

# **Growth and Cycles in Australia's Wine Industry**

**Kym Anderson**

with the assistance of Nanda R. Aryal

This volume provides time series data for the major wine regions of Australia from the 1840s, to complement a volume on global wine markets (published in December 2011) and one on where the various winegrape varieties are grown in the world (published in December 2013), both by University of Adelaide Press. All three volumes are published in paperback and are also freely available as e-books at [www.adelaide.edu.au/titles](http://www.adelaide.edu.au/titles)

K. Anderson and S. Nelgen, **Global Wine Markets, 1961 to 2009: A Statistical Compendium**, Adelaide: University of Adelaide Press, 2011

K. Anderson (with the assistance of N.R. Aryal), **Which Winegrape Varieties are Grown Where? A Global Empirical Picture**, Adelaide: University of Adelaide Press, 2013.  
(Recipient of the 2014 OIV Prize from l'Organisation Internationale de la Vigne et du Vin)

This volume is freely available as an e-book at [www.adelaide.edu.au/press/titles/austwine](http://www.adelaide.edu.au/press/titles/austwine)

The data are also freely available in Excel spreadsheets at [www.adelaide.edu.au/wine-econ/databases](http://www.adelaide.edu.au/wine-econ/databases)

The author welcomes comments on how to improve the quality and coverage of data and the way they have been summarized. Please send feedback to:

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# **Growth and Cycles in Australia's Wine Industry:**

**A Statistical Compendium, 1843 to 2013**

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with the assistance of Nanda R. Aryal

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## Preface and acknowledgements

This report revises, updates, and greatly expands a 1998 booklet by Robert Osmond and Kym Anderson, *Trends and Cycles in the Australian Wine Industry, 1850 to 2000*, that was published by the University of Adelaide's Centre for International Economic Studies. The earlier booklet was written when the nation's wine industry was expanding very rapidly. Its aim was to improve our understanding of prospects for the industry into the 21<sup>st</sup> century by bringing a long historical perspective to the current export-oriented boom in the industry. Those authors were grateful for helpful comments from numerous people in the industry, especially Brian Croser, Peter Hallier, Peter Hayes, Lawrie Stanford, Stephen Strachan, and Ian Sutton and for financial assistance from the Winemakers Federation of Australia (WFA), the South Australian Government, and the Grape and Wine Research and Development Corporation (GWRDC, now part of AGWA, the Australian Grape and Wine Authority).

One reason for revisiting, expanding and updating these data is because that recent growth spurt – the fifth in the industry's history – has come to an end. There is now value in more-fully evaluating the latest boom-bust cycle in the light of the four earlier cycles. The other main reason for the present volume is in response to the industry wishing to improve its profitability through differentiating its product. Two major approaches to differentiation in an ever-more-competitive environment domestically and abroad are by region and by winegrape variety, hence new sections of data pertinent to those two options have been added.

On regional aspects, the data are now differentiated by State (or, before the Australian Federation was formed in 1901, by Colony). As well, for recent years they are also presented for as many regions within States as the available data permit. This updates an earlier report prepared for GWRDC, WFA and the Australian Wine and Brandy Corporation (AWBC, subsequently Wine Australia and now part of AGWA), by Kym Anderson, Signe Nelgen, Ernesto Valenzuela and Glyn Wittwer, *The Economic Contributions and Characteristics of Grapes and Wine in Australia's Wine Regions*, circulated as Wine Economics Research Centre Working Paper 0110, February 2010. The authors of that report gratefully acknowledged helpful comments from Leanne Webb of CSIRO, Jim Fortune of GWRDC, and members of the research project's Industry Reference Group.

As for the other option for wineries, of differentiating their product is by grape variety, we now include data on the evolution of the mix of varieties in the bearing area of the various winegrape-growing regions of the country. This expands greatly the period covered for the Australian data included in a 2013 report prepared for GWRDC by Kym Anderson (with the assistance of N.R. Aryal) on *Which Winegrape Varieties are Grown Where? A Global Empirical Picture*, circulated as a University of Adelaide Press e-book that can be freely downloaded at [www.adelaide.edu.au/press/titles/winegrapes](http://www.adelaide.edu.au/press/titles/winegrapes).

