Wine tax reform: The impact of introducing a volumetric excise tax for wine

James J. Fogarty[a*] and Guy Jakeman[b]

[a]School of Agricultural and Resource Economics, The University of Western Australia, Crawley, WA 6009, Australia

[b]ACIL Tasman

Level 1, 33 Ainslie Place

Canberra City, A.C.T. 2600, Australia

E-mail address: James.Fogarty@uwa.edu.au

6 July 2011

Working Paper 1118

School of Agricultural and Resource Economics

http://www.are.uwa.edu.au

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Citation: Fogarty, J.J. and G. Jakeman (2011) *Wine tax reform: The impact of introducing a volumetric excise tax for wine*, Working Paper 1118, School of Agricultural and Resource Economics, University of Western Australia, Crawley, Australia.

Abstract. In addition to the GST, alcohol sold in Australia is subject to excise tax. Although both beer and spirits are subject to a volumetric excise tax, wine is subject to an additional value added tax known as the Wine Equalisation Tax (WET). The recent Henry tax review recommended substantial changes to Australian alcohol taxation policy. Here, the implications for the wine industry of the Henry tax review recommendations are explored using a computable general equilibrium model. The results show that: (i) replacement of the WET with a revenue neutral volumetric excise tax would have a small negative impact on the wine industry; (ii) removal of the WET rebate would have a substantial negative impact on small wineries; and (iii) applying a uniform alcohol tax equal to the packaged beer excise rate across all alcoholic beverages would have a notable negative impact on the wine industry.

Key words: wine, alcohol taxation, general equilibrium modelling

JEL: R13, H23

1 Introduction

The 2010 Henry tax review found current taxation arrangement for beer, wine, and spirits to be incoherent. To make alcohol tax policy more coherent, the review suggests a number of policy reforms. In brief, the review recommends: (i) moving to a volumetric excise tax for all alcoholic beverages; (ii) the application of excise tax rates that reflect net spillovers, which in the first instance are assumed to be common across beverages; and (iii) the removal of tax exemptions for small wine producers and international travellers.

The reform objectives outlined in the Henry tax review have significant implications for all producers and consumers of alcoholic beverages; but implementing the review recommendations would result in especially significant changes to the way wine is taxed. In the following paper a computable general equilibrium (CGE) model is used to investigate the impact on the Australian wine industry of implementing the Henry tax review recommendations. So that the impact of different changes can be seen, three scenarios are considered. In the first scenario the impact of changing the basis of wine taxation from a value added tax to a revenue neutral volumetric tax is considered. The second scenario assesses the impact of moving to a revenue neutral volumetric excise tax, where in addition, the wine tax rebate system is discontinued. The third scenario considers the impact of applying a uniform volumetric excise tax equal to the current packaged beer rate to all alcoholic beverages.

The structure of the remainder of the paper is as follows. Section two provides context by providing information on externality costs, explaining current alcohol taxation arrangements, and describing the findings of the Henry tax review. In section three, Australian wine production and consumption information is presented, and in section four, the model used is explained. Modelling

results, sensitivity analysis findings, and discussion are presented in section five; with concluding remarks presented in section six.

2 Alcohol taxes, the tax review and externality costs

2.1 Externality costs and current taxation arrangements

The social costs associated with excessive alcohol consumption are substantial. For example, Collins and Lapsley (2008) estimate the social costs associated with alcohol consumption in Australia for 2004-05 as: traffic cost $2,202 million, health cost $1,977 million, crime cost $1,611 million, lost production cost $5,150 million, and intangible morbidity and mortality cost $4,489 million. The extent to which these costs represent externality costs is a matter of debate, with a fundamental issue being whether the unit of consideration should be the family or the individual. If the focus is the family, any negative impacts on family members due to alcohol abuse by a member of the family are internal costs. However, if the focus is the individual, negative impacts on family members must be considered. The difference in the total externality cost between the individual utility model and the family utility model is large, and Freebairn (2010) uses the Collins and Lapsley social cost data to show that the alcohol externality cost under the family utility model is around $5 billion; whereas under the individual utility model externality costs could be as high as $12 billion.

Although there remains room for debate about the appropriate form and extent of alcohol excise taxation, the existence of large externality costs provides a sound theoretical basis for imposing alcohol excise taxes. In Australia, beer excise tax rates vary with alcohol content, and also depend on whether or not the beer is sold in a large keg format or in standard size bottles or cans. For spirits, there is a concessional tax rate for brandy, and for wine a value added tax known as the Wine Equalisation Tax (WET) is levied. Both the excise taxes and the WET apply to consumption bases, with exports exempt and imports taxed. The standard metric used to discuss

alcohol excise taxes is the per litre of pure alcohol (LAL) excise tax rate, and Table 1 provides details on the effective LAL tax rates for a representative sample of alcoholic beverages as at February 2011.[1] As can be seen from the table, low alcohol beer is lightly taxed; keg beer is taxed more lightly than beer of comparable strength sold in cans or bottles; bottled spirits and ready-to-drink spirits are heavily taxed; brandy receives a concessional tax rate relative to other bottled spirits; cask wine is lightly taxed; and premium wine is heavily taxed. The very low tax rate for cask wine is a feature of the Australian alcohol tax regime of significant concern to the health profession (PHT 2008).

Table 1 **Effective alcohol excise tax rates**

Product category	Alcohol (%)	LAL tax rate ($)
Light keg beer	2.5	3.96
Mid keg beer	3.5	15.45
Regular keg beer	5.0	23.18
Light packaged beer	2.5	19.61
Mid packaged beer	3.5	28.72
Regular packaged beer	5.0	32.74
Brandy	37.0	67.66
All non brandy bottled spirits	37.0	72.46
Ready-to-drink spirits	5.1	72.46
Cask wine ($3.60 per litre)	12.6	4.15
Wine ($15 per bottle)	12.6	23.02
Wine ($30 per bottle)	12.6	46.03

Note: Beer excise rates are effective excise tax rates that adjust for the 1.15 percent excise free component.

Source: Beer and Spirits excise tax www.ato.gov.au and wine values use half retail price formula.

