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Grape and Wine Research and Development Corporation

Enhancing wine market intelligence through economic research



FINAL REPORT (two year extension) to

GRAPE AND WINE RESEARCH & DEVELOPMENT CORPORATION

Project Number: MOU 03/01

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Date: **3 July 2008**

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1. Executive summary

This project extension continued several of the tasks outlined in the original project. The continuing elements were:

1. Two further updates of the global statistical compendium. Each year's data included a hardcopy version of the global database for printing, plus a CD version and files for the Data Warehouse.
2. 10-year projections for the global wine industry. This task was undertaken twice.
3. Econometric studies of micro-unit data of Australian National Health Surveys and Australian National Drug Strategy Household Surveys on health and labour market outcome of various types/patterns of wine consumption.

Part 1 concerns the need to update and upgrade existing data on global wine markets. This has been undertaken for several years. Further information is downloadable from http://www.awbc.com.au.

Global modelling of wine was undertaken in two reports, fulfilling requirements under part 2 of the project. Whereas pessimism at the time of the final report of the core project in June 2006 concerned depressed winegrape prices, particularly in warm-climate, inland areas, persistent drought and a water supply crisis in the southern Murray-Darling basin have presented new difficulties for the industry. The first set of projections (Wittwer, 2007) concentrated on a comparison between Australia and Chile. Australia's export base, although diversifying, is concentrated among English-speaking nations, United Kingdom, USA, Canada and New Zealand. China has exhibited import growth recently, but the pattern of sales of Australian wine has been puzzling: volumes fell and the value of sales rose in 2007 due to the establishment of wine tasting outlets in Shanghai. Chile has a more diversified export base than Australia, but countries may expect substantial sales growth in the US market over the next decade.

The deep crisis concerning water supply in the southern Murray-Darling basin followed record rainfall deficits in the Snowy Mountains headwaters region in 2006 followed by below average rainfall in 2007. Water allocations were cut drastically for all irrigators in the basin in the 2007-08 season. However, vineyards coped better with water shortfalls than other plantations. Anecdotes indicate that more citrus orchards than vineyards were grubbed in the southern Murray-Darling basin in 2007-08, reflecting both differences in tolerance to reduced water application and a less favourable international market for citrus produce (Wittwer, 2008). But the water-allocation crisis is not over for grape producers in the southern Murray-Darling basin. Even if vineyards are better able to cope with adverse conditions than competing crops, continuing shortfalls in water allocations will place strain on all crop production in the region.

Part 3 relates to a comprehensive microeconometric study of consumer behaviour using large scale individual level data from the Australian National Drug Strategy Household Surveys (NDSHS) over the period of 1991 to 2004. Data from the Australian national Health Surveys are not used due to limited information relating to differentiated alcohol types. There are four components to this part of the project.

1. Changes in consumer taste over time are examined for four types of beer, three types of wine and three types of spirits. Participation rates for both wine and spirits have increased steadily since 1991: nearly doubled for wine and more than doubled for spirits. The rise in spirits consumption is due to increasing popularity of pre-mixed drinks in recent years. Beer has seen a slight decline since 1998. In 2004, wine is still the most popular alcohol drink for Australians.
2. Socio-economic and demographic characteristics of consumers for different types of alcohol drinks are examined. More women drink wine than men. Wine drinkers are more likely to be educated, married and middle aged. Bottled wine is linked to white collar workers and retirees/housekeepers, while cask wine is linked to retirees/housekeepers and unemployed. Heavy bingers and underage drinking are most likely to be linked to normal strength beer and spirits and least likely to be linked to wine. Most likely places for wine consumption are own homes, cafes and restaurants.
3. The correlation between individuals' alcohol drinking behaviour and health status is also studied. Wine drinkers enjoy the highest self-reported overall health status, especially bottled wine drinkers, whilst regular beer drinkers report the lowest health status. In terms of major chronic diseases, beer drinkers report the highest proportions of most of the major chronic conditions including diabetes, heart diseases and high blood pressure, while spirit drinkers report the highest chance for mental health problems. Spirit drinkers report lower proportions of many chronic conditions than wine drinkers due to the link between youth and spirit consumption.
4. An investigation into the relationship between drinking behaviour and labour market outcomes shows that wine consumption is linked to employment in white collar jobs and higher earnings.

2. Forward projections for the global wine industry

1. Outline of "The global wine market in the decade to 2015 with a focus on Australia and Chile"

Australia's wine industry faced the following difficulties in mid-2007:

- depressed winegrape prices in several vintages prior to 2007;
- drought and frost in 2006-07;
- a virtual wipe-out of the 2007 vintage in Victoria's King Valley due to smoke taint; and
- an appreciation of the Australian dollar in response to the resource boom, reducing the competitiveness of Australia's non-mineral exports.

Both Australia and Chile have experienced spectacular wine export growth over that past two decades. The destinations of Australian wine have been relatively concentrated, with sales to the USA, United Kingdom and Canada accounted for over 75% of total wine exports. The top five destinations in 2005, namely USA, United Kingdom, Germany, Canada and Denmark, accounted for just over half of the value of Chile's total exports. However, there are signs of sales growth of Australian wine in markets where Chile previously had an advantage. Australia's sales value to Japan in 2006 exceeded that of Chile, with little difference between sales to Germany. Both Chile and Australia might suffer from currency appreciations in the price-conscious German market.

What gives the Australian industry an advantage over Chile in terms of quality (as reflected by higher averages prices)? It would appear that Australia's advantage stem from long-standing institutional arrangements, through formal grape and wine research, education and training for over a century. Roseworthy's Diploma of Oenology commenced in 1934. The Australia Wine Research Institute was established in 1955. The Cooperative Research Centre for Viticulture came into being in 1992. More recently, the industry established its own Grape and Wine Research and Development Corporation (GWRDC). Charles Sturt University (CSU) at Wagga Wagga in Murrumbidgee region offers degrees in wine science and viticulture, and formally a double degree in both. Wine business or marketing courses are available at CSU, the University of Adelaide and the University of South Australia (Anderson, 2000).

Forward projections

Since the forward projections were repeated for 2006 to 2016 in the subsequent paper outlined in this section, detailed projections for the first paper are not outline here. Rather, we repeat the background information presented in the first paper.

Figure 2.1 shows the trend in per capita wine consumption since 1995 in the four major wine-producing nations of Europe plus Switzerland. For France, Italy, Portugal and Switzerland, there appears to be a downward trend in wine consumed. It might be that there is a taste swing towards premium wines – but a strong swing against jug wine in these four countries masks any positive trend for bottled wine.

Figure 2.1: Western Europe wine consumption – group 1 (litres per capita)

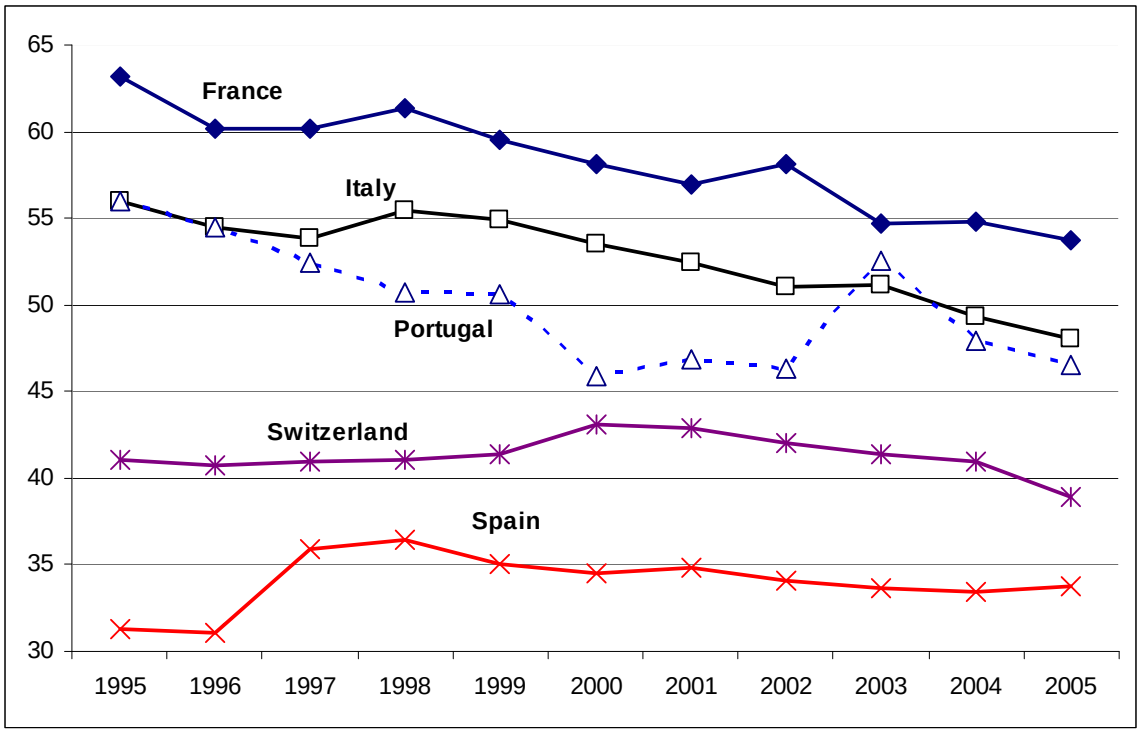


Figure 2.2: Western Europe wine consumption – group 2 (litres per capita)

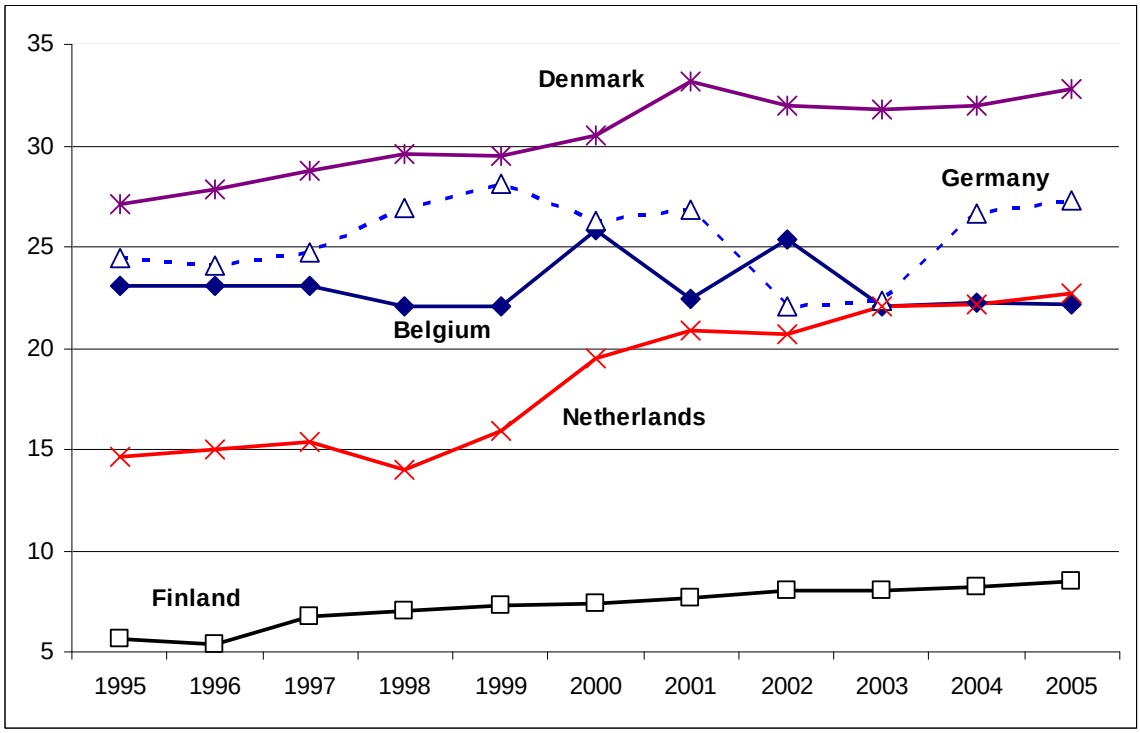
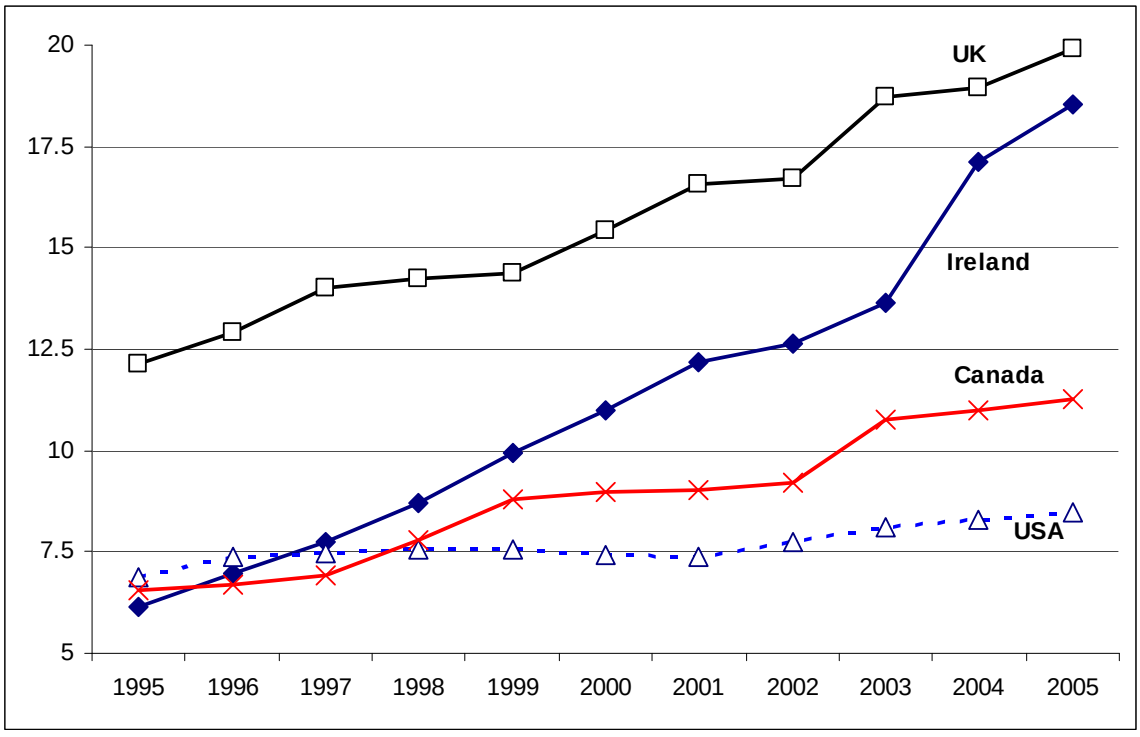


Figure 2.2 shows a different group of Western European consumers. In Denmark, the Netherlands and Finland, per capita consumption is rising and with it good prospects for increased sales from exporting nations. Although Germany's per capita consumption appears relatively stable, there appears to be growing demand for red wine. The Netherlands has become an increasingly important destination for wine from both Chile and Australia, with uncannily similar sales in both value and volume terms since 1999. The Netherlands and Germany give us examples of the importance of understanding what goes on in a particular market. As the world's largest importer of wine, Germany may have been regarded by some exporters as a key market in which to increase sales. Both Chilean and Australian exporters have succeeded in increasing their market shares in Germany. However, the Netherlands remains only a slightly less important destination for these two producers. The difference between Germany and the Netherlands is apparent in figure 2.2: there has been an unambiguous increase in wine consumption per capita in the latter that has enlarged its import demand.

