession, income deterioration between 2007 and 2011 affected actual consumption markedly. For example, Italy's wine consumption declined 14 percent and Spain's declined by 23 percent, to which real exchange rate changes contributed just 1 percentage point according to our model results.

We turn now to the impact of real exchange rate movements between 2007 and 2011 on six major importing markets: the United Kingdom, United States, Germany, China, smaller wine-importing European nations (a group that includes Belgium, Denmark, Finland, Ireland, Netherlands, Sweden and Switzerland) and the group of former Socialist nations in Eastern Europe and the former Soviet Union (denoted ECA in Table 6).

The negative impact on consumption of the real depreciation in the ***United Kingdom*** is bad news for wine-exporting countries. But for some exporters, the impact is even worse if we examine relative prices in the UK market. By 2007, Australia was the 2nd most important supplier

in volume terms of wine to the UK market after Italy, and 3rd in value terms after France and Italy. Real exchange rate movements have a pronounced negative effect not only on the UK's total wine imports, but also on Australia's share of the UK market. Table 4 shows the impact of the exchange rate changes is to raise real retail prices in the UK by between 40 and 50 percent – a huge increase, and only slightly less so for higher-priced wines. The first set of rows of Table 6 shows the impact on the UK's import volumes by country of origin. Australia and South Africa are the standout losers in this scenario, especially in commercial premium still wines. Even though all wine exporters other than the United States suffer a drop in sales to the UK, the Old World's sales fall by less than 10 ML as a consequence of real exchange rate movements between 2007 and 2011, whereas Southern Hemisphere exports fall almost 100 ML (compare columns (7) and (16) in Table 6). This reflects price-induced substitution arising from equation (12): New World wine retail price hikes in the UK market are higher than those for Old World wines.

The results for the ***United States*** are shown in the second set of rows in Table 6. They suggest home consumption of US and Old World wines changes little as a results of the exchange rate changes (columns (7) and (16) of Table 6). The reduction in US consumption is borne almost entirely by New World producers, whose wines become more expensive than US or Old World wines in the US market: a fall of 52 ML of imports from Australia, of 22 ML from Argentina, of 13 ML from Chile and of 4 ML from New Zealand. Almost 90 percent of that total cut in volume of imports from the New World into the US is non-premium or commercial-premium wine. It reduces the New World's share of US total wine consumption from 21 to 18 percent, and of the cheapest two categories of still wine from 25 to 22 percent.

Germany was in volumetric terms the world's largest importer of wine in 2009. However, as a sales destination, it is less important to New World producers than the UK or US markets, or the group of wine-importing Western European nations. Because the New World's export base in the German market is relatively small, it means that within the model, differences in database weights result in a pattern of import changes that differs substantially from that of other markets. The third set of rows in Table 6 show there is only limited substitution away from New World wines towards Old Wine wines in Germany as a result of exchange rate changes.

The smaller Western European net importers of wine (i.e., ***Belgium, Denmark, Finland, Ireland, Netherlands, Sweden*** and ***Switzerland***) individually are not large, but collectively they are among the major wine importers of the world. The negative impacts on wine consumption of real currency depreciations in most nations in this group are more or less offset by the positive impact on consumption in Switzerland, which had a real appreciation between 2007 and 2011. The effect of the currency changes on this group's wine consumption is positive for super-premium, iconic and sparkling wines, and slightly negative for lower-quality wine types, with little change overall (Table 5(a)). Since the New World's share of total sales within the group is higher than, for example, in Germany, the real exchange rate realignment has a larger negative impact on sales in this group than in Germany. New World exports (including from the United States) fall by 48 ML due to the currency realignment whereas Old World exports increase by 49 ML (fourth set of rows in Table 6). Substitution rather than any change in total wine demand drives the adverse impact on New World sales. The adverse impact on New World sales is not as pronounced as it is for the UK or USA, but it is larger than for Germany.

China remains the market in which wine exporters anticipate the highest rate of import growth in the future. China's renminbi appreciated in real terms more than most major currencies

between 2007 and 2011, the effect of which in isolation would be for China to increase its share of global wine consumption. Table 4 shows that real local currency prices of wine in China fell due to observed real exchange rate movements. This induces increased imports of wine from all sources, with a similar increases from both the New World and Old (24 ML including USA versus 21 ML), reflecting the larger volumetric base of New World exporters in the Chinese market. Those imports substituted for domestic wine, whose consumption is discouraged by the real appreciation: home consumption decreases by 42 ML while imports increase by 45 ML (columns (17) and (18) of Table 6).

For the transition economies of ***Eastern Europe and the former Soviet Union***, the changes in their volumes of domestic consumption due to changes in exchange rates are not large, but there are considerable changes in their sources (final set of rows in Table 6). What is most striking is the switch from home sourced wines in ECA nations to wines imported from the Old World (and slightly also from the United States). In aggregate, the sum of home consumption in all individual ECA nations falls by 73 ML while Old World imports increase by 105 ML. The latter is a little larger than the aggregate import increase of 98 ML partly because trade between ECA nations falls as their real exchange rates rise relative to those of Old World suppliers, and partly because wine imports from the Southern Hemisphere fall (by 5ML).