There are several important alcohol excise tax exemptions. For consumers, the most prominent exemption relates to international travel; with all adult persons entering Australia from overseas, whether they are visitors or returning citizens, allowed to enter the country with 2.25 litres of alcohol excise tax free. For producers, the most prominent tax exemption applies to the wine industry. Under the WET rebate scheme producers can claim a full rebate for WET paid up to a

[1] Australian excise tax rates are indexed to CPI in February and August each year.

certain amount; which since July 2006 has been $500,000. As the WET is levied at 29 percent of the wholesale value of the wine as it leaves the winery, the WET producer rebate results in the first $1.72 million in wholesale wine sales being excise tax free. For retail sales the Australian Tax Office (ATO) calculates the WET producer rebate as .29 × .50 × dollar value of retail sales. As such, the first $3.45 million in retail sales are excise tax free. Many small producers therefore pay no WET, while for large producers the average WET paid is very close to the headline WET tax rate. Additionally, as premium wine is heavily taxed, the rebate provides a strong incentive for small producers to focus on premium wine production.

2.2 Henry tax review findings and recommendations

The Henry tax review includes several observations and recommendations in the area of alcohol taxation. The first observation is that establishing the optimal alcohol tax is difficult. The optimal alcohol tax calculation is complicated because there is a level of consumption that is not harmful, and excise tax applies to both harmful and non-harmful consumption. The optimal tax formula therefore requires information on externality costs; the demand responsiveness of consumers that consume at non-harmful levels; the demand responsiveness of consumers that consume at harmful levels; and the proportion of harmful and non-harmful consumption (Pogue and Sgontz 1989; Kenkel 1996).

The second observation in the review is that social harm relates to alcohol content, not the type of beverage consumed, or where it is consumed. From this observation it follows that all alcohol excise taxes should be based on alcohol content, and that the WET should be replaced with a volumetric tax. It also implies that the current concessional tax treatment available for keg beer and brandy should be removed. The review then argues that a common volumetric excise tax -- with an exemption for the first 1.15 percent of alcohol by volume -- should apply across all alcoholic beverages. The review highlights that such a system would allow the majority of the technical rules required to administer the current alcohol excise tax regime to be removed and

would also remove the availability of very cheap alcohol products, such as cask wine. Adjustments to the common alcohol excise tax rate would then only be made in light of information on beverage specific externality costs.

The third important observation made in the review is that alcohol excise tax should be concerned with social harm; not industry assistance, regional development, or small enterprise assistance. If the government wishes to provide industry assistance, the review argues that such assistance should be provided in a form "unrelated to the method or quantity of production". The WET rebate provides subsidises to New Zealand producers as well as Australian producers, discourages economies of scale in wine production, and is specifically identified as a poorly targeted program.

Based on these observations the review outlines a reform path for alcohol excise taxation. The most immediate reform called for by the review is the replacement of the WET with a volumetric excise tax (AFTS 2010, p. 443). The review does not explicitly state the excise tax rate that should be used to replace the WET, but the discussion in the review seems to imply moving to a revenue neutral volumetric excise tax as a first step. The longer term reforms suggested are the removal of exemptions for small wine producers, and the application of a common alcohol excise tax equal to the current packaged beer tax rate. The review recommends the current packaged beer tax rate as once the 1.15 percent by volume excise free threshold is taken into account, it is approximately equal to the lower bound alcohol externality cost estimate for Australia contained in Cnossen (2010, p. 236) of $36 per LAL.

3 Wine consumption and production

3.1 Domestic wine consumption

There are several ways of considering alcohol consumption data to determine the relative importance of each beverage. One approach is to focus on the conditional budget share of each

beverage, where the conditional budget share of beverage *i* (*i* = beer, wine, spirits) at time *t* is denoted w_{it}, and is given by $p_{it}q_{it}/M_t$, where p_{it} is the price of beverage *i* at time *t*, q_{it} is the quantity of beverage *i* consumed at time *t*, $M_t = \sum_{i=1}^{3} p_{it}q_{it}$, and $\sum_{i=1}^{3} w_{it} = 1$. An alternative method of presenting information on the relative importance of each beverage is to follow the approach of Fogarty (2006) and consider ethanol share information. The ethanol share of beverage *i*, at time *t,* denoted s_{it}, can be found as $a_{it}q_{it}/E_t$; where a_{it} is the level of alcohol by volume for beverage *i* at time *t*, q_{it} is the quantity of beverage *i* consumed at time *t*, $E_t = \sum_{i=1}^{3} a_{it}q_{it}$, and $\sum_{i=1}^{3} s_{it} = 1$.

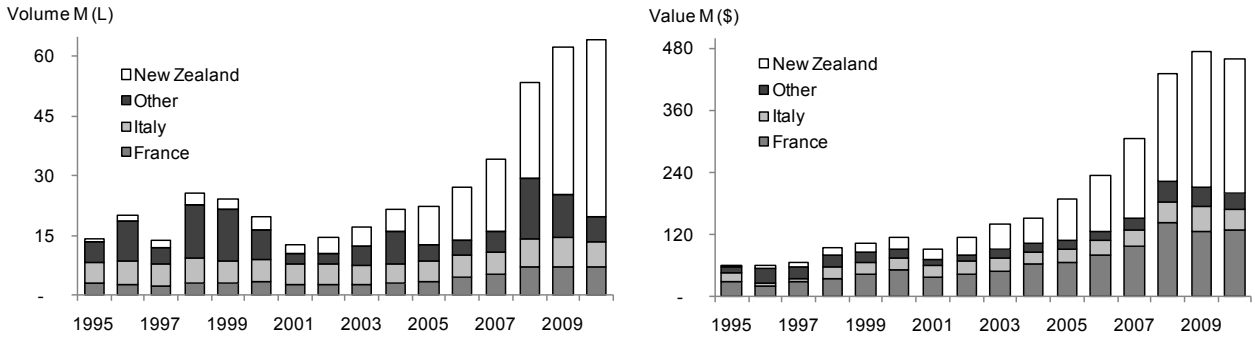
In 1989 total per capita ethanol consumption in Australia was 8.6 litres, and the ethanol shares were: 58 percent for beer, 27 percent for wine, and 14 percent for spirits (ABS 1998). By 2009 total per capita ethanol consumption in Australia had risen to 10.1 litres, and the ethanol shares were: 45 percent for beer, 35 percent for wine, and 20 percent for spirits (ABS 2010a). So, while the Australian alcohol market as a whole has grown over the past 20 years, the relative importance of spirits and wine has increased, and the relative importance of beer has fallen.