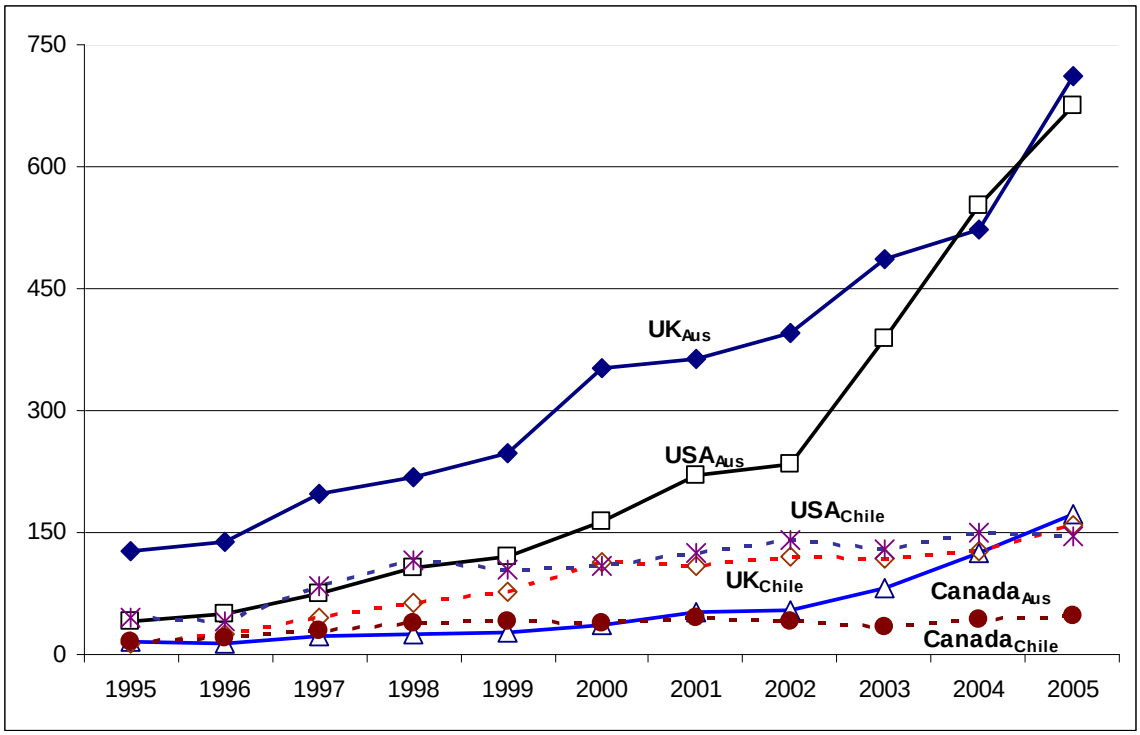
Figure 2.3: Emergent importers wine consumption (litres per capita)



Next, we turn emergent importers, the United Kingdom, USA, Canada and Ireland. The UK's per capita consumption of wine does not appear to have peaked yet. Trends from other countries shown in figures 2.1 and 2.2 seem to indicate that a plateau may appear at around 25 to 30 litres per capita. However, the UK's population is growing relatively slowly. This contrasts with USA, where per capita consumption is still relatively low in most states, and where the population continues to grow rapidly. The US market remains the single most important market for export expansion. Despite the monopolistic marketing arrangements in Canada that potentially may mask changes in consumers' behaviour, it is clearly the third largest buyer of Australian wine after the United Kingdom and USA.

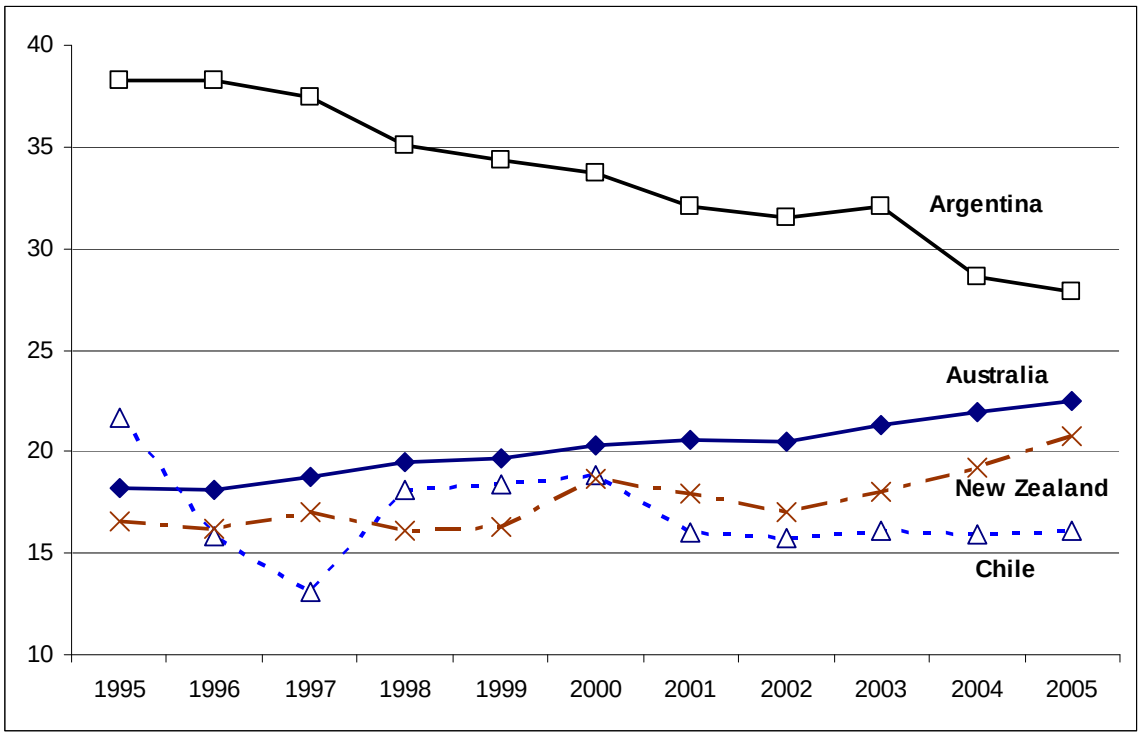
The starkest contrast between the sales trends of Chilean and Australian wine appears when we examine their sales to the largest three emergent exporters, United Kingdom, USA and Canada (figure 2.4). Whereas in other markets (i.e., Denmark, Germany, Netherlands, Ireland), the export growth performance of the two New World producers has been similar, in these three English-speaking nations, Chile's export growth has stopped while sales of Australian wine have raced ahead.

Figure 2.4: Chile's and Australia's exports to emergent importers ($m)



What of the drinking habits among the New World producers? Figure 5 shows us that Australia and New Zealand consumers have raised their per capita consumption. Indeed, bilateral wine trade between the two countries follows comparative advantage. Australia has become an important destination for New Zealand whites, while New Zealand buys Australian reds. Surprisingly little bulk wine makes it way across the Tasman to New Zealand.

Figure 2.5: Consumption: New World producers (litres per capita)



In Chile's case, it would appear that domestic wine was priced out of the reach of domestic consumers as the wine industry became more export oriented in the 1990s. Until the 1980s, wine consumption exceeded 40 litres per capita. As exports took off in the early 1990s, there was a sharp drop in consumption in Chile -- from over 30 litres per capita in the late 1980s to around 20 litres per capita in the 1990s. Exports led to rising wine prices, turning wine into a luxury rather than everyday good. Consumers in Chile started drinking wine more sparingly, reflecting rising prices at home. Moreover, changing demographics and changing tastes appear to have contributed to a switch from wine to beer and spirits among Chilean consumers (Troncoso and Aguirre, 2006). Now, the resources boom that has appreciated currencies throughout the New World might reduce the competitiveness of Chilean wine in some markets. But there is a potential upside: there may be good prospects for increased Chilean wine sales on the home market. If GDP growth in Chile translates into an increase in household disposable income, this combined with a currency appreciation will make internationally traded goods more affordable at home, thereby increasing domestic wine sales. Even to return to the per capita consumption of 1995, Chile's additional domestic sales would amount to around 60 million litres. If Chile's wine producers raised the quality of exports, the home market might provide a destination for commercial premium wine that has lost some competitiveness in some export markets.

In Australia, there is some sort of symbiosis between domestic and export sales. Smaller wineries have until the turn of the millennium concentrated on the domestic market. Wine tourism has played an important part in the profile of the domestic industry. While large corporate wineries may still dominate the volume of Australian exports, small wineries have increased their exports in the past few years. Some have seen this as a necessary strategy as the domestic wine grape glut led to heavy discounting in the domestic market. Even as the share of exports in total sales has

increased, now exceeding 50% of production, the domestic market has remained important – even more so as the average quality consumed has risen. The share of bulk wine in domestic sales has been shrinking over the past two decades. In the 1980s, cask wine sales dominated the volume of total domestic sales. As the consumer discernment has grown, the role of cask wine has diminished. For the first time since the advent of the cask, the volume of table wine sold in bottles exceeded the volume of soft pack sales in 2005 (ABS, 2006). The Australian industry wishes to keep a solid base of domestic sales. Among other considerations, such sales reduce the exposure of wine companies to exchange rate fluctuations.

Has Chile marketed wine in different increments of the quality range in the US market? Chile has some profile in the top end, judging by expensive wines available for purchases via internet sites in USA. But its commercial premium wine, which represents most sales, may not be sufficiently superior to “Two Buck Chuck” for it to remain competitive. If so, the best strategy might be to raise the quality of its currently commercial premium exports so as to differentiate it from the “extreme value” wines. There appears to be plenty of room in the US market for such differentiation.

If Chile starts to increase wine sales to North America, will it do so at the expense of Australia? In all probability, Chile could establish new sales and revitalise its image in the North American market without eating into the sales of other products: there may be plenty of room for all suppliers to expand sales. Differentiation is necessary. USA has the highest average retail prices for wine sales among the large markets. No longer is it sufficient to aim for value-for-money products in the lower commercial premium range.