We are grateful also for assistance with data for this volume from Peter Bailey, Kate Harvey and Mark Rowley at the Australian Grape and Wine Authority, for assistance with varietal names from Peter Dry and with AWRI investment data from Chris Day, for wine market modelling from Glyn Wittwer, for library research assistance from Katherine Grace and Winston Reed, for the initial data-gathering in 1998 by Robert Osmond, and for great

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While we have made every effort to ensure the accuracy and currency of information within this compendium, we cannot accept responsibility for information that may later prove to be misrepresented or inaccurate, or for any reliance placed on the information by readers. We warmly welcome comments on the raw data and the indicators we have derived from them, and we would gratefully receive any additional data. Please send to [kym.anderson@adelaide.edu.au](mailto:kym.anderson@adelaide.edu.au)

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## Technical notes

This section provides definitions of the units used in, and of the various indicators generated from, the raw data in this compendium.

**Wine** (*SITC 112.12; FAO CODE 0564; Harmonised System Tariff Heading 2204*) refers to beverage wines of fresh grapes of all qualities, including still, sparkling, fortified and dessert wines. Distillation wine refers to wine that is not consumed as such but rather is distilled into grape spirit for later converting to brandy or for strengthening fortified wine.

### *Definitions of unit measures*

<i>Variable</i>	<i>Unit (per year)</i>
Grape vine bearing area	hectares (ha)
Volume of grape production	‘000 tonnes (kt)
Grape yield	tonnes per hectare (t/ha)
Volume of wine production	‘000 litres (kl)
Volume of wine consumption	‘000 litres (kl)
Volume of wine exports and imports	‘000 litres (kl)
Value of wine exports and imports	current AUD ‘000 (1 Pound = AUD2)
Unit value of wine exports and imports	current AUD/L

### *Explanations of unit measures*

<i>Abbreviation</i>	<i>Definition</i>	<i>Conversion</i>
ha	hectare	10,000 square metres or 2.471 acres
t	tonne	1,000 kilograms or 2,205 pounds
kt	kilotonne	1,000 tonnes
kl	kilolitre	1,000 litres or 220 imperial gallons or 264.2 US gallons
lal	litres of alcohol	Assumes to be 40% for spirits, 4.5% for beer, and between 12% and 16% for wine, depending on the period (some of which had a high proportion of fortified wine whose alcohol content is 16-18%)

### *Definition of indexes used*

*Vine cropping intensity index* is the share of total cropped area under vineyards in a region as a ratio of its share nationally.

*Wine self-sufficiency index* is the volume of wine production divided by beverage wine consumption, times 100.

*Wine trade specialisation index* is calculated in volume terms as the ratio of net bilateral exports (exports minus imports) to the sum of bilateral exports plus imports, so that the index ranges between -1 and +1.

*Index of intra-industry trade* is calculated in value terms as 100 times the ratio of the difference between total bilateral trade (bilateral exports plus imports) and net bilateral trade (the modulus of bilateral exports minus imports) to total bilateral trade, so that it ranges from 0 to 100.

*Index of comparative advantage in wine* is calculated in value terms as the share of a country's or region's wine exports in total merchandise exports divided by the share of world wine exports in total world merchandise exports.

*Regional Quality Index* is defined as the average winegrape price in a region across all varieties as a proportion of that average price nationally.

*Varietal Quality Index* is defined as the average winegrape price of a variety across all regions as a proportion of that average price nationally.

*Varietal Intensity Index* is defined as a variety's share of a region's winegrape area divided by that variety's share of the global winegrape bearing area. The Varietal Intensity Index is thus a complement to share information in that it indicates the importance of a variety in a region not relative to other varieties in that region but rather relative to that variety in the world. Specifically, define  $f_{im}$  as the proportion of bearing area of grape variety  $m$  in the total winegrape bearing area in region or country  $i$  such that the proportions fall between zero and one and sum to one (i.e., there is a total of  $M$  different grape varieties across the world, and  $0 \leq f_{im} \leq 1$  and  $\sum_m f_{im} = 1$ ). For the world as a whole,  $f_m$  is the bearing area of grape variety  $m$  as a proportion of the total global winegrape area, and  $0 \leq f_m \leq 1$  and  $\sum_m f_m = 1$ . Then the Varietal Intensity Index,  $V_{im}$  for variety  $m$  in region  $i$ , is:

$$(1) \quad V_{im} = f_{im} / f_m$$

*Varietal Similarity Index* is defined by Anderson (2010a) to measure the extent to which the varietal mix of one region or country matches that of another region or country or the world. It can also be used to compare the varietal mix of a region or country over time. In defining the index, Anderson (2010a) borrows and adapts an approach introduced by Jaffe (1986) and Griliches (1979). That approach has been used subsequently by Jaffe (1989), and by others including Alston, Norton and Pardey (1998) and Alston et al. (2010, Ch. 4), to measure inter-firm or inter-industry or inter-regional technology spillover potential.<sup>1</sup>

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<sup>1</sup> Alston, J.M., Andersen, M.A., James, J.S. and Pardey, P.G. (2010), *Persistence Pays: U.S. Agricultural Productivity Growth and the Benefits from Public R&D Spending*, New York: Springer.