Considering Australian wine consumption information in detail reveals that over the past 20 years there has also been a shift towards drinking higher quality wine. The trend towards consumption of higher quality wine can be seen in the shift away from consumption of low quality cask wine towards consumption of higher quality bottled wine. For example, between 1989 and 2009 total per capita wine consumption of domestically produced wine rose from 18.1 litres to 21.5 liters, while per capita consumption of domestically produced cask wine fell from 11.3 litres to 9.0 liters (ABS 2010b; 2010c; 2008; 1998).

A further trend in the domestic wine market has been the growth of imports. For Australia, the most important source country for wine imports in volume terms has historically been Italy, while in value terms it has historically been France. However, New Zealand overtook Italy in

2003 to become the most important source country for wine imports in volume terms, and overtook France in 2005 to also become the most important source country in value terms. The change in the composition of wine imports can be seen in Figure 1, where the figure on the left shows the quantity of wine imports, and the figure on the right shows the value of wine imports. In volume terms New Zealand now accounts for 69 percent of all wine imports, and in value terms New Zealand's market share is now 56 percent (ABS 2010b).

Figure 1 **Volume and value of wine imports into Australia**



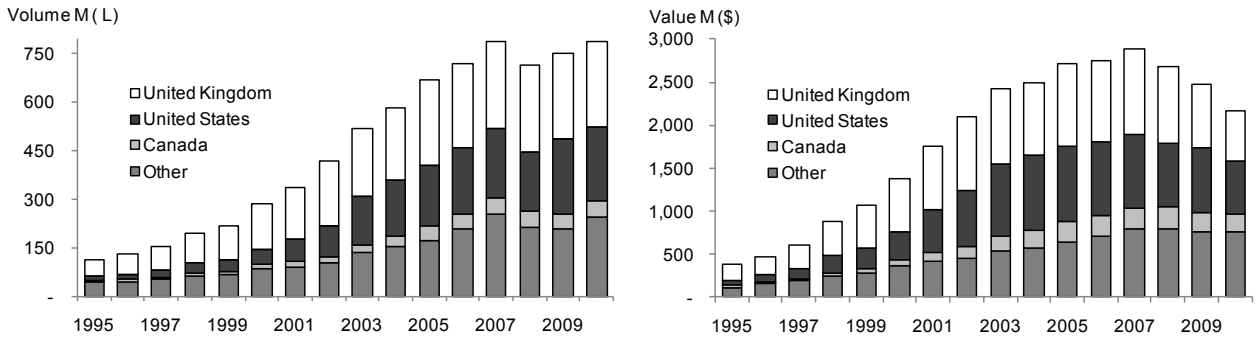
Note: Years are financial years.

Source: ABS (various), *Australian Wine and Grape Industry*, Catalogue 1329.0.

3.2 Domestic wine production

The overall size and focus of the Australian wine industry has changed substantially since the mid 1990s. For example, in 1995 total wine sales were 427 million litres, and about one quarter of production was exported. By 2002 total sales had increased to 804 million litres, and more than half total production was exported. For a variety of reasons, including drought, export volumes have been flat in recent years, but in 2010 the wine industry sold 1,259 million litres of wine, and export sales accounted for almost two thirds of total sales. The most important export destinations for Australian wine are the UK and the US, and these two markets account for 63 percent of export sales in volume terms, and 61 percent of export sales in value terms (ABS 2010b). The volume and value of Australian wine exports since 1995 can be seen in Figure 2.

Figure 2 **Volume and value of Australian wine exports**



Note: Years are financial years.

Source: ABS (various), *Australian Wine and Grape Industry*, Catalogue 1329.0.

Wine production in Australia is highly concentrated, and for the 2010 vintage just 13 wineries accounted for 74 percent of the total national crush (ABS 2010b). Based on the information contained in the AWBC Winefacts database,[2] the three main Australian wine production regions are the Riverland (SA), Swan Hill (Vic.), and Riverina (NSW); and in 2008 these three regions accounted for, respectively, 22.8 percent, 20.7 percent, and 17.1 percent of national production. All three of these regions are hot irrigated regions where yields are relatively high, but per tonne prices for grapes are relatively low. As such, the relative importance of these three regions is significantly lower in value terms, with the Riverland accounting for 15.9 percent of the value of production; Swan Hill accounting for 14.1 percent of the value of production; and the Riverina accounting for 10.4 percent of the value of production. The regions reporting the highest average grape sales prices are: Margaret River (WA), Mornington Peninsular (Vic.), Tasmania, and Yarra Valley (Vic.); and combined, these four regions account for 3.7 percent of production in volume terms, and 7.9 percent of production in value terms.

Over recent vintages there has been a considerable supply-demand imbalance for wine grapes which has meant the prices received by growers have been falling. Based on the values reported in Gunning-Trant (2010), current average prices for red grape varieties are around $1,000 per tonne for cool climate grapes, and a bit less than $500 per tonne for warm climate grapes.

[2] AWBC winefacts database available: www.wineaustralia.com [accessed 4 July 2010].

These prices are approximately half the respective average per tonne prices paid in 2000. The fall in white grape prices since 2000 has been less pronounced than the fall in red grape prices, with average prices for white grape varieties from cool climates falling from around $1,500 per tonne to around $1,000 per tonne, and average prices for white grape varieties from warm climates falling from just over $500 per tonne to just below $500 per tonne. It should however be noted that grape prices in 2000 were relatively high, with average grape prices for the 2000 vintage 81 percent higher than for the 1990 vintage (ABS 2000).

Regarding the overall financial health of the Australian wine industry, some indication of performance can be gained by considering the annual Winemakers' Federation of Australia-Deloitte survey on industry profitability. Table 2 provides details on the average earnings before tax for wineries of different sizes through time, as reported in the various WFA-Deloitte surveys. Performance in the 2006-08 period was impacted by drought, but in general, it is only the largest wineries that have consistently been profitability.