5. Summary and implications for New World exports

The above model results suggest that real exchange rate changes over the period 2007 to 2010 have altered substantially the global wine export shares of the Old World and USA versus the

Southern Hemisphere's New World exporters. This reverses somewhat the massive gains of the latter group at the expense of the Old World over the past two decades (Figure 2). It also strengthens the competitiveness of the US wine industry relative to other New World wine producers in both the US and European markets.

These changes can be seen in more detail in Table 7, which reports the global changes in key bilateral trades as a result of the real exchange rate changes. Most of the upper half of that table (exports of the Old World and the United States) has positive numbers, while most of the lower half – exports from the Southern Hemisphere – has negative numbers. The main exception for those latter countries' is their greater sales to China and to a lesser extent Russia, whose currencies strongly appreciated. Notice that New Zealand has enjoyed increased sales to Australia because of the greater strengthening of the AUD compared with the NZD.

Australia, the country whose wine trade has been most adversely affected by currency changes, has not only lost export sales but also has seen a considerable increase in imports. One-third of those extra imports are from New Zealand, for the reason just mentioned. The bracketed numbers in Table 8 show that New Zealand's extra penetration of the Australian market is especially strong in the super-premium category (predominately Sauvignon Blanc and Pinot Noir), while France's is in sparkling wine (Champagne) and Italy's is in commercial-premium wines.

The results of course depend on the parameter values in the model, the most important being the Armington elasticities that affect imports from different countries. The CES parameter for all wine types is set at 3.0 in equation (11) and at 6.0 in equation (12). When both sets of these CES parameters are doubled, the bilateral trade volume outcomes reported in Table 7 become those in Appendix Table A1. The differences between the two tables are small. We also

can check modeled outcomes using both sets of trade parameters against observed outcomes in the national market that has been most adversely affected by recent real exchange rate movements, namely Australia's. Available data indicate that between 2006-07 and 2010-11, the volume of Australia's wine exports fell only slightly, from 768 ML to 727 ML; but in domestic currency terms, exports dropped from almost $2.9 billion to just under $2.0 billion (www.wineaustralia.com). Therefore, the modeled effect of exchange rate changes slightly overstates the drop in the volume of wine exports, but the modeled drop in value is close to the observed change in the case of both sets of CES parameter choice (Table 8 and Table A2).

These results suggest real exchange rate changes go a long way towards explaining why market shares and producer prices have changed so much for some New World wine-exporting countries in recent years, and in particular the improvement in competitiveness of the US and the decline for Australia. This does not necessarily mean that the era in which the New World has gradually increased its share of global wine exports is over, because real exchange rate changes can easily reverse.[3] What it does mean, however, is that if exchange rates are going to continually be realigned in our ever-more-globalizing world, more producers are likely to benefit from hedging against currency movements in the years ahead.

References

[3] Had we analysed the effect of changes in real exchange rates over the dozen years to 2000, we would have predicted a dramatic growth in Australian wine exports because over that period Australia's currency depreciated in real terms by almost 30 percent. In fact the volume (and US$ value) of Australia's wine exports grew 16 (and 18) percent per year over that period.

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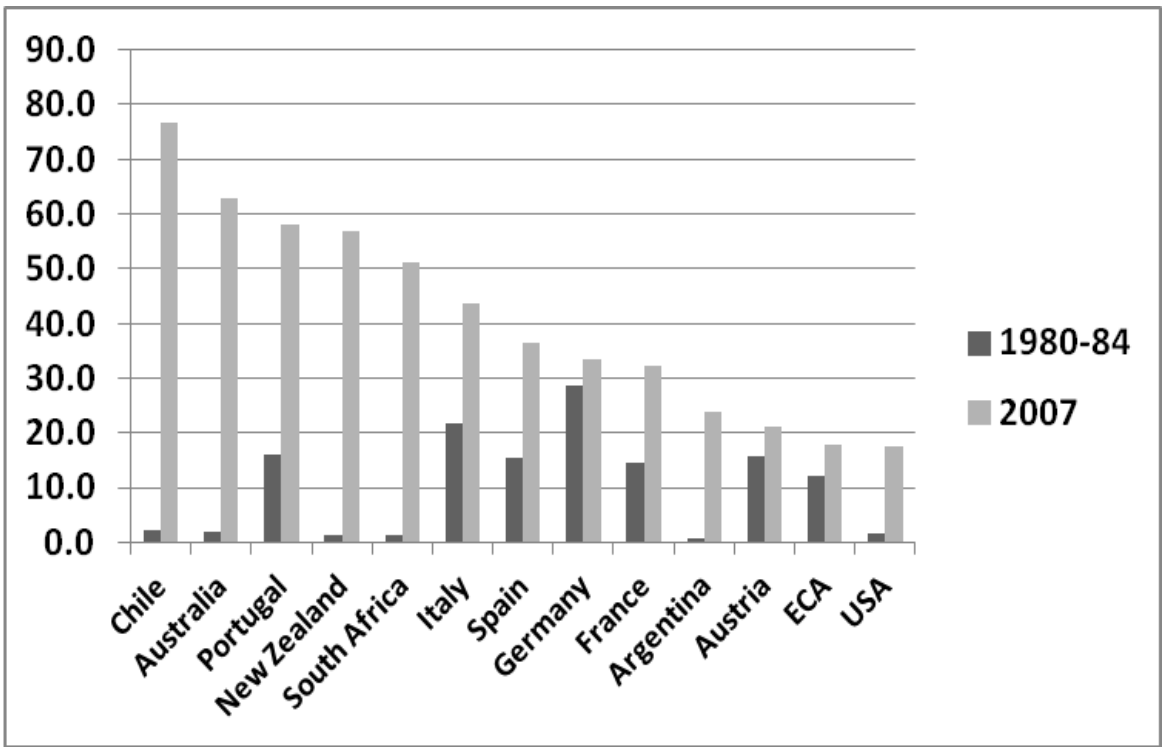
Figure 1: Export volume as a percent of production volume, 1980-84 and 2007[a]