Alston, J.M., Norton, G.W. and Pardey, P. (1998), *Science under Scarcity: Principles and Practice for Agricultural Research Evaluation and Priority Setting*, London: CAB International.

Anderson, K. (2010a), 'Varietal Intensities and Similarities of the World's Wine Regions', *Journal of Wine Economics* 5(2): 270-309, Winter.

Griliches, Z. (1979), 'Issues in Assessing the Contribution of R&D to Productivity Growth', *Bell Journal of Economics* 10: 92-116.

Jaffe, A.B. (1986), 'Technological Opportunity and Spillovers of R&D: Evidence from Firms' Patents Profits and Market Value', *American Economic Review* 76(5): 984-1001,

The mix of grape varieties is a form of revealed preference or judgement by vignerons about what is best to grow in their region. That judgement is affected by not only terroir but also past and present economic considerations, including current expectations about future price trends plus the sunk cost that would be involved in grafting new varieties onto existing rootstocks or grubbing out and replacing existing varieties.

The vector of grape varietal shares defined above,  $f_i = (f_{i1}, \dots, f_{iM})$ , locates region  $i$  in  $M$ -dimensional space. Noting that proximity is defined by the direction in which the  $f$ -vectors are pointing, but not necessarily their length, Jaffe (1989) proposes a measure called the angular separation of the vectors which is equal to the cosine of the angle between them. If there were just two varieties,  $m$  and  $n$ , and region  $i$  had 80 percent of its total vine area planted to variety  $m$  whereas only 40 percent of region  $j$  was planted to variety  $m$ , then their index of regional similarity is the cosine of the arrowed angle between the two vectors (see Chart 79). When there are  $M$  varieties, this measure is defined as:

$$(2) \quad \omega_{ij} = \frac{\sum_{m=1}^M f_{im} f_{jm}}{\left( \sum_{m=1}^M f_{im}^2 \right)^{1/2} \left( \sum_{m=1}^M f_{jm}^2 \right)^{1/2}},$$

where again  $f_{im}$  is the area of plantings of grape variety  $m$  as a proportion of the total grape plantings in region  $i$  such that these proportions fall between zero and one and sum to one (i.e., there is a total of  $M$  different grape varieties across the world, and  $0 \leq f_{im} \leq 1$  and  $\sum_m f_{im} = 1$ ). This makes it possible to indicate the degree of varietal mix “similarity” of any pair of regions. The index also can be generated for each region relative to the average of the world’s  $N$  regions, call it  $\bar{\omega}$ . In short,  $\omega_{ij}$  measures the degree of overlap of  $f_i$  and  $f_j$ . The numerator of equation (2) will be large when  $i$ ’s and  $j$ ’s varietal mixes are very similar. The denominator normalizes the measure to be unity when  $f_i$  and  $f_j$  are identical. Hence,  $\omega_{ij}$  will be zero for pairs of regions with no overlap in their grape varietal mix, and one for pairs of regions with an identical varietal mix. For cases in between those two extremes,  $0 < \omega_{ij} < 1$ . It is conceptually similar to a correlation coefficient. Like a correlation coefficient, it is completely symmetric in that  $\omega_{ij} = \omega_{ji}$  and  $\omega_{ii} = 1$ . Thus the results can be summarized in a symmetric matrix with values of 1 on the diagonal, plus a vector that reports the index for each region relative to the global varietal mix.

### ***Method of estimating annual growth rates***

Growth rates are computed using the least-squares method. The least-squares growth rate,  $r$ , is calculated by fitting a linear regression trend line to the logarithmic annual values of the variable in the relevant period. The regression equation takes the form

$$\ln X_t = a + bt + u_t$$

which is equivalent to the logarithmic transformation of the compound growth equation,

$$X_t = X_0(1 + r)^t.$$

In this equation  $X$  is the variable,  $t$  is time and  $a = \ln X_0$  and  $b = \ln(1 + r)$  are the parameters to be estimated. If  $b^*$  is the least-squares estimate of  $b$ , the average annual growth rate,  $r$ , is obtained as  $[\text{antilog}(b^*) - 1]$  and multiplied by 100 for expression as a percentage. The

calculated growth rate is an average rate that is representative of the available observations over the period. It does not necessarily match the actual growth rate between any two periods.