Table 2 **Winery earnings as a percentage of total revenue by winery size (percent)**

Earnings before tax	2002	2003	2004	2005	2006	2007	2008	Ave
Firm revenue less than $1M	-15.9	6.3	0.3	8.1	-18.6	1.9	-7.4	-3.6
Firm revenue $1M to $5M	1.9	-7.9	8.0	2.7	-0.7	-8.7	8.2	0.5
Firm revenue $5M to $10M	7.4	3.8	-4.2	-4.2	12.2	9.8	0.8	3.7
Firm revenue $10M to $20M	24.7	-7.0	-8.7	-7.0	10.0	7.4	-7.4	1.7
Firm revenue greater than $20M	12.3	15.3	10.3	6.3	17.3	18.8	22.1	14.6

Source: WFA- Deloitte (2003 through 2009).

4 Model structure

The core database used for the CGE model was derived from the Global Trade Analysis Project (GTAP) database released in 2008. The database is a fully documented publicly available global

database which contains complete bilateral trade information, and transport and protection linkages among regions for all GTAP commodities.[3]

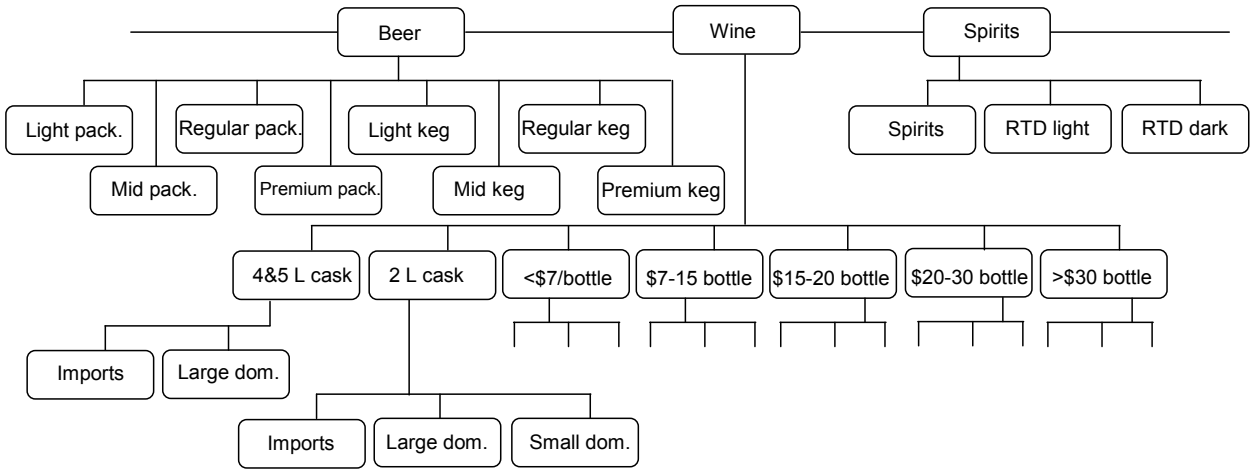
4.1 Consumer utility and model structure

For modelling purposes consumer utility has been represented using a Constant Difference of Elasticities (CDE) utility function. The CDE function was proposed by Hanoch (1975), and in the context of CGE modelling, popularised by Hertel et al. (1991) and Hertel (1997). In the model the three aggregate alcohol products beer, wine, and spirits enter at the top level of the utility function, and below each beverage is a product nest for the individual market segments. For beer, the market segments are: light beer, mid-strength beer, regular beer, and premium beer, all in either keg format or as packaged beer; for spirits, the market segments are: spirits, light ready-to-drink spirits, and dark ready-to-drink spirits; and for wine, the market segments are: 4&5 litre casks, 2 litre casks, wines less than $7 per bottle, wines between $7 and $15 per bottle, wines between $15 and $20 per bottle, wines between $20 and $30 per bottle, and wine costing more than $30 per bottle.

For beer and spirits a CES nest structure has been used to capture substitution between different market segments. For wine, the more flexible CRESH structure has been used. For each wine market segment an additional CES nest is then added to allow for substitution between imported wine, domestic wine from large producers that have a net WET liability, and domestic wine from small producers that have no net WET liability. The detailed database developed assumes small producers do not produce 4&5 litre cask wine products, and so the overall structure of the model can be visualised as shown in Figure 3.

[3] Detailed documentation on the CGE model used is available from the authors on request.

Figure 3 **Utility tree representation of the model structure**



In terms of production costs, small WET free producers are assumed to have production costs that are higher than those of large producers by approximately the value of the WET rebate. This means that across each market segment the retail prices of wines from large wineries and small wineries are approximately the same. It is further assumed that across large wineries and small wineries there is a specific profit centre for each market segment that has a specific capital requirement. The share of capital assumed to be specific to each market segment has been set at 15 percent. This approach means that as demand for a specific market segment falls or rises there can be a slight decrease or increase in the return to that market segment. The overall return to small wineries and large wineries, in terms of the average dollar margin per litre of wine sold, is however held constant. This structure has been chosen as it allows an export response following the tax changes considered. The impact of assuming there is no export response following the tax changes considered is discussed as part of the sensitivity analysis.

For imports, the average per litre import price to Australia for each country of origin has been used to allocate wine imports to different quality categories. To illustrate the allocation process for wine imports, consider the specific case of Italy. The average import price for wine from Italy is $5.69. At the comparable point in the supply chain the assumed average per litre price for domestically produced wine in the $7 to $15 price category is $5.47, and the average price for

wine in the $15 to $20 price category is $8.60. As $5.47 × .93 + $8.60 × .07 = $5.69, the allocation rule used sees 93 percent of the volume of imports from Italy allocated to the $7 to $15 price category, and seven percent allocated to the $15 to $20 price category.

As New Zealand producers are eligible for a WET rebate, and consideration is given to removal of the WET rebate, this feature also needs to be incorporated into the analysis. The only source of information on the value of the WET rebate to New Zealand producers that could be found was Australian Government (2005, p. 39), and this indicated that the value of the rebate to New Zealand producers would reach $9 million by 2008-09. The assumption used is that there are 18 large producers in New Zealand, each receives the maximum rebate of $500,000, and the rebate is allocated across market segments in the same proportion as total New Zealand wine imports.

A range of data sources were used to create the database including: ABS (catalogue numbers 1329, 4307, and 8504), Wittwer et al. (2009), ATO and AWBC data, the WFA-Deloitte benchmarking surveys, and several unpublished industry reports.