Figure 2.5: Consumption: New World producers (litres per capita)

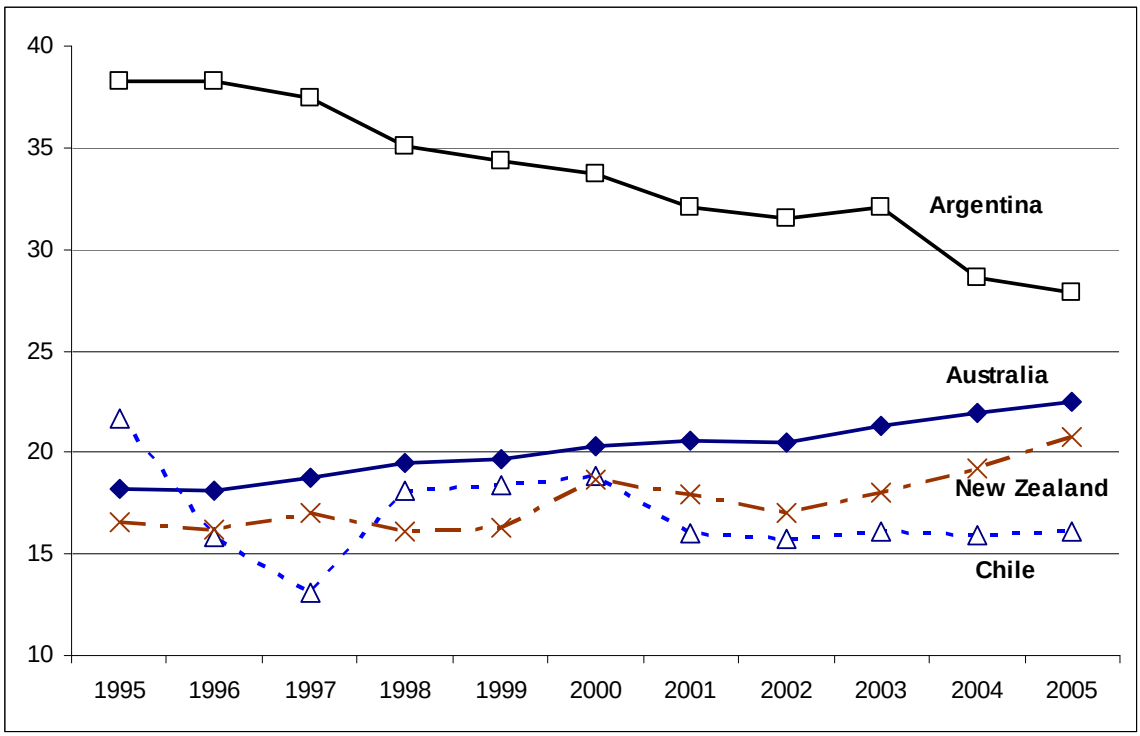
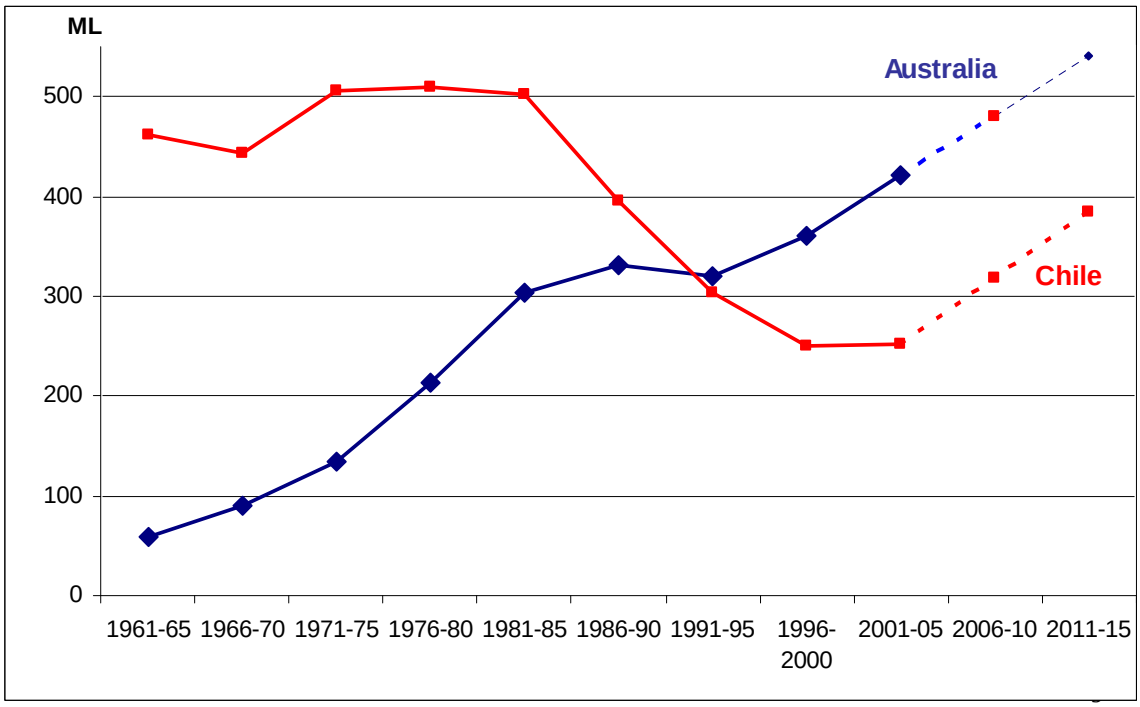


Figure 2.6 shows historical and projected wine consumption for both Australia and Chile. Increased domestic consumption, based on the assumptions used to project the world wine model to 2015, will account for a significant proportion of sales growth in both countries in the future. This is particularly important in Chile, given the observed decline in wine consumption since the early 1980s.

Figure 2.6: Past and future aggregate wine consumption in Australia and Chile



2. Outline of "Will drought erode the competitiveness of Australia's wine industry?"

Various difficulties have led to some loss of confidence in the future of the industry. In the short term, questions concern the impact of the droughts on production, on wine inventories and on the number of hectares of vineyards removed from production. What is the medium-term future of wine grape production in the southern Murray-Darling Basin in the context of domestic supply and global wine trends?

Australia's grape and wine sectors have had to deal with unprecedented market conditions over the past decade. In the mid- to late-1990s, rising export demand resulted in price premiums for red winegrapes from all regions of Australia, signalling the need for matching supply growth. In response, there was an unprecedented level of vineyard plantings. Grape prices started to fall in vintages around the turn of the millennium as new vineyards came into production, particularly for grapes from irrigated regions in the southern Murray-Darling Basin. Now, there is anxiety concerning the future of the industry in the irrigated regions brought on by cuts in water allocations in the 2007-08 season. Water quality has become a growing issue in the lower reaches of the Murray-Darling Basin, with escalating salinity levels due to drought. Also, there may be concern over the long-term future of the industry, given the signs of climate change. The focus of this paper is confined to the medium- rather than long-term. It therefore considers the aftermath of the drought but not the impacts of climate change.

An examination of global wine trends and Australia's place in the wine world is a necessary part of industry analysis. Looking at domestic supply conditions and grape prices from recent vintages, there may be a tendency to view the future with excessive pessimism. Analysis based on Australia's wine export performance over the past decade or more may lead to quite a different conclusion. Australia's export data contain few signs that demand for Australian wine is slowing.

Australian supply in recent vintages

Prices for wine grapes in warm climate regions of Australia bottomed out in the vintages from 2004 to 2006, through a massive increase in supply resulting from plantings of the late 1990s. Then in the 2007 vintage, drought and frosts in south-eastern Australia reduced yields sharply in cooler climate regions and had some effect on water allocations in irrigation regions. Wine production, which had hovered between 1,400 and 1,500 megalitres per annum in the previous three years, fell to 960 megalitres in 2007– the lowest production level in the new millennium. Wine inventories had been climbing with output increases over the past decade or more. Inventories peaked at over 2,100 megalitres in 2006 (ABS, 2008). The production drop in 2007 resulted in a fall in inventories of more than 300 megalitres.

Since many wines are not released until they are two years old or more, wineries tend to carry significant stocks. Recorded inventory volumes in 2006, equal to about one and a half year's production, appeared to be excessive, a consequence of a phase of rapid supply growth. The impact on grape producers was felt most acutely in warm climate inland regions. Wineries paid low prices for grapes, with a proportion of grapes being unpicked. Grapes from these regions account for a large proportion of

cask wine produced in Australia. Less obvious to consumers is that grapes from these regions make up a significant proportion of commercial premium production, used in budget-priced wines. Wine labelled as originating in south eastern Australia in all probability is from irrigated vineyards in the southern Murray-Darling basin.

The Australian Wine and Brandy Corporation (2008a) released an update on the 2008 vintage. Their outlook was that the cooler climate would be up 40% on the 2007 vintage – prior to the extraordinary March heatwave in South Australia. They presented the following outlooks for the southern Murray-Darling Basin:

- Riverina grape output would be up 20% on 2007 due to heavy rains in November/December and 80% water allocations;
- Riverland water allocations were 32% in December 2007, bolstered by water purchases, resulting in a small increase in grape output; and
- Murray Darling/Swan Hill tonnages would be down 10 to 15% on 2007, due to reduced water availability, even after water trading.

Revisiting the future of wine exports to China

There are several reasons why growth prospects for bulk wine exports to China have diminished over the past two years. First, severe drought and frost reduced stocks more rapidly in 2007 than any sales increase would have in a vintage with average yields. Second, there does not appear to be growing demand in China for bulk wine that is bottled on arrival. This contrasts with the UK, Australia's most established export destination, in which an increasing share of commercial premium wine is shipped in bulk. This wine is bottled on arrival for supermarket distribution under labels in which country of origin and grape varieties appear to matter more than brands.

Between 2006 and 2007, there was a remarkable change in the composition of exports, with the volume dropping 16% while the value increased 53%, for an increase in unit values in excess of 80%. This indicates a sudden change in the composition of exports rather than any gradual or ongoing trend. This is as sudden as the increase in imports that occurred after China's two policy changes in 2004. The main reason for this change appears to be due to the establishment of specialty wine retail shops in Shanghai that propelled sales growth in higher quality wines (USDA, 2008). Around half the imports of wine into China arrive in Shanghai.

It is tempting for Westerners to think that with growing incomes, China's consumer tastes will merge with those of the Western world. It might be more pertinent to think of traditions: the partaking of "peasant" wine in Europe might have a role not dissimilar to the consumption of fruit of China. In China, wine consumption is confined to relatively high income-earners in cities mainly on the eastern seaboard. As such, wine is something of a prestige good. It is not an everyday item as in Europe that has penetrated China's food culture. This does not appear to leave much room for growing imports of bulk wine.

This may change over the next decade, but it appears more likely that wine in China in the future will have a similar role to wine in Japan at present. In Japan, wine's role appears to be confined to those with an interest in Western or international cuisine. As

such, consumption in Japan remains at less than 3 litres per capita, smaller than one tenth of that in a number of Western nations.

A development in 2007 in the Far East was that Hong Kong halved its import tariffs on wine from 80% to 40%. Now, tariffs on wine imports have been abolished. This could lead to a jump in Australian exports to Hong Kong. If Hong Kong's imports were confined to local consumption, in value terms the magnitude of any jump would be in tens of millions of dollars per annum, given the relatively small market. But since Hong Kong is a substantial re-exporter, the abolition of the import tax might encourage Hong Kong companies to market wine from around the world in China. This may magnify the impact of the abolition of the tariff. In the projection presented here, the tariff abolition in Hong Kong is not modelled, as the database of the model does not represent Hong Kong separately.

Will booming US demand for wine help Australia?

Although prospects for growth in the value of consumption over the next decade appear to be better in the United States than anywhere else in the world, exporters now must face the prospect of an ever-weakening US dollar. Across the quality spectrum, the weakening US dollar will raise the competitiveness of US wine against imports. Although this effect in isolation is likely to move domestic US consumers towards consumption of US-made wine, it will be constrained by domestic US production. At present, imports account for around 30% of the wine consumed in the United States, offset by exports of about half the volume of imports. California producers around 90% of US wine. Californian winemakers as elsewhere in the world face the prospect of growing water shortages and climate change.

Australian exporters to the United States will need to conscious of maintaining and upgrading wine quality. Competing on price alone may be a hazardous exercise. However, since Australia already has a large base in the commercial premium quality range in the US market, even without substantial growth in the category, such wine sold in the United States will retain a significant share of Australia's overall wine exports.

The future for warm climate inland producers

Red wine grape prices for warm climate inland regions peaked with the 1998 vintage. At the time, such prices were not many-fold lower than for grapes for relatively low yielding vineyards elsewhere. Although prices for white wine grapes from inland regions never soared to the same levels as those for red grapes at the time, prices were high enough to encourage plantings of white varieties.

Since the late 1990s, quality premia for winegrapes have risen. As the prices of warm climate grapes have fallen sharply, the price gap between warm climate grapes and cooler climate grapes has grown. In the vintages of 2004 to 2006, supply growth also affected prices for some cooler climate grapes. Yet prices for grapes from rare, aged vineyards continued to grow – although in the case of some of the most famous wines in Australia, those vineyards are owned by the winery.

Inland grape producers have suffered financial stresses for a number of reasons. First, they have had to deal with low prices arising from supply growth. Second, some input prices, notably those of fertilizer and herbicides, have escalated. Third, two years of drought have resulted in reduced water allocations, soaring prices for water and grape yield decreases. There is evidence of some vineyard grubbing in the warm climate regions in 2007 in the wake of the second year of drought. Such grubbing would start with grape varieties that appear to be less favoured by the wine industry. It would appear that these will have only a marginal effect on Australia's future wine supply.

The two year drought that has affected the southern Murray-Darling Basin has resulted in stress for irrigators across a range of products. Grape growers in the region who previously had to deal with low prices due to extraordinary supply growth have faced new challenges. With drastically reduced water allocations in 2007-08, they have had to perform a balancing act between purchasing water at high prices, reducing water applications per hectare of vineyards or letting vine stocks die. Relative to other producers of perennials, grape growers have some advantages. First, vineyards appear to be hardier than some competing crops in coping with reduced water applications. Second, despite perceptions of growing international competition, the foundation of exports across a range of varieties and qualities of wine is now well-established.[1] In the face of such rapid supply growth around the turn of the millennium, it was virtually impossible for Australia's wine sales growth to be seamless: low prices for grapes produced in some regions, at least for several vintages, may have been inevitable.

Cask wine's share of domestic wine consumption continues to fall: in 2006-07, the volume of soft pack sales fell behind bottled sales in Australia. In 2007-08, cask wine's volume share of domestic sales of Australian wine had fallen to 42 percent (ABS 2008, table 23). The trend of sales of relatively low quality wine falling relative to sales of higher quality wine is global rather than being confined to Australia. In countries with volumetric taxes on wine, low-priced wine is taxed more heavily than in the case of ad valorem taxes (as apply in Australia), thereby playing a part in the movement away from low quality wine. In the southern Murray-Darling Basin, falling demand for cask quality wine in isolation may not be good news. But since the region produces a substantial share of the grapes used in the growing commercial-premium segment of the market, there is some cause for optimism for grape growers in the southern Murray-Darling Basin.

There are signs that better days are ahead for such producers. While pessimism is an understandable response to low prices prior to the present drought, compounded by water woes now, a recovery is possible. A significant share of Australia's current wine export base is sourced from warm climate, inland regions. Vineyards in these regions are important suppliers of grapes for production of commercial premium wines. It might be that an increasing share of Australia's future sales will be of super-premium rather than commercial-premium wines, which will favour the produce of cooler climate regions. The cornerstone of recent wine marketing strategies in Australia has been to raise the quality of exports. However, the signs from export data for 2007 indicate that there is room for exports of different wine qualities.