## Statistical sources

Contemporary data on Australia's wine industry – the most recent 30 years – are best found at the Australian Bureau of Statistics (ABS, especially Cat. Nos. 1301.0, 1320.0, 4307.0.55.001, 7310.0, 8336.0 and 8504.0) at [www.abs.gov.au](http://www.abs.gov.au) and the Australia Grape and Wine Authority's WINEFACTS website at [www.agwa.net.au](http://www.agwa.net.au). AGWA came into being on 1 July 2014 by combining Wine Australia (previously the Australian Wine and Brandy Corporation and before that the Australian Wine Board) and the Grape and Wine Research and Development Corporation (GWRDC, which contributed toward the funding of the compilation of data for this compendium). For the previous 150 years of data, a wide range of sources have been tapped, as described below, but the main source for the nineteenth century is the Statistical Registers of each Colony before the Federation of Australian States brought those British colonies (other than New Zealand) together to form a nation in 1901.<sup>2</sup> Since many tables cover pre- and post-1901 data, for brevity's sake the word State will be used even when referring to the colonial period and the word Australia will be used whenever referring to the mainland plus Tasmania including in the pre-Federation period. A few of the long time series had already been assembled by the Winemakers' Federation of Australia for their publication, *Vintage: the Australian Wine Yearbook* (WFA 1999).

Since the vintage is in the first half of each calendar year, the years shown end either on 30 June or on 31 December, depending on the series. Generally, data for the nineteenth century are calendar years and those from the early twentieth century are fiscal years ending 30 June. Where data are unavailable for an occasional year, trend values are inserted and are shown in italics.

Virtually all of the charts in this compendium are derived from one or more of the tables that follow, as indicated in the table at the end of this section.

The tables in **Section I** that relied on data from sources other than the main ones listed above are listed below with their specific source(s), followed by those used to assemble the macro data in **Section IV**. The original data that have been drawn on to compile **Section V** were kindly provided in various Excel files from AGWA.

Wine industry data at the regional level (**Section II**) are available from various sources, but the coverage has been sporadic and the regional definitions have varied widely across the different sources and over time. The latest regional definitions are shown in Chart 51 on the map of Australia. The most reliable employment data come from the Australian Bureau of Statistics (ABS) censuses, which are conducted every five years with the most recent one being for the 2010-11 financial year (and so covering the 2011 vintage). The ABS

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<sup>2</sup> The Colony of New South Wales was settled by the British from 1788. Van Diemen's Land (now the island state of Tasmania) began to be settled from 1803 but was not politically separated from New South Wales until 1825. In 1829 Western Australia became a colony (west of the 129<sup>th</sup> meridian), completing the British settlement of the continent. South Australia was settled as a non-convict colony on 28 December 1836. What is now Victoria began to be settled from 1834 and, although it did not become a separate colony from New South Wales until 1851, it is treated in the data as if it was separate from that earlier year. Queensland began to be settled from 1803 but was not politically separated from New South Wales until 1959. New Zealand, initially a dependency of New South Wales, became a separate colony on 7 August 1840 and chose to become a separate country rather than part of the Federation of Australia in 1901.

also conducts annual industry surveys and reports those data the following year in industry and other publications. More-detailed data are made available on-line for various levels of regional disaggregation: States are divided into Statistical Divisions, Statistical Sub-Divisions (SSDs), and Statistical Local Areas (SLAs, of which there are just over 1400 nationally). SLA data on vineyards and other agricultural activities as of 2005-06 are available in ABS Cat. No. 7125.0, for example.

For present purposes we focus on 27 Statistical Sub-Divisions as defined by the ABS. These are home to around half of the wine industry's Geographical Indications (GIs), which comprise more than 60 homogeneous areas legally defined for marketing purposes by the Australian Grape and Wine Authority's Geographical Indications Committee. Each of our selected 27 SSDs map closely to one or more GIs, and the 34 GIs thereby covered (see Table 45) account for all but one-tenth of the nation's winegrape vineyard area, wine production volume, and value of wine sales.<sup>3</sup> Those SSDs account for around one-eighth of national GDP and population. As well, services associated with the wine industry are important in urban areas, for example in shipping activities at the major ports of Adelaide, Melbourne, Perth and Sydney as well as in the head offices of major wine companies in those cities.