(percent)

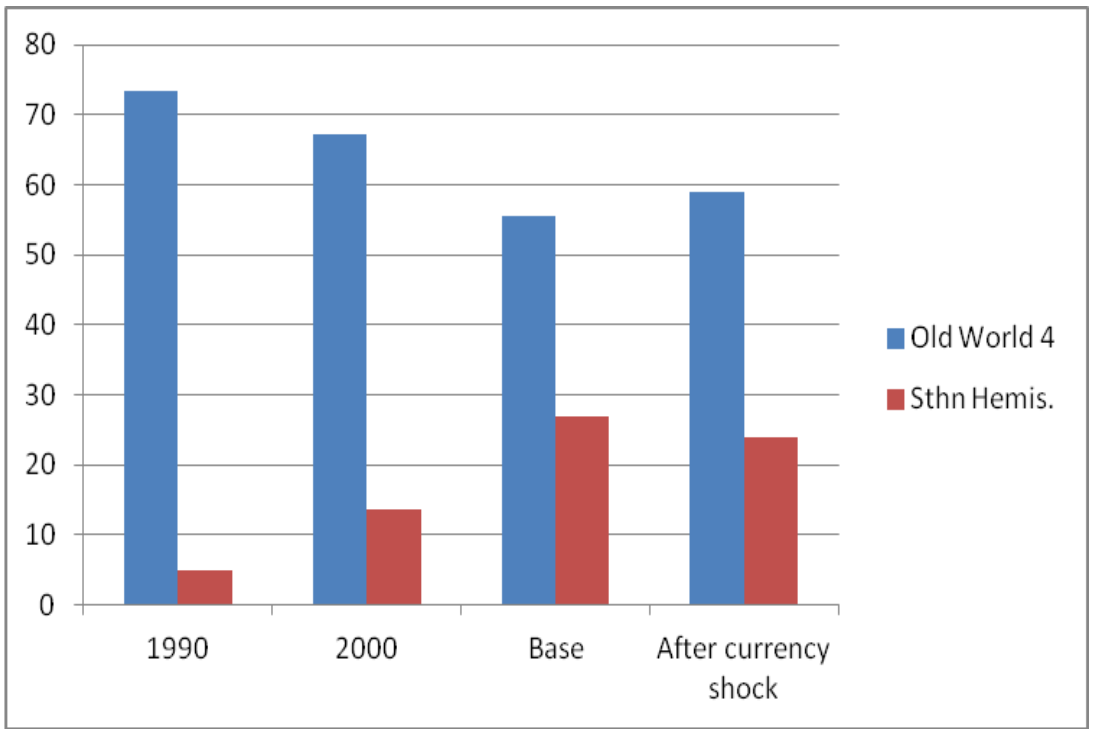


[a] For 2007 the Australian number refers to 2006-08, because 2007 was a severe drought year

Source: Anderson and Nelgen (2011, Tables 51 and 120)

Figure 2: Shares in global wine export volume,[a] 1990, 2000 and before and after real exchange rate changes during 2007-11

(percent)



[a] 'Old World 4' refers to France, Italy, Portugal and Spain; 'Sthn Hemis.' refers to the six Southern Hemisphere New World wine-exporting countries shown in Table 6.

Source: Authors' model results

Table 1: Cumulative changes in exchange rates and prices relative to the US dollar, 2007 to 2011 (percent)