4.2 Income, own-price, and substitution elasticity values

The parameterisation of the CDE utility function relies on unconditional compensated own-price elasticity values, and unconditional income elasticity values. Across the alcohol demand studies of Australia that have been published since the 1980s, the average unconditional income elasticity values are: beer .66, wine .65, and spirits 2.08; and the average unconditional compensated own-price elasticity values are: beer -.37, wine -.40, and spirits -.96 (Fogarty 2010).[4] As noted above, for beer and spirits a CES nest has been used to capture substitution between market segments. The default elasticity of substitution value in both these nests has been set at 2.0.

[4] The meta-analysis identified a trend in the data for own-price and income elasticity values which is in part why the sample has been restricted to studies published since the 1980s. The other reason is that the estimation methods of the earlier papers are not especially robust.

A CRESH specification has been used for the wine nest, and for the CRESH specification the compensated own-price elasticity formula can be expressed as $\eta_{ii} = -(1 - s_i^*)\sigma_i$, where η_{ii} is the own-price elasticity of good i, σ_i is the elasticity of substitution for good i, $s_i^* = \frac{s_i/(1-h_i)}{\sum s_i/(1-h_i)}$, where s_i is the (conditional) budget share of good i, $\sigma_i = \frac{1}{(1-h_i)}$, and h_i is a parameter that is less than one, but not zero. As an individual elasticity of substitution value can be specified for each good in the nest, it is possible to set the elasticity of substitution values with target own-price elasticity values in mind. The default price elasticity values are as follows: 4&5 litre casks -.31, premium casks -.42, less than $7 per bottle -.55, $7-$15 per bottle -.66, $15-$20 per bottle -.75, $20-$30 per bottle -.88, more than $30 per bottle -.98. The pattern of the own-price elasticity values being more responsive as quality increases is consistent with the demand structures used in Wittwer and Anderson (2002), and also consistent with evidence for the alcohol market as a whole (Clements et al. 1997). As part of the sensitivity analysis the default own-price elasticity values were scaled up and down by 20 percent and 40 percent. For completeness, the sensitivity analysis also considers a scenario where the market segment level own-price elasticity values were all assumed to be -.66.

For wine as a composite good, the approach of Wittwer and Anderson (2002), where 4.0 is used as the Armington elasticity of substitution between imported wine and domestic wine, and 8.0 is used as the elasticity of substitution for imports from different destinations, appears appropriate. However, as the current application involves several wine categories, these values are not directly applicable. For low value wine substitution is expected to be strong, but for premium wine where terroir is important substitution is expected to be more subdued. Reflecting this, the default elasticity of substitution value for imports, wine from small producers, and wine from large producers has been set at 6.0 for the lowest three wine quality market segments; 4.0 for wine between $7 and $20 per bottle; 2.0 for wine between $20 and $30 per bottle; and 1.5 for wine

costing more than $30 per bottle. The same elasticity values are also used for demand in the rest of the world which imports wine from Australia. As part of the sensitivity analysis these values were scaled up and down by 20 percent and 40 percent, with the implication of assuming a uniform elasticity of substitution value of 4.0 also considered.

4.3 Other assumptions

The actual retail price changes modelled depend in part on the product mark up assumption. Assuming retailers maintain constant absolute margins implies that only the incremental effect of the tax change (and the GST effect) will be passed on to consumers. Assuming a constant percentage margin implies that retailers will pass on more than the additional tax impost for the alcoholic beverages whose prices are rising, and reduce prices further for the alcoholic beverages whose prices are falling. The main results report findings based on the constant per litre retail margin assumption, with the impact of assuming a constant percentage mark up considered as part of the sensitivity analysis.

As the WET is based on value not alcohol content, wine producers have not felt the need to control the alcohol content of the wine they produce, and over the past 20 years the average alcohol content of Australian wine has gradually risen. For example, Godden and Gishen (2005) report that between 1984 and 2004 the average alcohol content of Australian red wine increased by 1.6 percentage points, and that between 1985 and 2000 the average alcohol content of Australian white wine increased by 1.0 percentage point. The change to a volumetric alcohol tax would provide producers with a strong incentive to reduce the alcohol content of their wines. As such, it is assumed that although the revenue neutral tax rate imposed is calculated based on an average alcohol content for wine of 12.65 percent, the actual average alcohol content of wine once the system is introduced is actually 11.65 percent. The impact of assuming producers ignore the incentive to reduce the alcohol content of their wine is noted in the sensitivity analysis.

With a change to a volumetric tax, the value of the WET rebate for products sold in each market segment would change. To simplify matters, for the scenario that assumes a producer rebate system is retained, the assumption used is that if a winery had a zero net WET liability prior to the tax change they have a zero net excise tax liability after the change to a volumetric tax.

5 Results, sensitivity analysis, and discussion

5.1 Domestic wine consumption impacts

The estimated changes in domestic wine prices and consumption for the three scenarios considered are shown in Table 3. Consistent with the Henry tax review recommendations, under all scenarios the first 1.15 percent of alcohol by volume is excise tax exempt.

Table 3 **Domestic price and consumption changes following wine tax reform: by market segment and scenario**

	Scenario A: Revenue neutral volumetric wine tax of $15.75 per LAL, retain producer rebate			Scenario B: Revenue neutral volumetric wine tax of $13.38 per LAL, no producer rebate			Scenario C: Common volumetric alcohol tax of $42.31 per LAL, no producer rebate		
	% Δ price retail	% Δ in quantity	Δ volume M L	% Δ price retail	% Δ in quantity	Δ volume M L	% Δ price retail	% Δ in quantity	Δ volume M L
4&5 litre casks	45.43	(10.99)	(15.40)	37.23	(9.36)	(13.12)	154.33	(26.86)	(37.63)
Premium casks	13.47	(5.31)	(3.07)	11.26	(4.49)	(2.60)	70.00	(20.07)	(11.61)
<$7/ bottle	10.58	(6.13)	(4.13)	10.00	(5.76)	(3.88)	64.58	(22.68)	(15.29)
$7-$15/ bottle	(1.27)	(.71)	(.87)	(1.55)	(.18)	(.22)	27.06	(12.20)	(15.10)
$15-$20/ bottle	(6.43)	5.06	4.75	(5.93)	4.69	4.41	10.91	1.00	.93
$20-$30/ bottle	(6.97)	4.96	1.34	(5.39)	3.49	.94	6.52	3.59	.97
>$30/ bottle	(13.71)	14.38	1.86	(13.66)	14.70	1.90	(6.16)	20.18	2.61
Overall	4.29	(2.97)	(15.52)	3.45	(2.40)	(12.57)	39.16	(14.36)	(75.11)