The 2006 ABS census data are incorporated in the database of a regional multi-sectoral model of the Australian economy known as TERM and developed by the Centre of Policy Studies.<sup>4</sup> That database is the source of comparative information on the industry's contribution to regional employment, gross value of production and value added (GDP). Vine area, grape and wine production quantities, and number of establishments in the grape and wine business are from the annual survey data reported in ABS Cat. No. 1329.0. Irrigation data are from ABS Cat. No. 4618.0.

The ABS does not publish winegrape price data, but since 1999 the industry itself has been conducting a series of State-based annual winegrape price and utilization surveys, and the average price data and crush volumes from those surveys are now made freely available online by AGWA. As for wine prices, these are not available at the regional level but AGWA uploads on its WINEFACTS website, on a monthly basis, national information on the distribution of prices for wine exports (which now account for more than three-fifth of the value of all sales of Australian wine).

There is no official definition of wine regions by climate, but Leanne Webb has carefully assembled climate information for the major regions, reported in Table 46.<sup>5</sup> From that we have defined three zones as follows:

- Hot zone: Mean January and February temperatures each above 23°C and Growing Degree Days above 2200;

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<sup>3</sup> Further disaggregation proved to be not sensible because the concordance between the other smaller GI regions and one or more SSDs or SLAs is very poor because of overlapping. Even for the chosen GIs the concordance is not always great. For example, the McLaren Vale GI is a small part of the Southern Adelaide SSD which includes a large amount of urban activity.

<sup>4</sup> Wittwer, G. and M. Horridge, 'Bringing Regional Detail to a CGE Model Using Census Data', *Spatial Economic Analysis* 5(2): 229-55, 2010. This is a bottom-up regional model. A top-down regional model has also been developed for wine industry analysis, based on the ORANI-G model developed by Mark Horridge, 'ORANI-G: A General Equilibrium Model of the Australian Economy', Preliminary Working Paper No. OP-93, Centre of Policy Studies, Monash University, October 2000.

<sup>5</sup> Webb, L.B., *The Impact of Projected Greenhouse Gas-induced Climate Change on the Australian Wine Industry*, unpublished PhD thesis, University of Melbourne, Parkville, Victoria, October 2006.

- Cool zone: Mean January and February temperatures each below 20°C and Growing Degree Days below 1550.
- Warm zone: those with temperatures and Growing Degree Days between those of the Hot and Cool zones.

The beneficial effect of a large diurnal temperature range also was considered, but it did not cause any change to the above classification of regions into H, W and C.

As for **Sections III and V**, data on winegrape bearing area by variety and region are from AGWA's WINEFACTS website for this century, from AGWA archives for last century and, for 1860, from Kelly, A.C., *The Vine in Australia*, (Sydney: Sands and Kenny, 1861), with thanks to Peter Dry for suggesting what those old varietal names are likely to be today by drawing on, among other sources, Antcliff, A.J., 'Variety Identification in Australia', *Australian Grapegrower and Winemaker* 160: 82-88, April 1977. Different firms sometimes use different names for the same winegrape variety, and over time common usage changes. For present purposes, and to be consistent with our global compendium on *Which Winegrape Varieties are Grown Where? A Global Empirical Picture*, (Adelaide: University of Adelaide Press, 2013), our key source for identifying DNA-identical varieties is the Robinson, Harding and Vouillamoz book called *Wine Grapes* (London: Allen Lane, 2012). It provides a detailed guide to 1368 commercially grown 'prime' varieties, and it also identifies their various synonyms used in various countries. Those authors chose the 'prime' name according to the name used in its country or region of origin. Hence we use Syrah rather than Shiraz, since Syrah is its common name in France, its country of origin.

Turning back to **Section I** data sources that are table-specific, these are listed here in the order in which they appear. Some indicators involve macro data in the denominator, such as total crop area sown, population, total merchandise trade or real GDP; those macro data are reported in Section IV.

Table 1: Authors' own compilation, with dates of cycles based on visual observation of de-trended data.

Table 11: Exports to the United Kingdom up to 1946 are assumed to be the same as imports by the UK from Australia, reported in Laffer, H.E., *The Wine Industry of Australia*, (Adelaide: Australian Wine Board, 1949).