	ϕ_d	P_d^g	P_d^c	ϕ_d^R		ϕ_d	P_d^g	P_d^c	ϕ_d^R
	(1)	(2)	(3)	(4)		(1)	(2)	(3)	(4)
FRA	-1.5	5.8	6.7	0.1	UKR	57.8	91.4	71.4	13.0
ITA	-1.5	6.5	8.6	0.7	TURK	28.5	35.4	35.7	-1.9
POR	-1.5	4.3	6.9	-1.3	AUS	-18.9	16.2	13.0	33.4
SPN	-1.5	4.3	9.0	-1.3	NZL	-7.0	8.8	13.4	9.0
AUT	-1.5	6.9	9.1	1.1	CAN	-7.9	8.5	7.5	9.7
BEL	-3.9	7.3	10.5	4.0	USA	0.0	7.3	8.5	0.0
DEN	-1.4	10.3	10.1	4.1	ARG	32.8	77.2	40.0	24.3
FIN	-1.5	7.3	7.2	1.5	BRA	-14.1	34.4	24.1	45.8
GER	-1.5	3.4	6.5	-2.2	CHILE	-7.4	15.7	5.3	16.4
GRE	-1.5	11.3	14.1	5.3	MEX	13.7	26.0	23.3	3.3
IRL	-1.5	-7.7	1.0	-12.7	URU	-17.7	30.0	33.2	47.1
NLD	-1.5	4.2	7.5	-1.4	SAFR	3.1	35.8	30.8	22.8
SWE	-3.9	7.3	7.2	4.0	OAFR	5.3	52.7	61.9	35.2
SWI	-26.0	3.3	2.9	30.1	CHINA	-15.1	23.2	14.5	35.1
UK	24.9	10.4	14.2	-17.7	HK	-0.2	4.8	13.0	-2.2
BUL	-1.6	22.0	23.3	15.5	INDIA	12.9	34.9	46.5	11.3
CRO	-0.4	13.0	12.2	5.7	JAP	-32.2	-5.8	-1.0	29.4
GEO	1.0	27.4	30.1	17.6	KOR	19.3	12.2	15.2	-12.4
HUN	9.5	16.3	20.5	-1.0	MAL	-11.0	14.3	11.3	19.6
MOLD	-3.3	33.2	30.3	28.4	SING	-16.5	0.7	15.9	12.5
ROM	25.0	31.9	27.8	-1.7	TAIW	-15.1	23.2	14.5	35.1
RUS	14.9	55.6	47.6	26.2	THAI	-11.7	14.5	12.1	20.7

Key: ϕ_d = nominal exchange rate; P_d^g = GDP deflator; P_d^c = CPI; ϕ_d^R = real exchange rate, based on equation (16).

Source: Authors' compilation based on data downloaded from data.worldbank.org.

Table 2: Impact of real exchange rate changes on grape and wine real producer price changes, in local currency, 2007 to 2011

(percent)

	FRA	ITA	POR	SPN	AUT	GER	AUS	NZL	USA	ARG	BRA	CHILE	SAF
Non-premium wine	5.8	4.9	6.2	7.9	4.4	8.2	-31.3	-5.8	7.5	22.2	-18.9	-12.1	-5.7
Commercial-premium	6.5	6.2	8.2	8.2	4.5	9.3	-30.3	-4.9	7.5	23.1	-21.5	-11.4	-3.5
Super-premium	5.0	4.4	7.0	6.1	2.0	5.2	-25.6	-6.8	3.1	20.6	-16.8	-12.5	-0.8
Iconic still wine	2.5	3.2	4.1	4.9	2.0	4.0	-22.9	-7.2	3.3	16.8	-18.3	-14.3	1.7
Sparkling wine	3.2	3.4	5.0	5.6	2.3	4.3	-27.5	-4.9	4.5	28.0	-20.7	-13.1	-5.8
Premium grapes	4.1	4.2	6.6	6.6	1.2	5.7	-31.3	-9.2	2.6	11.6	-24.0	-14.8	-8.4
Non-premium grapes	4.1	4.2	6.2	6.2	3.4	5.7	-33.7	-6.5	6.1	17.2	-24.6	-12.2	-7.9

Source: Authors' model results

Table 3: Grape and wine output volume changes, 2007 to 2011
(percent)

	FRA	ITA	POR	SPN	AUT	GER	AUS	NZL	USA	ARG	BRA	CHILE	SAF
Non-premium wine	0.7	0.4	0.7	0.9	0.3	1.1	-5.5	-1.0	0.6	-5.8	-3.4	-1.6	-5.2
Commercial-premium	1.8	1.4	2.3	1.9	0.8	2.7	-10.4	-1.2	1.4	-10.7	-9.0	-2.6	-8.5
Super-premium	1.3	0.7	1.9	1.1	-0.3	1.3	-6.2	-2.4	-0.4	-13.6	-5.5	-3.5	-7.4
Iconic still wine	0.2	0.1	0.6	0.6	-0.3	0.7	-3.8	-2.6	-0.3	-16.9	-6.7	-4.9	-5.7
Sparkling wine	0.6	0.3	1.3	1.2	-0.3	1.0	-9.8	-1.8	0.1	-11.1	-11.1	-4.9	-14.2
Premium grapes	0.3	0.2	0.7	0.5	-0.4	0.6	-5.6	-1.9	-0.4	-9.5	-5.7	-2.3	-6.4
Non-premium grapes	0.3	0.2	0.7	0.5	0.0	0.6	-6.8	-1.3	0.2	-7.7	-5.9	-1.7	-6.2

Source: Authors' model results

Table 4: Changes in real consumer prices, in local currency, 2007 to 2011
(percent)