[1] Other crops such as citrus are facing growing international competition.

Consider the rising quality example: in the US market, despite a substantial appreciation of the Australian dollar against the US from 2006 to 2007, the average unit value of Australian exports in Australian dollar terms rose by 6.5% in this time (Australian Wine and Brandy Corporation, 2008b). This appears consistent with a strategy of raising quality. Yet in the UK market, the average unit value in Australian dollar terms fell by 2.7%. This reflects the increasing share of bulk wine in total shipments. Wine exporters are unlikely to ship super-premium wine in any container other than a labelled bottle. Since Australia has a reputation for value-for-money wines, especially reds, bulk shipments to the UK may continue growing. Such shipments are destined for supermarket shelves under a home brand label. Although this might be a segment of the market regarded as being based on price competition rather than quality, growing green-consciousness may attract consumers. Such wine has "green" appeal, in that shipping is more efficient and local bottles may be recycled readily: this may turn out to be a bonus for the Australian industry.

Australia wine's reputation for value-for-money and reliable quality may be challenged by Chile, Argentina and South Africa. Yet available evidence is that Australia is maintaining its dominance in the UK, US and Canadian markets, its three most important export destinations. Australia experienced strong sales growth to the Netherlands in 2007 (92% in volume terms, 77% in value terms) and surprising value growth in China (16% fall in volume, 53% rise in value) (Australian Wine and Brandy Corporation, 2007). Even if there are signs that some consumers overseas are tiring of Australian wine in the commercial-premium quality range, this has not been translated into sharply falling sales in any market yet. In any case, there are reasonable growth prospects in newer markets such as China. On balance, with a gradual broadening of Australia's export base, prospects remain encouraging.

Revised projection from 2006 to 2016

The main difference between the present projection and that of Wittwer (2007) concerns the supply response.[2] The present projection is less optimistic than the previous study concerning the land, capital and water that will be available for grape and wine production to meet growing global demand for higher quality wines. Water scarcity is likely to constrain growth in grape production in a number of countries, including the United States and Australia. Competing agricultural products will limit the movement of resources into winegrape production: in the case of China, table grapes will continue to be a major alternative product. At the macroeconomic level, China's income growth may not be as high as projected in Wittwer (2007). However, if China's massive trade surpluses fall, aggregate consumption, which drives the expenditure effects in theory of household demand within the World Wine Model, may still increase sharply in China even as GDP growth slows.

This projection takes no account of climate change: it is unlikely that a movement towards cooler regions in winegrape production will be evident by 2016, although climate change has the potential to impose such a change over a longer time period.

[2] Wittwer (2007) reported projections from 2005 to 2015; the present projections are from 2006 to 2016. Notable differences between 2005 and 2006 are the base export volumes of Australia and New Zealand, which grew from 702 ML to 760 ML and 57 ML to 65 ML respectively.

Productivity growth shocks imposed on the projection are slightly smaller than in Wittwer (2007). Wine productivity growth for super-premium, commercial premium and sparkling wine is limited to 5% in the decade to 2016, although some productivity improvements may be masked by quality improvements. For non-premium wine, the imposed productivity gain is 10% but since we assume a taste swing away from this wine, this results in a global decrease in labour and capital used in non-premium production.

The projected outcomes in tables 2.1 to 2.6 are subdivided into different groups of shocks applicable from 2006 to 2016. The macro column (1) represents the portion of the price or quantity change attributable to economic growth (national population and aggregate consumption). The wine taste column (2) shows the impact of a taste swing from non-premium towards premium wines. The supply shift column (3) indicates exogenous changes in land and capital, and total factor productivity growth imposed on the grape and wine sectors.

In examining the impact of global projections on output prices, we need to be aware that in the base year, 2006, warm climate grape prices were at a low level in Australia.[3] The substantial increases in producer prices for commercial premium wine (52.5%, table 2.2) should translate to increased prices for warm climate grapes, albeit from the low 2006 level. Since prices for key inputs including fuel, fertilizer and water are likely to rise or remain high, such producer price increases at worst may do little more than cover rising costs. Nevertheless, reductions in input requirements over time induced by their rising scarcity may offset the impact of rising costs on production.

Table 2.1: Super premium wine output and real price changes, key producers

(% change between 2006 and 2016)

	(1) Macro	+(2) wine taste	+(3) supply shift	=Total output	(1) Macro	+(2) wine taste	+(3) supply shift	=Total price
AUS	7.4	2.3	13.7	**23.5**	47.6	12.3	-15.2	**44.8**
NZL	8.9	2.8	13.5	**25.3**	44.1	12.0	-15.1	**41.0**
USA	6.3	1.9	8.8	**17.0**	50.2	12.4	-15.2	**47.5**
Chile	2.6	0.8	15.3	**18.7**	49.7	12.9	-16.2	**46.5**
SAF	21.6	7.3	2.7	**31.6**	37.9	9.7	-8.6	**39.1**
ARG	7.3	2.1	17.9	**27.2**	54.0	12.7	-30.5	**36.2**
FRA	5.4	1.8	3.3	**10.5**	43.9	12.4	-9.1	**47.2**
ITA	4.7	1.6	-1.1	**5.2**	44.1	12.7	-5.8	**50.9**
POR	4.6	1.8	-0.9	**5.5**	41.9	12.4	-6.3	**48.1**
SPN	5.4	1.8	-0.8	**6.5**	44.6	12.6	-6.7	**50.5**
MOLD	20.1	7.7	7.4	**35.2**	30.9	9.4	-10.2	**30.2**

Source: World Wine Model projections.

In considering Australia's projected output, we should first recall that a substantial proportion of Australia's increased output over the past decade or so has resulted in a build up in wine stocks. We therefore need to define what we mean by "output", as shown in tables 2.1, 2.2 and 2.3. This refers to sales either to domestic consumers or as exports. Australia's apparent output increases reflect in part a slowing down of

[3] The tables do not include changes in grape prices. In Australia's case, grape prices track super-premium and commercial-premium wine producer price changes closely in the projection to 2016.

inventory accumulation: that is, tables 2.1 to 2.3 express output growth in terms of sales rather than output inclusive of changes in stocks. The World Wine Model is not dynamic and therefore does not attempt to model stocks disposal following any economic theory. Beyond a certain level, wine stocks are an accident of rapid expansion – in the cases of Australia and New Zealand – or production policies that are far removed from the needs of consumers, as has been evident in the European Union for several decades.

Tables 2.1 and 2.2 show smaller output responses and larger producer price hikes in response to growing global demand for premium wines than in Wittwer (2007). The traditional exporting nations of Western Europe (i.e., France, Italy, Portugal and Spain) experience output losses in non-premium production (Table 2.3) with relatively small increases in premium production (tables 2.1 and 2.2).

A key difference between premium and non-premium production is reflected in producer prices: they rise substantially for premium production (tables 2.1 and 2.2) while falling for non-premium production (Table 2.3) in real terms. Part of the assumption underlying these results is that demand growth continues for premium wine, whether exported in bottles or in bulk, while falling for non-premium wine. The commercial premium category is likely to include a growing proportion of exports of bulk wine.

Table 2.2: Commercial premium wine output and real price changes, key producers

(% change between 2006 and 2016)

	(1) Macro	+(2) wine taste	+(3) supply shift	=Total output	(1) Macro	+(2) wine taste	+(3) supply shift	=Total price
AUS	6.1	3.2	13.5	**22.8**	45.3	23.0	-15.7	**52.5**
NZL	9.5	4.3	12.5	**26.3**	52.1	22.8	-19.9	**54.9**
USA	4.9	2.5	3.5	**10.9**	47.9	23.3	-13.7	**57.5**
Chile	1.4	0.7	15.5	**17.6**	49.5	23.5	-18.3	**54.7**
SAF	9.2	5.1	3.5	**17.8**	43.5	21.8	-11.7	**53.5**
ARG	6.5	2.8	17.3	**26.5**	53.0	22.5	-35.3	**40.2**
FRA	4.8	3.0	-3.9	**3.9**	41.3	22.7	-7.5	**56.5**
ITA	3.9	2.3	-4.9	**1.4**	40.7	23.1	-6.6	**57.2**
POR	4.3	2.6	-1.6	**5.3**	43.6	23.1	-9.4	**57.4**
SPN	4.8	2.7	-1.4	**6.1**	41.0	22.8	-8.3	**55.5**
MOLD	10.8	4.8	7.2	**22.8**	49.1	20.4	-20.6	**48.9**

Source: World Wine Model projections.

Table 2.3: Non-premium wine output and real price changes, key producers

(% change between 2006 and 2016)

	(1) Macro	+(2) wine taste	+(3) supply shift	=Total output	(1) Macro	+(2) wine taste	+(3) supply shift	=Total price
AUS	0.7	-0.6	5.3	**5.4**	45.4	-36.0	-8.7	**0.7**
NZL	0.3	-0.3	12.1	**12.1**	52.7	-39.3	-19.0	**-5.7**
USA	1.0	-1.0	10.7	**10.7**	44.4	-38.2	-12.5	**-6.3**
Chile	20.5	-16.2	8.8	**13.2**	36.5	-27.7	-9.9	**-1.1**
SAF	24.9	-24.7	10.7	**10.9**	31.7	-29.0	-9.5	**-6.8**
ARG	2.6	-2.2	25.9	**26.3**	43.4	-31.3	-25.5	**-13.5**
FRA	1.3	-1.8	-0.5	**-0.9**	38.5	-38.2	-4.2	**-3.9**
ITA	0.5	-0.6	-16.6	**-16.8**	37.7	-39.4	8.7	**6.9**
POR	3.7	-6.1	2.3	**-0.1**	37.0	-36.9	-5.2	**-5.1**
SPN	1.5	-1.7	5.1	**4.8**	37.9	-36.4	-6.6	**-5.1**
MOLD	20.8	-20.2	6.5	**7.1**	25.5	-21.3	-13.1	**-8.9**

Source: World Wine Model projections.

Next, we consider consumption patterns across different key destinations. Differences reflect mainly differences in population growth and economic growth. For example, in Germany with an aging population that is no longer growing, there is little growth in premium wine consumption (Tables 2.4 and 2.5) combined with a fall in non-premium wine consumption. Australia's consumption of all three types of still wine grows, reflecting a growing population. In China, projected economic growth results in a doubling of super-premium wine consumption over the next decade. There are also substantial increases in commercial-premium and non-premium consumption. Perhaps China and Russia among the large nations provide the largest sources of uncertainty in the global wine market on the demand side. In China's case, changes in imports in 2007 reflected dramatic changes in wine marketing within Shanghai. The extent to which premium wine consumption spreads beyond Shanghai and a handful of other eastern seaboard cities remains a matter for conjecture.

Table 2.4: Super-premium wine consumption and real price changes, key consumers

(% change between 2006 and 2016)

	(1) Macro	+(2) wine taste	+(3) supply shift	=Total consumption	ΔCon ML	(1) Macro	+(2) wine taste	+(3) supply shift	=Total real consumer price
AUS	17.2	2.0	7.2	**26.4**	12	24.7	6.5	-7.6	**23.6**
USA	9.4	2.0	6.0	**17.3**	174	24.9	6.5	-6.6	**24.9**
UK	-5.4	1.9	4.7	**1.1**	3	23.4	6.5	-5.7	**24.2**
China	81.6	19.7	6.7	**108.0**	7	23.8	6.2	-5.2	**24.9**
GER	-1.8	1.7	0.4	**0.4**	0	20.7	6.7	-0.5	**26.9**
NLD	-7.5	2.1	3.7	**-1.7**	0	21.2	6.2	-4.5	**22.9**
IRL	-11.4	1.8	4.8	**-4.8**	-1	23.8	6.5	-5.9	**24.4**
JPN	5.4	2.5	4.3	**12.2**	20	19.5	5.7	-4.7	**20.5**
SPN	-0.1	1.8	3.5	**5.2**	0	23.6	6.7	-4.2	**26.1**
Rus	26.9	4.4	6.0	**37.3**	53	26.2	5.1	-7.5	**23.9**

Source: World Wine Model projections.

Table 2.5: Commercial-premium wine consumption and real price changes, key consumers

(% change between 2006 and 2016)

	(1) Macro	+(2) wine taste	+(3) supply shift	=Total consumption	ΔCon ML	(1) Macro	+(2) wine taste	+(3) supply shift	=Total real consumer price
AUS	13.6	2.4	3.8	**19.8**	29	24.9	12.6	-8.6	**29.0**
USA	9.0	2.6	3.2	**14.7**	163	25.4	12.4	-7.6	**30.2**
UK	-0.5	2.6	2.5	**4.6**	39	23.3	12.1	-6.3	**29.1**
China	31.7	12.4	4.5	**48.6**	70	45.6	20.0	-8.9	**56.7**
GER	-1.2	2.6	1.5	**3.0**	38	22.1	12.2	-4.0	**30.3**
NLD	-1.8	2.8	1.8	**2.8**	8	22.6	12.1	-4.9	**29.8**
IRL	-4.2	2.7	2.6	**1.0**	1	23.9	12.2	-6.9	**29.3**
JPN	3.7	3.3	2.9	**9.9**	26	17.5	9.7	-6.6	**20.7**
SPN	1.1	2.5	1.8	**5.4**	49	22.3	12.4	-4.5	**30.2**
Rus	11.2	3.7	4.8	**19.8**	155	25.9	10.3	-11.9	**24.2**

Source: World Wine Model projections.

In Russia's case, there has been growing demand in the past decade for Western goods among urban elites. The trade ban imposed on wine from Moldova and Georgia in 2006 has resulted in changes of origin of wines destined for Russia, but such changes may be transient.