Table 12: Apparent wine consumption is assumed from 1907 to be production plus net imports less net increase in stock less the diversion of wine production to distillation. Changes in wine stocks are available only from 1983, and wine for distillation data are available only from 1923, so both are assumed to be zero prior to those years. (When divided by population, these turn out to be quite close to wine consumption per capita data in ABS Cat. No. 4307.0.55.001 from 1945.) We estimate consumption prior to 1907 by using per capita consumption data (times population) from Vanplew, W., *Australians: Historical Statistics* (Sydney: Fairfax, Syme and Weldon, 1987). Australian wine import data are unavailable prior to 1901, so apparent imports are derived as apparent consumption plus exports minus production. In a few years this generates a negative number, in which case we assume imports are zero. Sales of Australian wine are available only from 1947 (see Table 11), so wine production minus distillation is used as a proxy for earlier years (hence overstating sales pre-1923 because lack of data requires us to assume no wine was distilled when in fact it rose from close to zero in the early 1890s to one-third of wine production by 1923).

Table 14: Apparent wine consumption in each State pre-Federation is assumed to be production plus net imports, and so overstates actual consumption to the extent of any net increase in stock or any distillation of wine in its year of production.

- Table 16: From the database used to compile *Global Wine Markets, 1961 to 2009: A Statistical Compendium* (Adelaide; University of Adelaide Press, 2011), by K. Anderson and S. Nelgen, except for part (j) which is from [www.agwa.net.au](http://www.agwa.net.au).
- Table 18: Statistical Registers and Mill, S., *Taxation in Australia*, London: Macmillan, 1925.
- Table 19: Lewis, M., *A Rum State: Alcohol and State Policy in Australia 1788-1988* (Canberra: Australian Government Publishing Service, 1992).
- Table 20: The export bounty is described in Laffer, H.E., *The Wine Industry of Australia* (Adelaide: Australian Wine Board, 1949) and Lloyd, P.J. and D. MacLaren, 'Relative Assistance to Australian Agriculture and Manufacturing Since Federation', *Australian Journal of Agricultural and Resource Economics* 59 (forthcoming 2015). Laffer also describes the UK import tariff preference on Australian fortified wine.
- Tables 21 and 22: Winetitles, *The Australian and New Zealand Wine Industry Directory*, (Adelaide: Winetitles, 2014, see [www.winebiz.com.au](http://www.winebiz.com.au)).
- Tables 23 to 26: Beeston, J., *A Concise History of Australian Wine*, 3<sup>rd</sup> Edition (Sydney: Allen and Unwin, 2001); Halliday, J., *A History of the Australian Wine Industry: 1949-1994* (Adelaide: Winetitles, 1994) and *Top 100 Australian Wineries: From Vines to Wines, Histories to Vintages* (Melbourne: Hardie Grant Books, 2014); company websites and [www.winebiz.com.au](http://www.winebiz.com.au)
- Table 27: Intangible Business, *The Power 100: The World's Most Powerful Spirits and Wine Brands, 2013* (London: Intangible Business, 2014) at [www.drinkspowerbrands.com](http://www.drinkspowerbrands.com).
- Table 28: Brandy production data from 1907 to 1924 refer to clearances of domestically produced brandy.
- Table 32: Per capita consumption data pre-1961 for beer and spirits are from Vanplew, W., *Australia: Historical Statistics* (Sydney: Fairfax, Syme and Weldon, 1987). Wine is converted from the apparent wine consumption estimates in Table 13 by assuming it has an alcohol content of 14% during 1843 to 1922; for 1923 to 1960 we use the consumption-weighted average of table wine (12%) and fortified wine (18%) which averaged 15.5% during that period; and during 1961 to 2013 the alcohol content of wine as in Cat. No. ABS 4307.0.55.001 was used (which averaged 13% during that period, ranging from 11.9% to 15.9%). Beer is assumed to have an alcohol content of 4.5%. Where spirits data are reported as proof rather than pure alcohol, they are converted to alcohol by multiplying by 0.5714. For years prior to 1907 Australia's per capita consumption of spirits and beer are assumed to be the population-weighted average of that in New South Wales and Victoria (as was in fact the case in 1896 for which each colony's data are reported in Commonwealth of Australia (1902), *A Statistical Account of the Seven Colonies of Australasia*, page 357). Home-brewed beer was not included in the NSW statistics until 1886 and in Victoria's until 1863. The differences between the five years before and the five years since those dates were 8.4 and 9.4 gallons of beer in New South Wales and Victoria, respectively, so those amounts are added to the prior years' data to get a more-accurate beer estimate.
- Table 35: The categorization into premium and non-premium is based on winegrape varieties listed in Table 36.
- Table 36: The quality categorization of varieties is the author's own, based on historical use of each variety in Australia since the 1950s.
- Table 37: Winegrape prices are from ABARES up to 2007 and from the Winemakers' Federation thereafter. Winegrape value is the product of those prices and the volume of production reported also in Table 7.
- Table 38: ABARES, *Agricultural Commodity Statistics*, various years, [www.abares.gov.au](http://www.abares.gov.au) in addition to ABS Cat. No. 1329.0.