	FRA	GER	ITA	SPN	UK	OWE[a]	RUS	AUS	NZL	USA	ARG	BRA	CHILE	SAF	CHINA	JAP
Non-premium wine	3.2	2.9	1.1	0.9	49.5	-3.1	18.9	-27.0	-9.4	5.0	58.0	-11.0	-2.3	0.0	-14.3	-43.9
Commercial-premium	3.6	3.4	2.1	1.1	48.7	-5.9	19.4	-26.5	-8.9	5.3	59.0	-16.0	-1.7	1.9	-16.7	-40.5
Super-premium	2.4	0.8	0.8	-0.4	47.0	-12.4	20.7	-22.4	-10.5	1.5	56.5	-9.9	-2.7	4.0	-16.3	-40.5
Iconic still wine	0.6	-0.1	-0.1	-1.3	43.6	-17.1	18.0	-20.6	-10.4	1.8	53.0	-11.3	-4.2	6.0	-20.7	-42.9
Sparkling wine	1.1	0.0	-0.3	-1.1	43.7	-10.2	24.4	-25.3	-9.6	2.6	63.4	-16.1	-3.5	-1.7	-24.5	-43.7
All other products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[a] Belgium, Denmark, Finland, Ireland, the Netherlands, Sweden and Switzerland

Source: Authors' model results

Table 5: Changes in quantities of wine consumption, 2007 to 2011

(a) percent

	Model estimates of effects of exchange rate changes						*Actual total wine consumption change*
	Non-premium wine	Commercial-premium	Super-premium	Iconic still wine	Sparkling wine	All Wine	
FRA	-1.3	-2.2	-3.2	-2.9	-1.1	-1.7	*-6.9*
GER	-1.2	-2.1	-1.9	-1.9	-0.7	-2.0	*-3.8*
ITA	-0.7	-1.6	-1.9	-2.0	-0.6	-1.1	*-13.7*
SPN	-0.7	-1.1	-0.9	-0.3	-0.2	-0.9	*-22.5*
UK	-4.5	-7.0	-12.4	-17.9	-5.8	-7.7	*-6.6*
OWE[a]	-0.5	-0.4	2.7	6.4	1.6	0.0	*n.a.*
RUS	-0.7	-1.2	-2.9	-2.7	-2.5	2.8	*-0.5*
AUS	3.0	4.5	3.8	2.9	3.8	3.3	*3.1*
NZL	0.7	0.9	3.2	5.3	1.3	-0.7	*0.3*
USA	-1.3	-2.2	-1.2	-2.5	-1.1	-3.5	*2.3*
ARG	-4.4	-7.3	-12.6	-18.2	-8.3	-5.2	*-13.0*
BRA	-0.9	0.9	-3.5	-3.9	0.9	2.6	*-9.1*
CHILE	-1.4	-2.5	-4.0	-4.6	-1.8	-1.9	*-4.6*
SAF	0.8	0.5	-0.7	-3.4	1.9	0.3	*-0.8*
CHINA	-0.2	0.8	1.1	8.9	5.0	0.3	*22.4*
JAP	5.7	6.1	11.5	25.7	9.0	13.5	*-1.7*

(b) millions of litres

	Non-premium wine	Commercial-premium	Super-premium	Iconic still wine	Sparkling wine	All wine
FRA	-13.4	-14.9	-8.7	-0.8	-3.3	-43.5
GER	-21.1	-18.0	-1.8	-0.1	-3.6	-52.5
ITA	-14.2	-9.7	-2.2	-0.2	-1.4	-29.5
SPN	-3.6	-4.6	-0.5	0.0	-0.7	-10.0
UK	-21.1	-72.7	-4.8	-0.5	-6.2	-105.6
OWE[a]	-2.9	-2.0	3.2	0.9	0.1	-1.7
RUS	13.8	22.0	2.4	-0.1	-6.6	34.1
AUS	4.1	7.4	3.1	0.2	1.7	15.9
NZL	-0.4	-0.3	0.3	0.0	-0.3	-0.7
USA	-26.7	-54.4	-13.3	-0.1	-3.7	-99.3
ARG	-35.0	-13.7	-1.1	-0.2	-3.3	-53.6
BRA	-0.8	9.4	0.0	-0.2	0.0	8.2
CHILE	-2.3	-1.2	-0.8	-0.1	-0.1	-4.6
SAF	1.0	0.7	-0.2	-0.1	-0.3	0.2
CHINA	6.9	-3.7	0.1	0.0	0.0	2.8
JAP	1.2	13.6	24.3	0.0	3.3	41.9

[a] Belgium, Denmark, Finland, Ireland, the Netherlands, Sweden and Switzerland

Source: Authors' model results

Table 6: Change in wine consumption in major importers by source, 2007 to 2011 (ML)