The modelling suggests that following the introduction of a revenue neutral volumetric tax, with a rebate system retained (Scenario A), the weighted average retail price of domestic wine would increase by 4.3 percent, and total domestic wine consumption would fall by 3.0 percent, or 15.5 million litres. Across the individual market segments, prices would increase substantially for the three lowest quality market segments, be little changed in the $7-$15 per bottle segment, and fall across the three highest quality segments. The biggest impact is on cask wine sales, which fall by 18.5 million litres. Although cask wine sales fall substantially, it is worth noting that in standard drink terms, after the tax change cask wine is still the cheapest alcohol product by a considerable

margin. Specifically, the Scenario A tax change raises the cost of a standard drink in terms of 4&5 litre cask wine from $.34 to $.48, and leaves the cost of a standard drink in terms of regular packaged beer and bottled spirits unchanged, at, respectively, $1.25, and $1.62.

Under Scenario B the producer rebate is removed. The revenue neutral tax rate is therefore slightly lower than under Scenario A. The overall impacts on domestic consumption under Scenario B, are, however, broadly similar to those under Scenario A.

Applying the current packaged beer tax rate to all alcoholic beverages, with the WET producer rebate removed (Scenario C), would have a substantial negative impact on domestic wine sales. All but the most expensive wine would increase in price, and the weighted average price of wine would increase by almost 40 percent. Overall, domestic wine consumption would fall by around 75.1 million litres, or 14.4 percent. The cheapest wine products would increase in price by more than 150 percent, and total cask wine sales would fall by almost 50 million litres. The tax change would substantially reduce the difference in the standard drink price of cask wine and other alcoholic beverages, but in standard drink terms, 4&5 litre cask wine would remain approximately 50 percent cheaper than either regular packaged beer or bottled spirits. Specifically, under Scenario C, the respective standard drink prices for 4&5 litre cask wine, regular packaged beer, and bottled spirits are, $.84, $1.24, and $1.22.

Although details on imports are not reported in Table 3, it can be noted that as imports are strongly represented in the higher price market segments, in general, imports benefit from a shift to a volumetric tax. Additionally, as most imported wine does not benefit from the WET producer rebate, removal of the producer rebate improves the relative competitiveness of most imported wines. The specific impacts on imports under each scenario are as follows: under Scenario A imports increase by 2.4 million litres, or 4.6 percent; under Scenario B imports increase by 4.1

million litres, or 8.6 percent; and under Scenario C imports increase by 1.2 million litres, or 2.0 percent.

5.2 Domestic wine production impacts

For production changes it is helpful to consider separately, production impacts at small and large wineries; and production impacts in terms of sales into the domestic market and sales into export markets. First, consider the information in the last six columns of Table 4 that show the impact on total domestic sales, total export sales, and total production. Under Scenario A, domestic production for the domestic market falls across the cheapest wine market segments; increases across the higher quality market segments; and in total falls by 17.9 million litres. Following the tax change the average per litre profit margin at both large and small wineries is the same as it was prior to the tax change, but as each market segment has a specific profit margin, following the decrease in domestic demand for low quality wines the profit margin for low quality wine shrinks slightly. With a slightly lower profit margin for low quality wine there is an export response equal to approximately one third the loss in domestic sales. The very slight decrease in exports of premium wine arises because with the average per litre profit margin held constant, the slight fall in the profit margin for low quality wine implies a slight increase in the profit margin for premium wines. The impact on total production is given in the final column of Table 4, and the modelling indicates that the introduction of a revenue neutral volumetric wine tax, with the producer rebate retained, would result in domestic wine production falling by 12.2 million litres, or one percent.

Table 4 **Domestic production and supply changes following wine tax reform: by market segment and scenario**

	Small Wineries		Large wineries		Total domestic sales		Total export sales		Total production	
	Δ in quantity ML	% Δ in quantity	Δ in quantity ML	% Δ in quantity	Δ in quantity ML	% Δ in quantity	Δ in quantity ML	% Δ in quantity	Δ in quantity ML	% Δ in quantity
Scenario A: Revenue neutral volumetric wine tax of $15.75 per LAL, retain producer rebate										
4&5 litre casks	.00	.00	(10.86)	(2.45)	(14.77)	(11.21)	3.91	1.26	(10.86)	(2.45)
Premium casks	1.81	58.82	(4.62)	(7.43)	(2.96)	(5.23)	.15	1.69	(2.81)	(4.31)
<$7/ bottle	1.44	3.94	(3.96)	(1.12)	(4.02)	(6.05)	1.50	.46	(2.51)	(.64)
$7-$15/ bottle	(.98)	(3.76)	.52	.28	(.75)	(.65)	.28	.29	(.46)	(.22)
$15-$20/ bottle	(3.05)	(15.48)	5.48	7.23	2.44	3.48	(.00)	(.00)	2.44	2.55
$20-$30/ bottle	(1.00)	(5.71)	1.95	5.86	1.04	4.28	(.09)	(.34)	.95	1.88
>$30/ bottle	(.05)	(8.84)	1.14	8.46	1.10	15.19	(.01)	(.21)	1.09	7.76
Overall	(1.82)	(1.76)	(10.35)	(.89)	(17.90)	(3.80)	5.73	.72	(12.17)	(.96)
Scenario B: Revenue neutral volumetric wine tax of $13.38 per LAL, no producer rebate										
4&5 litre casks	.00	.00	(9.58)	(2.17)	(13.09)	(9.94)	3.50	1.13	(9.58)	(2.17)
Premium casks	(1.36)	(44.15)	(1.14)	(1.84)	(2.66)	(4.70)	.16	1.87	(2.50)	(3.83)
<$7/ bottle	(1.49)	(4.08)	(.77)	(.22)	(3.91)	(5.89)	1.65	.51	(2.26)	(.58)
$7-$15/ bottle	(5.17)	(19.84)	4.85	2.61	(.96)	(.84)	.64	.67	(.32)	(.15)
$15-$20/ bottle	(6.04)	(30.66)	8.25	10.88	2.09	2.99	.12	.48	2.22	2.32
$20-$30/ bottle	(2.07)	(11.87)	2.43	7.31	.50	2.06	(.14)	(.54)	.36	.71
>$30/ bottle	(.16)	(28.10)	1.21	8.97	1.05	14.45	.00	.01	1.05	7.49
Overall	(16.29)	(15.74)	5.25	.45	(16.98)	(3.60)	5.94	.74	(11.04)	(.87)
Scenario C: Common volumetric alcohol tax of $42.31 per LAL, no producer rebate										
4&5 litre casks	.00	.00	(26.05)	(5.89)	(36.06)	(27.38)	10.00	1.26	(26.05)	(5.89)
Premium casks	(1.26)	(41.14)	(9.75)	(15.68)	(11.47)	(20.26)	.45	1.69	(11.01)	(16.88)
<$7/ bottle	(1.57)	(4.29)	(7.73)	(2.18)	(15.11)	(22.76)	5.81	.46	(9.30)	(2.38)
$7-$15/ bottle	(5.18)	(19.88)	(7.51)	(4.04)	(14.63)	(12.70)	1.94	.29	(12.69)	(5.99)
$15-$20/ bottle	(5.42)	(27.54)	4.72	6.23	(.74)	(1.06)	.04	(.00)	(.70)	(.73)
$20-$30/ bottle	(1.73)	(9.90)	2.04	6.12	.54	2.20	(.23)	(.34)	.31	.61
>$30/ bottle	(.12)	(21.20)	1.39	10.34	1.35	18.62	(.08)	(.21)	1.27	9.08
Overall	(15.28)	(14.77)	(42.89)	(3.68)	(76.11)	(16.14)	17.94	.72	(58.17)	(4.58)