- Table 41: Various issues of the *Annual Report* of the Australian Wine Research Institute, of the Grape and Wine Research and Development Corporation, and of the Cooperative Research Centre for Viticulture at [www.crcv.com.au/publications/annualreports/](http://www.crcv.com.au/publications/annualreports/).
- Table 42: Anderson, K., 'Contributions of the Innovation System to Australia's Wine Industry Growth', Ch. 4 in *Innovation and Technological Catch-Up: The Changing Geography of Wine Production*, edited by E. Giuliani, A. Morrison and R. Rabellotti, Cheltenham UK: Edward Elgar, 2011.
- Tables 43 and 44: Anderson, K. (with the assistance of N.R. Aryal), 'Excise Taxes on Wines, Beers and Spirits: An Updated International Comparison', *Wine and Viticulture Journal* 2(6): 66-71, November/December 2014.
- Table 46: Webb, *op. cit.*
- Tables 62-64: WGGGA, *The National Winegrape Grower Book 2013* (Adelaide: Wine Grape Growers Australia, 2013).
- Tables 72-74: The categorization into premium and non-premium is based on winegrape varieties listed in Table 36.

The **Section IV** data sources are listed here in the order in which they appear, or otherwise they are from Vanplew, W., *Australians: Historical Statistics* (Sydney: Fairfax, Syme and Weldon, 1987).

- Tables A1 and A2: ABS Cat. No. 3105.0.65.001, *Australian Historical Population Statistics*, 2008 and Butlin, M., R. Dixon and P.J. Lloyd, 'A Statistical Narrative: Australia, 1800 -2010', Ch. 21 in *The Cambridge Economic History of Australia*, edited by S. Ville and G. Withers (Cambridge: Cambridge University Press 2014). Victoria's population from 1836-50, before it was separated from New South Wales, has been subtracted from the NSW official total. Victoria in 1836 had a population of 177, in 1841 it was 16,671, and in 1846 it was 32,879; the in-between years were estimated assuming a log-linear trend.
- Table A3: Vanplew, *op. cit.*; ABARES, *op. cit.*; and the Statistical Registers of each Colony.
- Table A4-A8, A10-A13: Butlin, Dixon and Lloyd, *op. cit.*; Butlin, N.G. and W.A. Sinclair, 'Australian Gross Domestic Product 1788-1860: Source and Methods', *Australian Economic History Review* 26(2): 127-47, 1986; Sinclair, W.A. (2009), *Annual Estimates of Gross Domestic Product: Australian Colonies/States 1861-1976/77*, at <http://arrow.monash.edu.au/hdl/1959.1/88855>. See also Butlin (1962, 1986 and 1994) and Cashin (1995). Updates from ABS Cat. Nos. 5220.0 and 5206.0.
- Table A9: Updated from Lloyd and MacLaren, *op. cit.* and Anderson, K., P.J. Lloyd and D. MacLaren (2007), 'Distortions to Agricultural Incentives in Australia Since World War II', *The Economic Record* 83(263): 461-82, December.
- Table A10: Manufacturing GDP data have been multiplied by 0.63 pre-1861 because they included construction, unlike post-1860.
- Table A14-A16: Vanplew, *op. cit.*; Butlin, Dixon and Lloyd, *op. cit.*
- Table A17: Vanplew, *op. cit.*, updated from Reserve Bank of Australia, [www.rba.gov.au](http://www.rba.gov.au)
- Table A18: Butlin, Dixon and Lloyd, *op. cit.*, updated from Reserve Bank of Australia, [www.rba.gov.au](http://www.rba.gov.au)
- Table A19: Vanplew, *op. cit.* and Butlin, Dixon and Lloyd, *op. cit.*, updated from Reserve Bank of Australia, [www.rba.gov.au](http://www.rba.gov.au)
- Table A.20: Spliced from indexes in Harley, C.K. (1988), 'Ocean Freight Rates and Productivity, 1740–1913: The Primacy of Mechanical Invention Reaffirmed', *Journal of Economic History* 48: 851–76 (up to 1869), in Mohammed, S.I. and J.G. Williamson (2004), 'Freight Rates and Productivity Gains in British Tramp Shipping 1869-1950', *Explorations in Economic History* 41(2): 172–203 (1870 to 1994), and in