UK	FRA (1)	ITA (2)	POR (3)	SPN (4)	AUT (5)	GER (6)	**AllOLDWld[a] (7)**	ECA[b] (8)	USA (9)	AUS (10)	NZL (11)	ARG (12)	BRA (13)	CHILE (14)	SAF (15)	**AllSthHem[a] (16)**	Home sourced (17)	Imports (18)
Non-premium wine	0.9	2.0	0.2	0.1	0.0	0.3	**3.4**	-0.1	0.9	-13.5	-0.7	-1.3	0.0	-3.1	-6.7	**-25.2**	0.0	-21.1
Commercial-premium	-0.6	-4.6	-0.2	-0.8	0.0	-1.2	**-7.5**	-0.7	1.8	-31.4	-1.7	-3.9	0.0	-8.2	-20.7	**-66.0**	0.0	-72.7
Super-premium	-1.1	-0.5	-0.1	0.0	0.0	0.0	**-1.7**	0.0	0.1	-1.3	-1.3	0.0	0.0	-0.2	-0.4	**-3.2**	0.0	-4.8
Iconic still wine	-0.3	0.0	0.0	0.0	0.0	0.0	**-0.4**	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	**-0.1**	0.0	-0.5
Sparkling wine	-0.7	-1.8	0.0	-1.0	0.0	0.1	**-3.4**	-0.1	-0.1	-1.7	0.0	-0.1	0.0	-0.1	-0.7	**-2.6**	0.0	-6.2
Total	-1.8	-4.9	-0.2	-1.8	0.0	-0.8	**-9.6**	-1.0	2.8	-47.9	-3.9	-5.3	0.0	-11.5	-28.5	**-97.2**	0.0	-105.3
USA																		
Non-premium wine	0.7	1.1	0.2	0.3	0.0	0.2	**2.6**	-0.2		-14.4	-0.4	-5.4	-0.1	-3.6	-0.8	**-26.0**	-3.3	-23.4
Commercial-premium	2.2	1.8	0.3	1.2	0.1	0.7	**6.3**	-0.6		-31.0	-0.8	-16.1	0.0	-8.4	-2.6	**-59.2**	-1.2	-53.2
Super-premium	-1.6	-0.6	-0.2	-0.1	0.0	0.1	**-2.6**	0.0		-4.3	-2.6	-0.4	0.0	-0.8	-0.2	**-8.3**	-2.3	-10.9
Iconic still wine	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	0.0		0.0	0.0	0.0	0.0	0.0	0.0	**-0.1**	0.0	-0.1
Sparkling wine	0.2	-0.3	0.0	-0.3	0.0	0.2	**-0.2**	-0.2		-2.4	0.0	-0.4	0.0	-0.1	-0.1	**-3.1**	-0.1	-3.5
Total	1.5	2.1	0.2	1.2	0.2	1.2	**6.1**	-1.0		-52.1	-3.8	-22.2	-0.1	-13.0	-3.7	**-96.6**	-7.0	-91.1
GER																		
Non-premium wine	1.2	7.6	0.4	-2.2	0.6		**7.1**	-8.8	0.3	-3.0	0.0	-0.9	-0.2	-4.2	-10.5	**-19.0**	0.0	-21.0
Commercial-premium	0.6	-2.5	0.0	0.1	1.1		**-1.6**	-3.9	0.5	-1.2	0.0	-0.6	0.0	-1.7	-5.9	**-9.4**	-3.2	-14.8
Super-premium	-0.6	-0.6	-0.1	0.0	0.1		**-1.3**	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0	-0.1	**-0.2**	-0.2	-1.6
Iconic still wine	0.0	0.0	0.0	0.0	0.0		**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	0.0	0.0
Sparkling wine	-0.1	-1.6	0.0	-0.9	0.0		**-2.7**	-1.0	0.0	-0.1	0.0	0.0	0.0	0.0	-0.2	**-0.3**	0.4	-4.0
Total	1.0	2.8	0.3	-3.0	1.8		**1.4**	-13.7	0.8	-4.4	0.0	-1.5	-0.2	-6.0	-16.7	**-28.9**	-3.1	-41.5
OWE[a]																		
Non-premium wine	3.9	5.5	0.9	2.4	0.2	1.3	**14.6**	-0.2	1.0	-5.6	-0.1	-2.8	-0.2	-2.9	-6.9	**-18.5**	0.0	-2.9
Commercial-premium	7.8	6.4	1.1	4.1	0.3	3.4	**24.5**	-0.5	1.4	-6.7	-0.1	-4.0	0.0	-3.4	-10.3	**-24.5**	-2.9	0.9
Super-premium	3.9	1.7	0.3	0.5	0.2	0.7	**7.2**	0.0	0.3	-1.4	-0.5	-0.1	0.0	-0.5	-1.2	**-3.8**	-0.5	3.7
Iconic still wine	0.8	0.3	0.0	0.1	0.0	0.0	**1.2**	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	**-0.2**	-0.1	1.0
Sparkling wine	0.9	0.0	0.0	-0.1	0.0	0.6	**1.3**	-0.2	0.0	-0.5	0.0	-0.1	0.0	0.0	-0.4	**-1.0**	0.0	0.1
Total	17.4	13.9	2.4	6.9	0.8	6.0	**48.9**	-0.9	2.7	-14.3	-0.8	-7.0	-0.2	-6.8	-18.9	**-48.1**	-3.5	2.9
China																		
Non-premium wine	5.0	1.2	0.1	1.6	0.0	0.3	**8.2**	0.2	2.6	4.1	0.1	0.2	-0.9	9.1	0.9	**13.6**	-17.8	24.8
Commercial-premium	7.2	1.6	0.2	1.5	0.0	0.6	**11.4**	0.1	2.2	0.4	0.1	0.1	0.0	4.5	0.1	**5.1**	-23.2	19.4
Super-premium	0.8	0.0	0.0	0.0	0.0	0.0	**0.9**	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	**0.0**	-1.2	1.3
Iconic still wine	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	0.0	0.0
Sparkling wine	0.1	0.0	0.0	0.0	0.0	0.0	**0.1**	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	**-0.1**	0.0	0.0
Total	13.2	2.8	0.4	3.2	0.0	0.9	**20.6**	0.3	4.9	4.4	0.2	0.3	-0.9	13.6	0.9	**18.7**	-42.2	45.5
ECA[b]																		
Non-premium wine	2.8	15.2	0.2	15.5	0.7	3.0	**37.7**		0.8	0.0	0.0	1.1	-11.6	2.7	0.7	**-7.1**	-24.0	35.2
Commercial-premium	4.2	21.3	0.3	18.1	0.9	7.9	**53.3**		0.7	-0.1	0.0	0.7	-0.3	1.5	0.1	**1.7**	-27.6	50.6
Super-premium	1.1	1.5	0.0	0.6	0.0	0.4	**3.7**		0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	-1.9	3.6
Iconic still wine	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**		0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	-0.2	0.1
Sparkling wine	0.9	3.1	0.0	4.5	0.0	1.1	**9.8**		0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	-19.5	8.9
Total	9.0	41.1	0.5	38.6	1.7	12.4	**104.6**		1.6	-0.1	0.0	1.8	-12.0	4.2	0.9	**-5.3**	-73.1	98.3