Table 2.6: Non-premium wine consumption and real price changes, key consumers

(% change between 2006 and 2016)

	(1) Macro	+(2) wine taste	+(3) supply shift	=Total consumption	ΔCon ML	(1) Macro	+(2) wine taste	+(3) supply shift	=Total real consumer price
AUS	10.7	-10.1	1.5	**2.1**	8	25.4	-20.2	-4.8	**0.4**
USA	7.7	-9.9	2.0	**-0.1**	6	23.7	-20.4	-6.4	**-3.1**
UK	0.3	-9.9	1.1	**-8.5**	-26	21.8	-19.5	-3.9	**-1.6**
China	28.3	45.8	3.7	**77.9**	277	32.1	-0.4	-9.4	**22.4**
GER	-0.9	-10.0	0.5	**-10.4**	-59	19.9	-19.0	-2.0	**-1.1**
NLD	-0.2	-10.2	1.0	**-9.4**	-4	20.2	-18.9	-3.6	**-2.3**
IRL	-2.0	-9.9	0.7	**-11.2**	0	20.6	-19.5	-2.5	**-1.3**
JPN	0.8	-10.1	1.3	**-7.9**	1	21.4	-18.5	-4.4	**-1.5**
SPN	0.6	-9.7	1.1	**-8.0**	-22	20.7	-19.9	-3.6	**-2.8**
Rus	8.5	-12.6	1.9	**-2.2**	-12	14.7	-12.1	-6.6	**-4.0**

Source: World Wine Model projections.

Some marketers may believe that Russia presents a unique opportunity for wine sales growth. But government policies in Russia appear to be concerned increasingly with addressing high levels of alcoholism in the population. In part, this motivation may have provided a smokescreen for the trade bans on Georgian and Moldovan wines in 2006 and 2007; it is more likely that such bans were aimed at suppressing perceived anti-Russian directions in the evolving foreign policies of these two former Soviet republics. It is possible that wine's share in total alcohol consumption in Russia will increase over time. Such a trend might reflect a gradual orientation towards Europe in

Russian tastes. On the other hand, policies aimed at reducing alcohol consumption in Russia might thwart growth in wine consumption.[4]

Table 2.7 shows projected export growth by different wine-producing nations. The most surprising result in this table is that in volumetric terms, Argentina will experience the largest growth in wine exports – an increase of over 200 megalitres. This growth will come mainly from commercial premium sales. Argentina's export growth reflects a large projected increase in production in the decade to 2016 than other nations (tables 2.1 to 2.3). In 2006, Argentina's exports to Russia increased by over 50 megalitres, due to the ban on wine from Moldova and Georgia. Australia's export growth is somewhat smaller than in previous projections (Wittwer, 2007). The projected growth implies an annual export volume of around 880 megalitres by 2016. This is consistent with wine availability in the two or three vintages prior to 2007 combined with a slowing of wine inventory build ups in that period. Since some grapes were not picked in 2006, production levels may reach the levels recorded prior to 2007 even if there is some vineyard grubbing.

Table 2.7: Export growth by producing nation

(change between 2006 and 2016)

	AUS	NZL	USA	Chile	ARG	FRA	ITA	POR	SPN	MOLD
	Change in export value ($US million)									
Super prem	355	58	12	16	11	462	149	12	26	0
Commerc prem	226	11	81	86	225	45	-9	20	71	54
Non-prem wine	-10	0	23	20	38	24	-131	4	29	2
	Change in export vol (ML)									
Super prem	58	8	2	2	2	64	24	2	4	0
Commerc prem	74	4	26	30	123	16	0	7	45	47
Non-prem wine	-9	0	19	42	89	29	-185	12	70	5

Source: World Wine Model projections.

Table 2.8 shows the change in import values and volumes by destination for the decade to 2016. In value terms, the US market accounts for the largest growth. China has the largest volumetric growth. One surprise is the Russia's imports do not grow more, given the large projected increase in wine consumption. Russia's additional consumption is supplied to a large extent by additional home production.

Next, Table 2.9 shows the sources of growth in Australia's export sales. Despite relatively modest volumetric growth in sales to the United States and United Kingdom, growth in value terms to these destinations is substantial, due to large existing export bases combined with increases in the unit value of exports. Given the developments in 2007, the projections for growth in premium sales to China shown in Table 2.9 may be pessimistic.

[4] India is one rapidly growing major economy that we do not represent separately in the World Wine Market. Despite rapid economic growth, there is little sign that India's wine consumption is growing rapidly (except in proportional terms from a tiny base). It appears that in India, climate, food and culture are conspiring against growth in wine consumption. In the Far East in Japan and China, cultural factors may slow growth in wine consumption. India adds the climatic dimension to cultural considerations: much of India is too hot for wine consumption.

Table 2.8: Import growth by consuming nation

(change between 2006 and 2016)

	AUS	USA	UK	China	GER	NLD	IRL	JPN	Rus
	Change in import value ($US million)								
Super prem	19	494	16	46	8	-7	-5	31	31
Commerc prem	1	190	108	170	103	18	1	-24	51
Non-prem wine	0	-7	-23	151	-38	-4	0	-2	-3
	Change in import vol (ML)								
Super prem	2	72	3	7	1	-1	-1	4	5
Commerc prem	1	63	39	56	41	7	1	-7	51
Non-prem wine	4	1	-26	234	-59	-4	0	1	-12

Source: World Wine Model projections.

Table 2.9: Australian export growth by destination

(change between 2006 and 2016)

($m)	USA	UK	China	GER	NLD	IRL	JPN
Super prem	397	157	21	5	3	12	16
Commerc prem	228	297	19	34	20	11	2
Non-prem wine	-3	-13	21	-3	-1	0	-1
(ML)							
Super prem	25	2	2	0	0	0	1
Commerc prem	30	26	5	4	2	1	0
Non-prem wine	-2	-14	21	-3	-1	0	0

Source: World Wine Model projections.

Conclusion

Since the US market continues to be important to Australia, accounting for over 30% of value of Australia's wine exports, it is significant that US producers are in a similar position to Australia's producers. That is, water scarcity in California, which accounts for 90% of US wine production, has worsened. One possibility is that grape and wine producers in other countries are not facing such severe water crises. Another possibility is that Australia's and California's water issues are typical of a global problem. If so, this imposes a considerable constraint on grape production in the medium term. In turn, this places a limit on growth in international competition, which may be of some comfort to Australian producers.

The worst outcome for grape producers in the southern Murray-Darling Basin – and indeed, all irrigators, urban users and the environment – is that rainfall in the catchment regions of Australia remains below average for another year or two. While the droughts of 2006 and 2007 may have led to improvements in strategies to deal with extreme water scarcity by irrigators and water managers, grape growers would benefit from several years of respite before such strategies need to be enacted again.

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3. Econometric Study of Wine Consumption and other Alcohol Drinks

Alcohol consumption is an integral part of Australian lifestyle. According to the World Drink Trends (WDT02), Australia was 19th in the world in terms of per capita alcohol consumption, with 7.8 litres of pure alcohol consumed per person per year. This ranked Australia behind major European countries but ahead of the US, Canada and New Zealand. When broken down to specific alcohol types, an average Australian consumed 95 litres of beer (9th in the world), 19.7 litres of wine (18th in the world) and 1.3 litres of pure alcohol from spirits (34th in the world) in the year.

In 2004, 6.8 million Australians (41% of the population) drank at least weekly and 1.5 million (9%) consumed alcohol on a daily basis (NDSHS 2005). Daily drinking was more common in the 50 and over age group, and among daily drinkers males were found to be twice as likely to drink as females.

The analysis in this report uses data from the 1991-2004 Australian National Drug Strategy Household Survey (NDSHS). NDSHS is a nationally representative survey of the non-institutionalised civilian population aged 14 and above in Australia. The survey has been conducted every two or three years since 1985. It collects information on individuals' behaviour, awareness and opinion in relation to a range of licit (such as alcohol and tobacco) and illicit (such as marijuana) recreational drugs. Up to 30,000 individuals were involved in each of the more recent surveys. Data from the 2007 survey are not yet available to us at the time of the study.

3.1 Trends in Consumer Tastes by Alcohol Types

Table 3.1 presents the proportions of the population who have consumed particular types of alcohol drinks in the 12 months prior to the surveys over the period of 1991-2004. It is obvious that participation rates for wine and spirits have increased consistently over the fourteen year period, while participation for beer has started to decline since 1998. The percentage of wine drinkers increased steadily from 27.7% in 1991 to 52.3% in 2004. The percentage of beer drinkers has increased from 31.9% in 1993 to 46.2% in 1998, and then decreased to 42.2% by 2004. Notably, prevalence for spirits has risen dramatically from 14.4% in the early 1990's to 43.9% in 2004. The significant increase in spirits consumption is due to the increasing popularity of pre-mixed RTDs (ready-to-drink), or 'alcopops', that have been the attention of recent government policy and media reports.

Unfortunately, detailed information on types of alcoholic drinks did not become available until the 1998 survey. Looking at the changes in the components of spirits since 1998 when the data first became available, while the bottled spirits has shown a decline in participation rate, the pre-mixed drinks in cans and in bottles have both increased steadily since 1998. The decline in beer participation is reflected in all beer types. Participation rates for regular and mid-strength beer have both declined steadily since 1998. Participation in low alcohol beer and home-brewed beer has also declined between 2001 and 2004.

Table 3.1: Participation Rate by Types of Alcohol Drinks

	1991	1993	1995	1998	2001	2004
Beer (B)	**34.9%**	**31.9%**	**41.9%**	**46.2%**	**43.9%**	**42.2%**
Regular strength beer (RSB)				29.6%	27.6%	24.3%
Mid strength beer (MSB)				13.7%	12.5%	11.2%
Low alcohol beer (LAB)				17.3%	18.5%	16.3%
Home-brewed beer (HBB)				n.a	3.5%	2.9%
Wine (W)	**27.7%**	**29.3%**	**40.0%**	**49.9%**	**51.5%**	**52.3%**
Cask wine (CW)				18.2%	17.1%	16.6%
Bottled wine (BW)				45.4%	46.2%	46.6%
Fortified wine (FW)				9.3%	13.8%	11.6%
Spirits (S)	**17.6%**	**14.4%**	**29.6%**	**42.9%**	**42.6%**	**43.9%**
Pre-mixed spirits in a can (PMSC)				12.4%	14.0%	16.9%
Bottled spirits (BS)				37.1%	35.3%	34.0%
Pre-mixed spirits in a bottle (PMSB)				10.3%	13.5%	15.1%
Other (O)	**3.4%**	**2.4%**	**4.3%**	**11.4%**	**5.5%**	**4.5%**

Source: NDSHS (2004).

The small increase in wine participation rate since 1998 has been led by the increase in the consumption of bottled wine. A rise in participation rate was also noted in fortified wine between 1998 and 2001 but the trend was not maintained in 2004. On the other hand, despite commentators noting that cask wine receives favourable tax treatment, a steady decline was noted in cask wine consumption between 1998 and 2004. Note however that data on quantities of consumption rather than participation are needed to investigate closely the trend for cask wine. The figures clearly indicate individuals' preference for bottled wine. In 2004, 47% of the population drank bottled wine, in comparison to 16% and 12% for cask wine and fortified wine respectively. These sum to little more than the overall 52% wine participation rate for 2004: without looking further into the cross correlation for different wine types, it seems that individuals tend to stick to a particular wine type and only a small proportion of the population jointly consumes more than one type of the wine product. A similar story emerges for beer products: 42% of the population drank beer in 2004 -- 24% of the population drank regular strength beer, 11% mid strength, 16% low alcohol beer, and 3% of the population drank home-brewed beer.

3.2 Consumer Characteristics by Alcohol Types

Next, we report consumer socio-economic and demographic characteristics for individual types of alcohol drinks. For example, we identify differences between drinkers of bottled wine and cask wine. The data also confirm the link of RTDs with young students, and pre-mixed bottles with young females. We also look at binge drinking and underage drinking by alcohol drink types.