Now, consider the information in the first four columns of Table 4 that describe the impact on small and large wineries. For Scenario A, the impact on large wineries mirrors the impact on the industry as a whole, but the impact on small wineries shows the opposite pattern. This is because the production of small wineries is tax exempt, and the change from a value based tax to a volumetric tax shifts the comparative advantage of small wineries away from the production of premium wine towards lower quality wine. With small winery production expected to decrease by 1.8 percent, and large winery production expected to decrease by only .9 percent, in relative terms, small wineries are also more negatively affected than large wineries. The impact on small wineries is greater because, in line with the change in their comparative advantage, they shift production

away from expensive, relatively high margin wine, to cheap, relatively low margin wine, and given average profit per litre is held constant, they are constrained in their ability to lower the prices of their premium wines.

Under Scenario B, the results for total domestic sales, exports, and total production are broadly the same as for Scenario A. The main difference in results is the relative impact on small producers and large producers. Removal of the WET producer rebate results in a substantial increase in production costs for small wineries, and a very small increase in production costs for large wineries. As such, the introduction of a volumetric tax, combined with the removal of the WET producer rebate, results in small winery sales falling in every market segment, and total small winery production falling by 15.7 percent, or 16.3 million litres. For large wineries the gain in relative competitiveness following the withdrawal of the WET producer rebate more than compensates for the impact of a volumetric tax so that unlike Scenario A where large winery production fell by 10.4 million litres, under Scenario B, large winery production increases by 5.2 million litres.

Under Scenario C, total domestic wine production is expected to fall by 58.2 million litres, comprised of a fall of 76.1 million litres in production for the domestic market, and an increase in exports of 18.0 million litres. For small wineries, application of a volumetric tax of $42.31 per LAL means the loss in relative competitiveness due to the removal of the WET is much diminished. As such, the overall fall in sales at small wineries under Scenario C is approximately the same as under Scenario B. With total production at large wineries expected to fall by 42.9 million litres, or 3.7 percent, the impact on large producers under Scenario C is significant.

5.3 Employment and taxation impacts

The change to a revenue neutral volumetric tax with a producer rebate system maintained is likely to result in only modest job losses within the wine industry. Specifically, total direct employment

within the industry is expected to fall by only 150 full time equivalent (FTE) jobs. Although total production at both large wineries and small wineries decreases following the tax change, the implied impact on employment is quite different at small wineries and large wineries. Following the tax change large wineries shift their production focus towards premium wine, and small wineries shift their production focus towards lower quality wine. As premium wine production is relatively labour intensive, the change in production focus implies job growth of 35 FTE jobs at large wineries, and the loss of 185 FTE jobs at small wineries. To put these changes in perspective, note that total direct employment in the wine industry is around 29,000 FTE jobs.

The removal of the producer rebate reduces the competitiveness of small producers substantially. So, while the total FTE job losses under Scenario B are approximately the same as under Scenario A, the net job change is comprised of 921 FTE job losses at small wineries, and employment growth of 774 FTE jobs at large wineries.

Under Scenario C, the employment impacts across the wine industry are somewhat greater than under Scenario A and B. Specifically, employment losses at small wineries are estimated to be 851 FTE jobs, and employment losses at large wineries are estimated to be 1,088 FTE jobs. Total direct industry job losses under Scenario C are therefore equal to 6.8 percent of total direct wine industry employment.

Two additional aspects of the employment impact can be noted. First, the employment impact on the wine industry is not equal to the net impact on employment. As vines in irrigated regions are replaced with other agricultural products, there will be employment growth in these replacement industries. Second, employment impacts will not be felt uniformly across all wine growing regions, with negative impacts concentrated in regions such as Riverland, Swan Hill and Riverina, and positive impacts concentrated in regions such as Margaret River, Mornington

Peninsular, Tasmania, Yarra Valley, and other places that are focused on premium grape production.