[a] OWE=Belgium, Denmark, Finland, Ireland, the Netherlands, Sweden and Switzerland. Column (7), All Old World, is slightly more than the sum of (1) to (6) as it includes changes in small trade volumes from other Western European nations. Column (16), refers to All Southern Hemisphere.

[b] ECA=Bulgaria, Croatia, Georgia, Hungary, Moldova, Romania, Russia, Ukraine, plus other former COMECON countries.

Source: Authors' model results

Table 7: Change in global bilateral wine trade flows, 2007 to 2011

(ML)

Importer: / Exporter:	FRA	BEL	GER	UK	OWE[a]	RUS	OEE[b]	USA	CAN	CHIN	JAP	OASIA	AUS	NZL	RofW	**World**
FRA	0.0	4.4	1.5	-2.1	-0.3	6.2	5.0	1.3	3.3	13.1	25.0	4.5	2.1	0.2	24.1	**88.3**
ITA	2.2	0.7	4.9	-5.1	-1.0	31.3	18.9	1.9	2.9	2.8	8.2	0.6	2.2	0.2	21.9	**92.6**
POR	1.3	0.5	0.3	-0.2	-0.1	0.1	0.6	0.2	0.5	0.4	0.4	0.1	0.2	0.0	37.7	**41.8**
SPN	-4.8	0.3	-2.8	-1.9	-0.7	36.3	10.6	1.1	0.9	3.1	3.8	0.4	0.5	0.1	22.3	**69.2**
GER	0.1	0.4	0.0	-1.0	-0.4	9.7	4.9	1.0	0.4	0.9	0.9	0.2	0.4	0.1	6.2	**23.6**
USA	0.2	0.3	1.1	3.0	0.0	0.9	1.2	0.0	6.6	4.9	5.3	2.6	0.1	0.0	7.7	**34.0**
AUS	-0.7	-3.6	-4.2	-47.7	-1.0	0.0	-0.1	-52.1	-7.6	4.3	-0.7	-2.8	0.0	-2.4	-11.2	**-129.8**
ARG	-0.6	-0.8	-1.5	-5.2	-1.1	3.6	-0.1	-22.0	-5.6	0.3	-0.3	-0.3	0.0	0.0	-0.3	**-34.0**
CHILE	-2.8	-1.1	-5.9	-11.6	-1.0	5.0	1.2	-13.1	-2.2	13.4	1.2	-0.6	0.0	0.0	7.6	**-9.7**
NZL	0.0	0.0	0.0	-3.9	0.0	0.0	0.0	-3.9	-0.5	0.2	0.3	0.1	2.8	0.0	-0.6	**-5.6**
SAF	-2.4	-2.3	-16.4	-28.4	-0.6	1.7	0.0	-3.7	-1.9	0.9	-0.2	-0.4	-0.2	-0.2	-13.0	**-67.2**
RofW	-4.3	0.0	-26.0	-1.5	-1.1	-15.8	-29.9	-2.9	-0.2	0.3	0.6	-3.4	0.3	0.0	-2.7	**-86.6**
World	**-11.9**	**-1.2**	**-48.9**	**-105.6**	**-7.4**	**79.0**	**12.5**	**-92.3**	**-3.4**	**44.6**	**44.4**	**1.1**	**8.3**	**-1.9**	**99.5**	

[a] OWE=Belgium, Denmark, Finland, Ireland, the Netherlands, Sweden and Switzerland.
[b] OEE=Croatia, Georgia, Hungary, Moldova, Romania, Ukraine, plus other former COMECON countries (i.e, ECA excluding Russia).