Table 3.2: Participation Rate by Demographic Groups for 2004

	B	RSB	MSB	LAB	HBB	**W**	CW	BW	FW	**S**	PMSC	BS	PMSB	**O**
Overall	***42.2%***	***24.3%***	***11.2%***	***16.3%***	***2.9%***	***52.3%***	***16.6%***	***46.6%***	***11.6%***	***43.9%***	***16.9%***	***34.0%***	***15.1%***	***4.5%***
MALE	**67.4%**	40.3%	18.6%	24.9%	5.0%	**46.4%**	15.3%	40.9%	13.3%	**41.2%**	17.4%	32.8%	8.2%	**4.1%**
FEMALE	**22.6%**	11.8%	5.4%	9.6%	1.2%	**57.0%**	17.6%	51.1%	10.3%	**46.0%**	16.4%	34.8%	20.5%	**4.8%**
MARRIED	**43.6%**	22.6%	11.7%	19.0%	2.9%	**58.4%**	18.1%	52.5%	12.7%	**40.4%**	12.2%	31.7%	11.1%	**3.8%**
SINGLE	**40.3%**	26.8%	10.6%	12.6%	2.7%	**44.7%**	14.6%	39.2%	10.2%	**48.9%**	23.3%	37.3%	20.8%	**5.5%**
WORK	**49.3%**	30.5%	13.7%	18.1%	2.9%	**58.2%**	14.9%	54.4%	11.5%	**49.2%**	19.6%	37.7%	16.6%	**4.9%**
STUDY	**34.2%**	26.0%	10.7%	8.8%	2.8%	**28.8%**	9.0%	25.6%	6.0%	**55.7%**	32.0%	39.5%	34.5%	**6.5%**
UNEMPL	**48.3%**	34.9%	11.5%	9.5%	4.7%	**42.8%**	17.6%	35.2%	10.4%	**50.6%**	26.6%	39.9%	19.8%	**6.8%**
OTHERACT	**33.1%**	13.5%	7.6%	16.2%	2.6%	**51.3%**	21.5%	42.0%	13.7%	**31.7%**	7.4%	26.2%	7.2%	**3.1%**
DEGREE	**43.9%**	27.1%	12.0%	18.5%	2.5%	**73.9%**	17.5%	70.3%	14.5%	**40.8%**	9.0%	35.3%	11.1%	**5.1%**
DIPLOMA	**48.1%**	26.8%	12.9%	18.7%	3.5%	**52.1%**	17.5%	46.0%	13.0%	**45.9%**	18.6%	35.1%	14.6%	**4.4%**
YR12	**43.1%**	29.9%	11.2%	12.5%	3.2%	**51.0%**	15.4%	45.5%	10.1%	**54.4%**	25.2%	42.3%	26.0%	**5.4%**
LESSYR12	**34.6%**	17.5%	8.9%	13.7%	2.3%	**37.9%**	15.4%	31.0%	8.9%	**39.8%**	17.3%	28.6%	14.2%	**3.8%**
PRESCHOOL	**44.1%**	28.3%	13.2%	14.8%	3.6%	**52.2%**	11.2%	49.9%	9.2%	**51.4%**	24.1%	35.5%	20.6%	**5.0%**
NO-PRESCHOOL	**42.1%**	23.9%	11.0%	16.5%	2.8%	**52.7%**	17.2%	46.6%	11.9%	**43.2%**	16.1%	34.0%	14.6%	**4.5%**
ATSI	**42.9%**	28.3%	12.9%	10.9%	4.0%	**22.7%**	9.8%	19.9%	7.3%	**53.5%**	34.3%	36.9%	21.5%	**5.2%**
NON-ATSI	**42.2%**	24.3%	11.2%	16.4%	2.8%	**53.1%**	16.7%	47.4%	11.7%	**43.9%**	16.6%	34.0%	15.1%	**4.5%**
CAPITAL	**40.9%**	25.2%	10.1%	15.9%	2.5%	**56.9%**	16.3%	51.8%	12.0%	**43.8%**	14.8%	35.1%	15.0%	**4.5%**
NON-CAPITAL	**44.3%**	22.8%	13.0%	17.0%	3.4%	**44.7%**	17.0%	38.0%	11.0%	**44.0%**	20.3%	32.1%	15.4%	**4.3%**
SIN-PARENT	**34.7%**	23.6%	10.7%	11.8%	3.0%	**43.9%**	14.8%	39.3%	9.1%	**56.6%**	30.0%	39.5%	28.3%	**6.4%**
OTHERHHLD	**43.1%**	24.6%	11.2%	16.7%	2.8%	**53.8%**	16.9%	47.9%	11.9%	**43.0%**	15.7%	33.8%	14.1%	**4.3%**

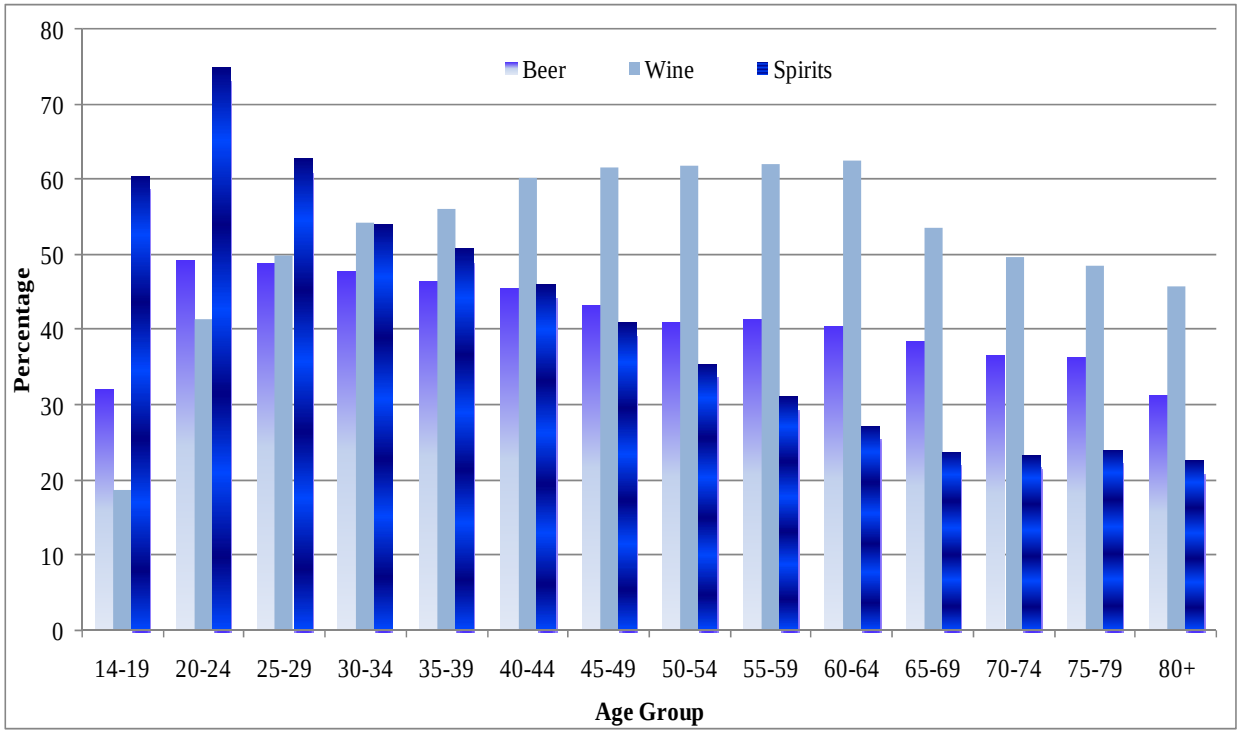
Source: NDSHS (2004).

Who Drinks What?

Table 3.2 presents participation rates for various types of alcohol drinks by socio-economic and demographic characteristics, using data from the 2004 NDSHS. Focusing on wine first in Table 3.2, 57% of women drank wine in 2004 relative to only 46% of men, resulting in a 52% participation rate for the whole population. In terms of individual wine types, females are more likely to drink both cask wine (17.6% of women) and bottled wine (51.1% of women) than men (15.3% and 40.9%), but less likely to drink fortified wine (10.3% of women versus 13.3% of men). Married or partnered individuals are more likely to drink all three wine types than singles. With relation to main activities, those who work and those who are retired or home makers (OTHERACT) are most likely to drink bottled wine and fortified wine, while retiree/home-makers and unemployed are most likely to drink cask wine. People who mainly study are least likely to drink all types of wine products. All three wine types are shown to be positively linked to education levels; those with tertiary education are most likely to drink all wine products. Lower proportions of Aboriginals and Torres Strait Islanders (ATSI) drank all wine types than the rest of the population, and people living in capital cities are less likely to drink cask wine but more likely to drink bottled or fortified wine. Single-parents are less likely to drink all wine types than the rest. Finally, people with pre-school age children are less likely to drink cask or fortified wine but more likely to drink bottled wine.

Without discussing detailed results for individual beer types, we can clearly see from Table 3.2 that beer is clearly associated with male and those who work or unemployed. The story emerging from the consumer characteristics for spirits is also consistent with anecdotal observation. In particular, the pre-mixed spirits are mostly likely to be linked with being single, female and a student.

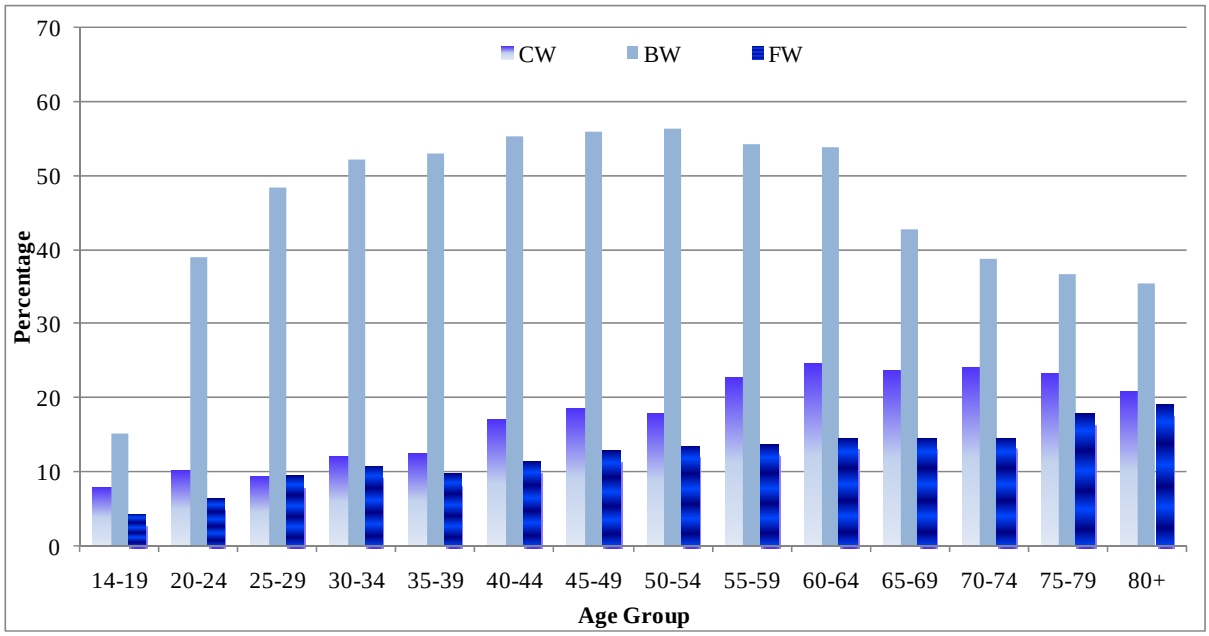
Figure 3.1: Participation[a] in Beer, Wine and Spirits Consumption by Age



[a] Proportions of consumers within each age group. Note that the proportions do not add up to a 100 for a given age group because drinkers may consume multiple alcohol types. Source: NDSHS (2004).

Figure 3.1 shows the age profile for beer, wine and spirits using data from 2004. It is clear that teenagers and young adults have a much higher prevalence rate, while wine is more evenly spread across the age groups though more popular for the middle aged. Figure 3.2 depicts the age profile for cask wine, bottled wine and fortified wine. Clearly bottled wine is more popular among middle aged individuals whereas cask wine and fortified wine is more highly consumed by older cohorts.

Figure 3.2: Participation[a] in Cask Wine, Bottled Wine and Fortified Wine Consumption by Age



[a] Proportions of consumers within each age group. Note that the proportions do not add up to a 100 for a given age group because drinkers may consume multiple alcohol types. Source: NDSHS (2004).

Who Are the Bingers?

The adverse consequences of alcohol consumption are generally linked to heavy or binge drinking. Heavy episodic or binge drinking more common among young people has been a major concern for policymakers worldwide. Young people generally consider intoxication as being fashionable while others simply give in to peer pressure. In Australia, where drinking is an entrenched part of the individuals' lifestyle, heavy sessional intake imposes a huge toll on the society. Alarmed by the increasing rate of binge drinking among young Australians, the Rudd Government has recently announced a new national strategy to address the binge drinking epidemic. Several measures such as community level initiatives, early intervention and advertising have been earmarked in order to help reduce alcohol misuse and binge drinking among young Australians.

Although binge drinking is a term widely recognised as the act of drinking heavily on an occasion, there appears to be a lack of consensus on its definition worldwide. Much of the difference in the definitions has been driven by variations in the units of measurement of alcoholic beverages and in other instances, the number of drinks. A problematic feature of these definitions is that very often neither the duration of an occasion nor the drink sizes and strength is defined. In Australia, the National Health and Medical Research Council (NHMRC) recommends guidelines for the maximum number of standard drinks to be consumed in order to minimise risks in the short and

long terms and maximise any potential health benefits. They indicate three risk levels - low, medium and high - based on both the amount (i.e. number of standard drinks consumed on any one day) and frequency of consumption (NHMRC 2001).

In the absence of a standard measure of binge drinking, risk levels for short-term harms associated with drinking as defined by the NHMRC are used to separate individuals into different drinking categories (NHMRC 2001)[5]. Using the 2001 guidelines, we define bingers as those indulging in medium to high risk drinking, that is to say men drinking at least seven and women drinking at least five drinks on a single occasion. This is also consistent with the definition of binge or heavy drinking, in the literature.

Based on their drinking patterns, individuals are grouped into four categories: abstainers; non bingers; occasional bingers; and frequent bingers. Abstainers are defined as those who have not consumed any alcohol in the past year; non bingers refer to those who drink but do not binge (consumption in a day of less than seven drinks by males and less than five drinks by females); occasional bingers are those who binge less than three days a week; and frequent bingers are those who binge at least 3 days a week.

Table 3.3 reports the pattern of drinking across the three most recent surveys to demonstrate, in particular, Australians bingeing behaviour. Australians' drinking pattern has remained rather stable in the period 1998 through 2004. In 2004, 31.8% of males and 27.2% of females binged occasionally while 10.1% of males and 6.2% of females binged at least 3 days a week.

Table 3.3: Pattern of Recent Alcohol Consumption (Percent)

	1998		2001		2004		Pooled		
	Male	Female	Male	Female	Male	Female	Male	Female	All
Abstainers	16.9	22.2	14.9	20.4	12.9	18.6	13.9	19.5	17.1
Non Binger	44.1	45.2	46.9	47.5	45.2	48.1	46.1	47.8	47.1
Occasional Binger	29.7	26.0	29.6	26.3	31.8	27.2	30.7	26.7	28.5
Frequent Binger	9.4	6.7	8.6	5.7	10.1	6.2	9.3	5.9	7.4
Drinking Participation[a]	83.1	77.8	85.1	79.6	87.1	81.4	86.1	80.5	82.9
Binge participation	39.1	32.6	38.2	32.0	41.9	33.3	40.0	32.7	35.9

Notes: [a] Used in the last 12 months. Source: NDSHS (2004).