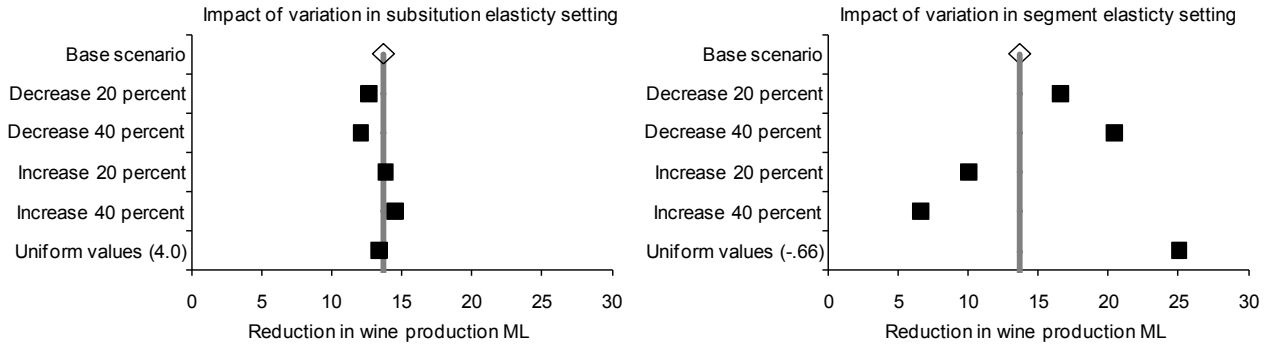
A uniform tax rate equal to the current packaged beer tax rate would also raise an additional $1.1 billion in tax revenue; comprising $1.5 billion in extra wine tax revenue, $.2 billion in extra beer tax revenue, and a reduction of $.6 billion in spirits tax revenue.

5.4 Sensitivity analysis

The move to a revenue neutral volumetric wine tax where a tax rebate program remains in place is thought the most plausible tax reform achievable, and is also consistent with the first stage of reform recommended by the Henry tax review. As such, the sensitivity analysis focuses on the impact of varying the assumptions for Scenario A. The alcohol content assumption and product mark-up assumption were found to have very little impact on the results. The product mark-up assumption does, however, become important when considering scenarios that involve very large price changes, such as those involved under Scenario C. The other assumptions varied as part of the sensitivity analysis related to the market segment elasticity settings; the elasticity of substitution settings; and the possible export response. In terms of approach, the sensitivity analysis follows the ideas and suggestions contained in Pannell (1997).

As can be seen from Figure 4, varying the import vs domestic production substitution elasticity made little impact to the overall result, while varying the market segment elasticity values has a relatively large impact on the result. Specifically, if demand responsiveness is assumed to be uniform across all market categories rather than variable, total domestic demand is estimated to fall by 25.1 million litres, or 2.0 percent, rather than 12.2 million litres or 1.0 percent.

Figure 4 **Sensitivity of results to variation in the elasticity settings**



As noted above, there has been a supply-demand imbalance for wine grapes in recent years. This imbalance is reflected in both harvest information and changes in the area of land planted to wine grapes. For example, approximately nine percent of the area bearing, or 158,000 tonnes of fruit was not harvested in 2009 (Gunning-Trant 2010); and in 2010 the net loss in area bearing was 6,800 hectares (ABS 2010b). Given substantial quantities of grapes are being left on the vine to rot, and given the area being planted to grapes is being reduced, it could be argued that export markets are not a viable destination for surplus Australian wine production. As such, one of the sensitivities explored was a scenario where there is no export response following the replacement of the WET with a volumetric tax. With no export response, the decrease in domestic production is estimated to be 18.4 million litres rather than 12.2 million litres. In percentage terms, holding the export response to zero implies a fall in production of 1.5 percent, rather than the 1.0 percent fall for the case where there is an export response.

5.5 Discussion

The case for moving to a volumetric wine tax is strong, and the results presented suggest that moving to a revenue neutral volumetric tax would not place a substantial additional burden on the wine industry. Although the overall negative impact is likely to be quite modest, negative impacts will be felt most strongly in the Riverland, Swan Hill, and Riverina regions; and positive impacts will be felt most strongly in the premium wine growing regions. In terms of the mechanics of moving to a revenue neutral volumetric tax for wine, a reasonable approach would be to gradually

reduce the WET rate over a number of years, while at the same time gradually increasing the volumetric tax element. Such an approach would provide sufficient time for producers to adjust production, and is also broadly consistent with previously suggested reforms (WWIA 1995).

At the time of the Henry review there was only limited Australian evidence that alcohol externality costs varied by beverage type. However, since the review evidence has been published that indicates alcohol externality costs in Australia do vary across beverage types. Specifically, Srivastava and Zhoa (2010) analysed national drug strategy survey data and found that: heavy binge drinkers are more likely to drink regular strength beer or RTDs; regular beer and RTD drinkers are more likely to drive a car or operate hazardous machinery while under the influence of alcohol; and beer drinkers and spirit drinkers are more likely than wine drinkers to report they missed study or work due to alcohol consumption. The drink driving result is consistent with an earlier study in Western Australia that found: (i) no impact from wine sales at licensed premises to drink driving incidents; (ii) higher spirit sales at licensed premises were associated with more drunk driving but not accidents; and (iii) higher beer sales at licensed premises were associated with more accident and non-accident drink driving (Gruenewald et al., 1999).

Given the large proportion of total alcohol externality costs associated with drunk driving, binge drinking incidents, and lost tax revenue from lower productivity, the findings of Srivastava and Zhoa (2010) suggest that the wine industry could reasonably argue that wine consumption is associated with lower externality costs than other beverages, and as such should be eligible for a concessional tax rate. As such, it would seem appropriate to conduct further research into the extent to which externality costs -- as well as health benefits -- vary across beverage types before lifting the volumetric wine tax above the revenue neutral excise tax rate. More generally, it would seem appropriate to fund research that would generate the information required to set optimal alcohol taxes in line with the conceptual framework of Pogue and Sgontz (1989), and then use this approach to establish the optimal beer, wine, and spirits tax rates.

The rational for the existence of the WET producer rebate is often framed in terms of regional development. It is, however, difficult to disagree with the observation in the Henry tax review that the excise tax system is not the appropriate tool to use for achieving regional development objectives. It is also not clear that wineries are more deserving of tax breaks than other regional business operators. The removal of the producer rebate would, however, seriously erode the relatively competitiveness of many small wineries, and result in a reduction in consumer choice. Before removing the producer rebate, research into the value of the additional consumer surplus generated by the additional wine consumption choices created by the rebate is warranted.

6 Conclusion

The move to a revenue neutral volumetric wine tax, with rebate provisions for small producers retained, would change relative prices for wine products substantially, but in aggregate the change would have only a modest negative impact on the Australian wine industry. The change would, however, result in a substantial improvement in Australian alcohol tax policy. The removal of the producer rebate would have a significant negative impact on small wineries, and application of a common volumetric alcohol tax at the current packaged beer rate would have a substantial negative impact on the wine industry as a whole.

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