Source: Authors' model results.

Table 8: Change in Australia's wine export and import volumes and values, 2007 to 2011

	Volume (ML)		Value (AUS$m)	
	Exports	**Imports** (and % from NZL)	**Exports**	**Imports**
Non-premium wine	-36.8	0.8 (50)	-106.0	-0.5
Commercial-premium	-77.3	3.2[a](31)	-635.2	6.0
Super-premium	-9.6	1.3 (85)	-70.8	3.2
Iconic still wine	-0.3	0.2 (50)	-35.7	8.9
Sparkling wine	-5.7	2.9[b] (3)	-42.2	3.0
Total	-129.8	8.3 (34)	-889.9	20.6

[a] 32 percent of the increase in commercial-premium wine is from Italy.

[b] 39 percent of the increase in sparkling wine is from France.

Source: Authors' model results

Table A1: Change in global bilateral wine trade flows, 2007 to 2011 (using doubled Armington elasticities)

(ML)

Importer: / Exporter:	FRA	BEL	GER	UK	OWE[a]	RUS	OEE[b]	USA	CAN	CHIN	JAP	OASIA	AUS	NZL	RofW	**World**
FRA	0.0	4.5	0.5	-1.1	13.5	8.1	4.7	0.0	3.6	18.7	30.4	5.0	2.8	0.3	18.9	**110.0**
ITA	3.7	0.8	5.2	-3.7	13.5	39.4	18.9	2.2	3.3	4.0	10.0	0.8	2.7	0.3	14.5	**115.6**
POR	1.4	0.3	0.3	-0.3	1.7	0.1	0.6	-0.1	0.4	0.5	0.4	0.1	0.2	0.0	49.2	**54.7**
SPN	-5.0	0.1	-4.9	-2.0	-3.7	43.9	10.5	1.1	1.0	4.5	4.4	0.5	0.7	0.1	39.1	**90.4**
GER	0.2	0.5	0.0	-0.8	5.9	12.5	4.7	1.2	0.4	1.2	1.1	0.2	0.5	0.1	1.3	**29.0**
USA	0.2	0.4	1.2	5.1	2.5	1.0	1.2	0.0	8.6	7.2	7.1	3.6	0.2	0.0	8.1	**46.4**
AUS	-0.8	-4.2	-4.9	-49.2	-13.8	0.0	-0.2	-58.3	-9.1	7.8	-1.1	-3.6	0.0	-3.0	-0.5	**-140.8**
ARG	-0.8	-1.0	-1.9	-6.7	-9.6	3.7	-0.6	-27.7	-7.1	0.6	-0.4	-0.4	0.0	0.0	12.9	**-39.1**
CHILE	-3.6	-1.4	-7.7	-13.1	-9.3	5.2	0.6	-16.0	-3.0	20.0	1.0	-0.7	0.0	0.0	20.7	**-7.3**
NZL	0.0	0.0	-0.1	-3.8	-0.8	0.0	0.0	-4.9	-0.5	0.3	0.4	0.1	3.5	0.0	0.2	**-5.6**
SAF	-2.7	-2.6	-18.9	-32.1	-20.0	1.8	-0.2	-4.1	-2.2	1.8	-0.2	-0.5	-0.2	-0.3	6.6	**-73.8**
RofW	-4.9	0.2	-16.6	-1.5	-0.3	1.5	-23.2	-2.9	-0.1	1.1	0.7	-3.9	0.3	0.0	-3.1	**-52.7**
World	**-12.4**	**-2.5**	**-47.9**	**-109.2**	**-20.4**	**117.2**	**17.0**	**-109.5**	**-4.7**	**67.9**	**53.9**	**1.3**	**10.7**	**-2.4**	**167.9**	

[a] OWE=Belgium, Denmark, Finland, Ireland, the Netherlands, Sweden and Switzerland.
[b] OEE=Croatia, Georgia, Hungary, Moldova, Romania, Ukraine, plus other former COMECON countries (i.e, ECA excluding Russia).

Source: Authors' model results

Table A2: Change in Australia's wine export and import volumes and values, 2007 to 2011 (using doubled Armington elasticities)

	Volume (ML)		Value (AUS$m)	
	Exports	Imports (and % from NZL)	Exports	Imports
Non-premium wine	-38.9	0.9 (45)	-110.5	-0.2
Commercial-premium	-81.8	3.4 (30)	-669.3	10.2
Super-premium	-12.8	2.1 (90)	-90.5	6.5
Iconic still wine	-0.4	0.3 (90)	-45.4	20.4
Sparkling wine	-7.0	4.0 (3)	-49.8	15.7
Total	-140.9	10.7 (34)	-965.5	52.6

Source: Authors' model results