[5] The analysis here is based on the 2001 NHMRC definition for binge drinking. Note that a new set of guidelines has recently been drafted by the NHMRC and is expected to be released by mid July 2008.

Table 3.4: Bingeing Behaviour and Types of Drinks

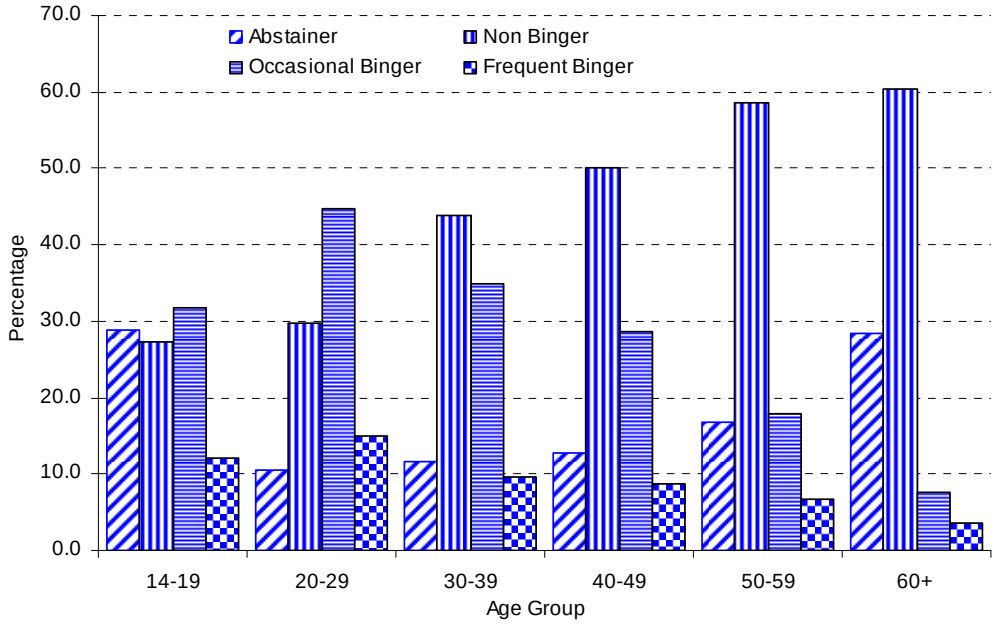
	Non bingers	Occasional bingers	Heavy bingers	
Beer	**47.0%**	**40.2%**	**12.8%**	***100%***
Regular strength beer	33.7%	49.0%	17.3%	*100%*
Mid strength beer	44.4%	43.6%	12.0%	*100%*
Low alcohol beer	62.0%	32.7%	5.3%	*100%*
Home-brewed beer	33.8%	49.9%	16.3%	*100%*
Wine	**57.8%**	**34.7%**	**7.5%**	***100%***
Cask wine	56.6%	32.7%	10.7%	*100%*
Bottled wine	57.1%	35.8%	7.1%	*100%*
Fortified wine	61.8%	31.4%	6.8%	*100%*
Spirits	**47.5%**	**42.0%**	**10.5%**	***100%***
Pre-mixed spirits in a can	33.1%	50.5%	16.4%	*100%*
Bottled spirits	46.2%	42.9%	10.9%	*100%*
Pre-mixed spirits in a bottle	40.7%	47.9%	11.4%	*100%*
Other	**45.8%**	**41.2%**	**13.0%**	***100%***

Source: NDSHS (2004).

Table 3.4 presents Australians' drinking pattern by type of alcohol. It can be seen that regular strength beer drinkers have the highest proportion of heavy bingers (17%) but low alcohol beer drinkers have the lowest incidence of heavy bingeing (5%). In the case of non bingers, the highest proportion of non bingeing comes from those who drink low alcohol beer while the lowest proportion of non bingeing comes from those who drink pre-mixed spirits in a can. The good news is that, except for low alcohol beer group, the wine drinking population presents the lowest probabilities of heavy bingeing and the highest proportions of non-bingers, including the cask wine drinkers.

Figure 3.3 depicts drinking patterns within various age groups based on the pooled sample of the last three surveys. The highest proportion of occasional and frequent bingeing occurs in the 14-29 age group. Thereafter, bingeing seems to decrease progressively over older cohorts.

Figure 3.3: Pattern[a] of Alcohol Use by Age



[a] Proportions of abstainers, non bingers, occasional bingers and frequent bingers within each age group. Source: NDSHS (2004).

Early Onset, Underage Drinking and Types of Drinks

The early onset of drinking is known to be linked to a higher risk of later alcohol abuse and dependence. A study on the drinking behaviour of Australian secondary students aged between 12 and 17 years shows that in 2005 around 86 percent of students had tried alcohol by the age of 14 and by the age of 17, 70 percent had consumed alcohol in the month prior to the survey (White and Hayman 2006a). Of current drinkers, almost 30 percent had binged in the previous week, peaking at 44 percent among 17-year olds.

Table 3.5 shows that early onset is highly associated with heavy binging. In particular, the average age of onset among heavy bingers was 15 years in 2004 as compared to non bingers whose age of onset was on average 18 years. The average age of onset among occasional bingers was somewhere between the two (16 years). Underage drinking is a common phenomenon worldwide. A fairly high proportion of young Australians under the age of 18 were found to binge occasionally (23%) in 2004 and 6% binged frequently while about 30% were non bingers.

Table 3.5: Age of Onset and Underage Alcohol Participation by Binge Types

	Abstainer	**Non Binger**	**Occasional Binger**	**Heavy Binger**	
Average age of onset (years)		18	16	15	
Underage (%)	36.8	29.8	23.1	6.1	*100*

Source: NDSHS (2004).

To shed light on the underage drinkers' choice of alcohol drinks, we report in Table 3.6 the rate of participation by alcohol types among those who are below the minimum legal drinking age of 18. As expected, the highest rate of participation was noted for spirits (48%). As mentioned before, alcopops or RTDs are particularly appealing to young females. Beer is the second choice (25%) of alcoholic drink for young under-aged individuals. In particular, regular strength beer is preferred to mid strength beer or low alcohol beer. On the other hand, wine is among the least favoured drinks for underage drinkers; about 13% were found to drink wine on average, favouring bottled wine to cask wine or fortified wine.

Table 3.6: Underage Participation[a] by Alcohol Types

	Underage
Beer	**25.1%**
Regular strength beer	17.3%
Mid strength beer	10.3%
Low alcohol beer	7.6%
Home-brewed beer	2.4%
Wine	**13.3%**
Cask wine	5.9%
Bottled wine	10.1%
Fortified wine	3.4%
Spirits	**48.1%**
Pre-mixed spirits in a can	32.6%
Bottled spirits	30.4%
Pre-mixed spirits in a bottle	30.6%
Other	**5.8%**

[a] Proportions of consumers by alcohol types among those who are under 18.

Source: NDSHS (2004).

Place of Consumption and Types of Drinks

Table 3.7 presents the places where alcohol is commonly consumed in Australia. In general, all three alcoholic types, beer, wine and spirits, are mostly consumed at own home. Other than own home, beer is most commonly consumed at licensed premises such as pubs and clubs (63%), spirits is mostly consumed at a friend's house (65%), and wine is more frequently consumed at restaurants/cafes (69%). Other than own home, the most common place to consume cask wine, bottled wine or fortified wine is at a friend's place or at restaurants/cafes.

Table 3.7: Participation Rate[a] by Place of Consumption

	Beer	Wine	Spirits	Cask Wine	Bottled Wine	Fortified Wine
In my own home	86.5%	90.3%	83.0%	95.0%	89.9%	92.9%
At a friend's house	59.6%	64.8%	64.9%	62.9%	68.2%	68.9%
At a party at someone's house	49.0%	49.6%	57.4%	49.2%	52.2%	54.8%
At licensed premises (e.g., pubs, clubs)	62.5%	52.5%	62.6%	53.4%	54.4%	58.4%
At restaurants/cafes	54.5%	69.2%	57.4%	62.5%	73.8%	68.8%
At my workplace	8.4%	6.5%	7.2%	4.8%	7.2%	8.1%
At raves/dance parties	5.5%	3.6%	7.4%	4.2%	3.8%	4.4%
In public places (e.g., parks)	4.0%	3.1%	4.0%	3.8%	3.1%	5.0%
In a car or other vehicle	3.3%	1.5%	3.3%	2.5%	1.4%	2.6%
Somewhere else	2.7%	1.5%	2.6%	1.9%	1.5%	3.1%
At school, TAFE, University, etc	1.6%	1.2%	1.5%	1.6%	1.3%	1.5%

[a] Participation rate by place of consumption. Source: NDSHS (2004).

3.3 Alcohol Consumption and Health

The misuse of alcohol causes significant harm to individuals and society. Alcohol is second only to tobacco as a preventable cause of death and hospitalisation in Australia. Alcohol harm was responsible for 3.2 percent of the total burden of disease and injury in Australia in 2003 (Begg, et al 2007). Its hazardous and harmful use led to the deaths of more than 3000 Australians in 2003, which represented almost 3 percent of all deaths. These deaths were primarily related to road accidents, stroke, alcoholic liver cirrhosis and suicide. Alcohol is also responsible for a significant level of crime, violence and sexual assaults (AIHW 2007).

Whilst excessive drinking is often associated with acute health consequences, crime, violence, road fatalities and various other adverse social and psychological outcomes, moderate drinking is widely recognised to provide health benefits. Several studies have found that light and moderate drinking are associated with a lower incidence of stroke. There has been evidence linking wine consumption to some positive health outcomes among middle-aged and older people. In particular, regular and moderate use of red wine has been associated with a reduced risk of heart disease. Alcohol was found to prevent 0.9 percent of the total burden in 2003 (Begg, et al 2007). The study also reported that in females over the age of 65, the benefits of alcohol consumption outweighed its harmful effects.

Table 3.8 reports some health statistics by individual alcohol types. Individuals' self-reported health statuses across various alcohol types consumed indicate that wine drinkers enjoy the highest overall health status, whilst beer drinkers report the lowest health status. A finer disaggregation of the alcohol types indicate a remarkably high proportion of individuals (56%) reporting a very good to excellent health status among those who drink bottled wine as compared to cask wine or fortified wine consumers.

Table 3.8: Self Reported Health by Types of Drinks

	Very good/ Excellent	Good	Fair	Poor	
Overall	***50.7%***	***34.7%***	***12.2%***	***2.4%***	***100%***
Beer	**48.6%**	**36.7%**	**12.6%**	**2.1%**	**100%**
Regular strength beer	50.1%	35.9%	11.8%	2.1%	100%
Mid strength beer	49.7%	37.1%	11.6%	1.7%	100%
Low alcohol beer	49.2%	35.7%	13.0%	2.0%	100%
Home-brewed beer	49.9%	36.6%	11.7%	1.8%	100%
Wine	**54.2%**	**33.8%**	**10.2%**	**1.8%**	**100%**
Cask wine	49.0%	35.9%	12.5%	2.7%	100%
Bottled wine	55.7%	33.3%	9.5%	1.5%	100%
Fortified wine	49.1%	36.3%	12.4%	2.2%	100%
Spirits	**50.5%**	**35.7%**	**11.9%**	**1.8%**	**100%**
Pre-mixed spirits in a can	49.7%	36.9%	11.7%	1.6%	100%
Bottled spirits	49.5%	36.2%	12.3%	2.0%	100%
Pre-mixed spirits in a bottle	53.2%	35.4%	10.2%	1.2%	100%
Other	**48.3%**	**36.1%**	**13.2%**	**2.4%**	**100%**

Source: NDSHS (2004).

Table 3.9: Chronic Conditions by Types of Drinks

	Diabetes	Heart disease	HBP	STD	Cancer	Mental	Other Conditions
Overall	***4.3%***	***3.8%***	***14.8%***	***1.2%***	***2.6%***	***9.9%***	***17.2%***
Beer	**4.1%**	**4.2%**	**15.6%**	**1.1%**	**2.7%**	**8.8%**	**14.2%**
Regular strength beer	2.7%	2.6%	10.6%	1.5%	1.7%	9.1%	13.5%
Mid strength beer	3.6%	3.2%	11.9%	1.0%	2.5%	8.1%	14.2%
Low alcohol beer	6.0%	5.7%	19.2%	0.8%	3.6%	8.0%	14.9%
Home-brewed beer	3.7%	2.7%	15.2%	1.0%	4.0%	9.1%	13.9%
Wine	**3.6%**	**3.7%**	**14.7%**	**1.0%**	**2.6%**	**9.7%**	**16.7%**
Cask wine	4.4%	5.2%	20.1%	0.8%	3.2%	11.4%	18.3%
Bottled wine	3.4%	3.3%	14.6%	1.0%	2.4%	9.3%	16.4%
Fortified wine	4.0%	5.2%	19.1%	1.0%	3.3%	9.9%	19.1%
Spirits	**3.0%**	**2.7%**	**11.5%**	**1.4%**	**2.0%**	**10.9%**	**18.3%**
Pre-mixed spirits in a can	1.4%	1.1%	5.8%	2.1%	1.1%	11.4%	17.9%
Bottled spirits	3.3%	3.1%	13.0%	1.4%	2.2%	10.9%	18.5%
Pre-mixed spirits in a bottle	1.8%	0.6%	5.4%	1.8%	1.1%	11.6%	20.1%
Other	**2.6%**	**3.0%**	**11.0%**	**1.6%**	**2.1%**	**12.9%**	**21.8%**

Nb: Percentages represent prevalence of chronic conditions overall and in each drinking group. **HBP**: hypertension (high blood pressure); **STD**: sexually transmitted infection including hepatitis; **Mental**: mental disorders such as depression, anxiety disorder, schizophrenia, bi-polar disorder, eating disorder and other form of psychosis; **Other Conditions**: iron deficiency and asthma. Source: NDSHS (2004).

Table 3.9 presents some incidences of chronic conditions across individual alcohol types. Overall, spirits appear to be correlated with the lowest incidence of diabetes, heart disease, hypertension, cancer, presumably due to the link of spirits with young drinkers; wine is correlated with the lowest incidence of STD; and beer with the lowest incidence of mental disorders and other conditions. Note however, the incidence across all chronic conditions for those who consume wine is lower than that those in the general population (first row). In contrast, beer consumers have a higher incidence of heart disease, hypertension and cancer than the general population. The incidence of mental disorders and other conditions is highest among those who consume spirits - generally the younger segment of the population. A econometric model can be used to isolate the partial correlation between types of drinks and chronic conditions controlling for other factors such as age.

Bingeing and Health

Bingeing behaviours also appear to be correlated with self-reported heath. Table 3.10 shows that those who binge heavily report a lower general health status relative to abstainers, non bingers and occasional bingers. Interestingly, occasional bingers and non bingers report a higher health status than abstainers. However, this may also reflect the reverse causal relationship between health and drinking where those with poor health might have quit drinking. Again, formal econometric models are needed to separate these effects.

Table 3.10: Bingeing and Self Reported Health

	Overall	**Abstainer**	**Non Binger**	**Occasional Binger**	**Heavy Binger**
Very good/Excellent	***50.7%***	48.4%	51.1%	54.1%	40.1%
Good	***34.7%***	32.1%	34.9%	34.2%	41.1%
Fair	***12.2%***	15.1%	11.8%	10.3%	15.7%
Poor	***2.4%***	4.4%	2.2%	1.4%	3.2%
	100.0%	100.0%	100.0%	100.0%	100.0%

Source: NDSHS (2004).

Table 3.11 presents the incidences of chronic conditions across the four drinking statuses. The incidences of metal disorders and STD are clearly the highest among heavy bingers and also higher than in the general population. The high incidences of the other chronic conditions across abstainers and non bingers could again reflect the reverse causal relationship of health on drinking behaviour.

Table 3.11: Bingeing and Chronic Conditions

	Overall	**Abstainer**	**Non Binger**	**Occasional Binger**	**Heavy Binger**
Diabetes	***4.3%***	7.9%	4.9%	1.9%	2.5%
High BP	***14.8%***	20.1%	17.8%	7.7%	11.6%
Mental	***9.9%***	9.5%	9.3%	9.9%	13.8%
STD	***1.2%***	0.9%	0.8%	1.6%	2.4%
Cancer	***2.6%***	3.4%	3.0%	1.5%	2.2%
Heart	***3.8%***	6.6%	4.3%	1.7%	2.7%
Other Conditions	***17.2%***	20.1%	17.2%	15.7%	16.3%

Note: Percentages represent prevalence of chronic conditions overall and by drinking status. **HBP**: hypertension (high blood pressure); **STD**: sexually transmitted infection including hepatitis; **Mental**: mental disorders such as depression, anxiety disorder, schizophrenia, bi-polar disorder, eating disorder and other form of psychosis; **Other Conditions**: iron deficiency and asthma. Source: NDSHS (2004).

3.4 Alcohol Consumption and labour Market Outcomes

Drinking is widely argued to have an adverse impact on labour market outcomes usually through impaired health, absenteeism and poor job performance. Where workers receive wages that reflect their productivity, heavy drinking or bingeing is likely to have an adverse effect on their earnings. In 1998-99, drug abuse related loss of productive capacity in the Australian paid workforce was estimated at around AUD$5.5 billion. This represented loss in productive capacity due to deaths and illnesses causing premature retirement, absenteeism from sickness or injury, and reduced productivity (Collins and Lapsley 2002).

On the other hand, it is believed that moderate drinking can increase social capital which in turn can enhance labour market outcomes. The relationship between alcohol use and abuse, and labour market outcomes has received growing attention in the international literature, more so in the last decade. While excessive drinking has been associated with lower earnings through adverse health effects, absenteeism and low productivity, light, or moderate, alcohol consumption is believed to generate positive wage effects. These positive wage premiums are expected to arise from the beneficial health effects of drinking in moderation. As mentioned earlier, moderate drinking is related to some health benefits such as lower incidence of stroke. It is also believed that alcohol reduces stress and tension levels and plays a networking role. A Dutch study has found that moderate drinkers under stress were less likely to be absent from work than were either abstainers or heavy drinkers under stress (Vasse et al., 1998). Peters and Stringham (2006) has shown that individuals derive benefits from the 'networking' effect of alcohol consumption.

Labour Market Status and Types of Drinks

In Table 3.2 discussed earlier, the four rows relating to the four types main activities (Work, Study, Unemployed and Other Activities) show the participation rates for various alcohol types within the four employment sub-populations in comparison to the 'Overall' participation rates for the general population on the top row of that table. Workers, retirees or home makers (OTHERACT) are most likely to drink bottled wine and fortified wine, while retirees/home-makers and unemployed are most likely to drink cask wine. Among the unemployed, wine consumption had the lowest prevalence (43%) and spirits consumption the highest (51%), very different picture in comparison to the general population who prefer wine over spirits.

To provide further insights on relationship between job types and drink types, we present in Table 3.12 the participation rates for the sub-population of white collar workers versus blue collar workers. Among those who are employed in white jobs, wine appeared to be the most popular type of alcohol consumed (66%), with a distinct preference for bottled wine (62%). Spirits was the second choice of alcoholic drink (49%) with a higher preference for bottled spirits (39%) while the least consumed drug was beer.

On the other hand, beer is clearly the first choice of alcoholic drink across blue collar workers (64%), with again a preference for regular strength beer (40%). The second most favourite drink is spirits (52%) while wine is the least favoured drink (36%), with the highest participation in bottled wine (32%).

Table 3.12: Participation by Types of Drinks across Unemployed and Employed with White/Blue Type Jobs

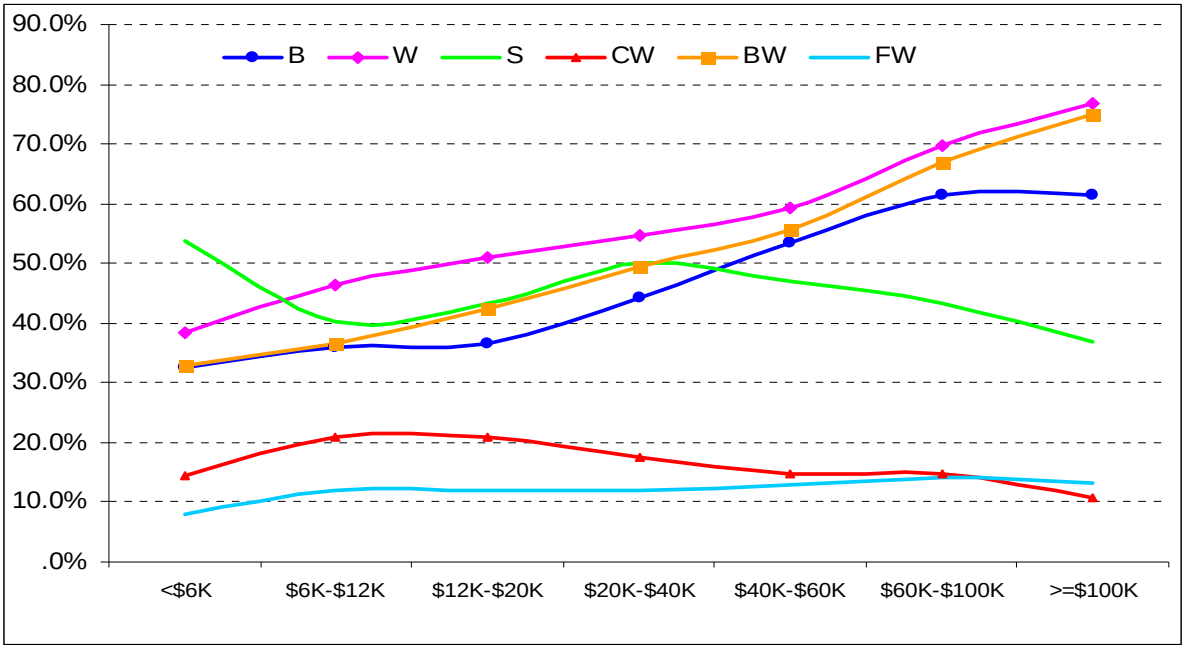
	White jobs %	Blue jobs %
Beer	**44.6**	**63.8**
Regular strength beer	27.4	40.2
Mid strength beer	12.1	18.6
Low alcohol beer	18.0	18.7
Home-brewed beer	2.6	4.3
Wine	**66.1**	**35.6**
Cask wine	16.3	10.9
Bottled wine	62.3	31.8
Fortified wine	12.1	10.2
Spirits	**49.0**	**51.5**
Pre-mixed spirits in a can	16.6	28.7
Bottled spirits	38.6	36.3
Pre-mixed spirits in a bottle	17.3	14.6
Other	**5.1**	**4.8**

Note: Percentages represent participation by types of drinks among those who are employed in white/blue collar jobs. Source: NDSHS (2004).

Earnings and Types of Drinks

Figure 3.4 depicts Australians' earnings profile by alcohol types. Among those in the lowest earnings band, spirits has the highest prevalence and beer the lowest. On the other hand, among those with the highest earnings, wine has the highest prevalence while the prevalence of spirits is markedly low. Both beer and wine are positively correlated with earnings while spirits consumption does not appear to be particularly related with earnings. At a more disaggregated level, neither cask wine nor fortified wine consumption appears to be correlated with earnings. However, bottled wine consumption is positively correlated with earnings.

Figure 3.4: Earnings by Types of Drinks



Note: Participation rate by type of drink within each earning band. Note that the proportions do not add up to a 100 for a given earning band because drinkers may consume multiple alcohol types. Source: NDSHS (2004).

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Appendix 1: Communication

(1) Srivastava, P. and Zhao, X. (2008), "Microeconometric Evidence on Alcohol Consumption in Australia: Drinker Characteristics, Bingeing Behaviour and Types of Alcohol Drinks", Working paper, Department of Econometrics and Business Statistics and Centre for Health Economics, Monash University. (draft)

This comprehensive working paper documents econometric evidence relating to Australians' alcohol consumption. It extends the four aspects that have been discussed in this final report to also include cross correlation across different alcohol types, relationship of beer, wine and spirit consumption with consumption of other recreational drugs such tobacco, marijuana and designer drugs, more detailed analysis of frequencies and patterns of alcohol consumption, links of alcohol consumption with other behaviour such as driving, swimming and breast feeding. In addition, while this final report has focused on presenting descriptive relationships between key variables of interest, the working paper have also estimated more advanced econometric models. Such econometric models allows for the marginal effects of individual variables to be isolated and estimated. For example, correlation of moderate wine consumption with health status, labour market outcomes and bingeing behaviour can be estimated controlling for other factors that may also impact on these endogenous variables.

(2) Ramful, P. and Zhao, X. (2008), "Heterogeneity in Alcohol Consumption: The Case of Beer, Wine and Spirits in Australia", Economic Record 84(265): 207-222.

Abstract:

This paper examines the effects of socioeconomic and demographic factors on Australian individuals' participation in beer, wine and spirits consumption using unit-record data during 1991 to 2001. A trivariate probit formulation allows for participation in the three alcoholic beverages to be modelled jointly accounting for correlation via unobserved personal characteristics. Own- and cross-price elasticities are estimated for both unconditional and conditional participation probabilities. While the three beverages are commonly considered closely related economic substitutes, we find that they relate to rather heterogenous population groups and the correlations via the unobservable characteristics are low in magnitude. An alarming proportion of young female Australians are found to be drinking spirits due to increasing popularity of pre-mixed drinks.

This paper was started during the first stage of the GWRDC project and is now published at the Australian leading economics journal The Economic Record. A copy of this paper is attached. As shown in the paper title footnote, GWRDC funding is acknowledged. The paper has attracted the attention of the media and other alcohol industry bodies, and the authors have received many requests for the paper. An article in ***The Australian*** newspaper on June 17, 2008 reported this research. The paper has been requested by the Parliament House for the collection for the Parliamentary Library.

(3) Zhao, X. and Wittwer, G. (2007), "Alcohol Tax Reform in Australia and Implications to Beer, Wine, RTD and Spirit", paper presented at the Australian Agricultural Economics Society annual conference, Queenstown, New Zealand, 13-16 February .

Abstract:

This paper examines potential alcohol tax reform scenarios in Australia and economic implications to beer, wine, RTD (ready-to-drink) and spirit consumers and producers. Currently, wine is taxed ad valorem while the rest by alcohol

content with various volumetric rates. There have been proposals of changing wine to volumetric tax and granting RTDs preferable rates in line with beer. Three revenue-neutral tax reform scenarios are considered. A system of demand and supply equations is specified to simulate the impacts on ten differentiated alcoholic products. The revenue neutral tax rates are solved endogenously via simulation allowing both producers and consumers to adjust.

This paper is being revised for submission to an academic journal.

(4) G. Wittwer (2007), "The global wine market in the decade to 2015 with a focus on Australia and Chile"

A DVD presentation of this paper was posted to Professor Javier Troncoso in Chile for a wine symposium. The working paper is available on the CoPS website:
http://www.monash.edu.au/policy/elecpapr/g-166.htm

According to REPEC statistics, this has had numerous downloads over the past year

(5) G. Wittwer (2008), "Will drought erode the competitiveness of Australia's wine industry?"

This is downloadable at:
http://www.monash.edu.au/policy/elecpapr/g-173.htm

(6) The global statistical compendia are available through the Australian Wine and Brandy Corporation. Details are available at their site:
http://www.awbc.com.au/