Hummels, D.L. (2007), ‘Transportation Costs and International Trade in the Second Era of Globalization’, *Journal of Economic Perspectives* 21(3): 131-54 (1995 to 2004).

Tables (or other sources, listed below) from which each Chart is drawn are as follows:

Chart no.	Table numbers	Chart no.	Table numbers	Chart no.	Table numbers
1	29, 13	30	40	59	58
2	13, 15	31	29	60	55
3	15, A&N	32	A2	61	56, 57
4	13, A&N	33	30	62	Winefacts
5	2	34	32	63	60
6	9	35	32	64	63, 67
7	11	36	CofA	65	70, 71
8	13	37	32, A4	66	61
9	2, 9, 13	38	33	67	57, Section V
10	6, 10, 13, A1	39	8, 28, 29, 31	68	61
11	4, 9, A4	40	34, 35	69	165
12	3	41	34	70	165
13	4	42	41	71	49
14	10	43	64	72	49
15	13, A20	44	KA15	73	122-126, 132
16	34	45	KA15	74	127-131, 133
17	2, 15, 37	46	KA15	75	133
18	Winefacts	47	KA15	76	125, 126
19	15, A&N	48	KA15	77	127-131
20	37	49	A&N	78	131, 146, 151
21	13, 15	50	KA14	7	KA14
22	21	51	A&N	80	KA14
23	A17, A18	52	KA15	81	KA14
24	WB	53	A9	82	Section V
25	6, A13	54	A&A	83	Section V
26	A&N	55	16	84	153
27	Winefacts	56	Winefacts	85	172, 173
28	Winefacts	57	47, 51	86	KA
29	Winefacts	58	48		

*Other sources for charts:*

A&N: Anderson, K. and S. Nelgen (2011), *Global Wine Markets, 1961 to 2009: A Statistical Compendium*, Adelaide: University of Adelaide Press (and updated). [www.adelaide.edu.au/press/titles/global-wine](http://www.adelaide.edu.au/press/titles/global-wine)

Winefacts: AGWA (2014), *Winefacts*, Adelaide: Australian Grape and Wine Authority. [www.wineaustralia.com/en/Winefacts](http://www.wineaustralia.com/en/Winefacts)

CofA: Commonwealth of Australia (1902), *A Statistical Account of the Seven Colonies of Australasia*, Melbourne: Government Printer.

KA14: Anderson, K. (2014a), ‘Evolving Varietal Distinctiveness of the World’s Wine Regions: Evidence from a New Global Database’, *Journal of Wine Economics* 9(3): 249-73.

KA15: Anderson, K. (2015), ‘Global Wine Markets, 1843 to 2013: A Statistical Compendium’ (forthcoming database).

A&A: Anderson, K. (with the assistance of N.R. Aryal) (2014), ‘Excise Taxes on Wines, Beers and Spirits: An Updated International Comparison’, *Wine and Viticulture Journal* 2(6): 66-71, November/December.

KA: Author’s own compilation.

WB: World Bank, *Commodity Price Data* (Pink Sheet), accessed 27 January 2015 at <http://econ.worldbank.org/>



## Executive summary of key findings

Just one generation ago, a few visionary leaders were optimistic that more investment funds could be attracted to expand the Australian wine industry. They developed a strategy that attracted even more funds than they had hoped for, and as a result Australia led and showed the way for New World wine exporters to ride the globalization wave and transform many of the world's wine markets.

Then a perfect storm of shocks hit the Australian industry: a multi-year drought with severe consequences for the cost of irrigation water, the global financial crisis that began in 2008, a dramatic mining-induced appreciation of the Australian dollar, rapid wine export expansion by competitor countries, and an austerity dictate in late 2012 by a new Chinese Government. This coincidence of shocks brought to a sudden halt what had been the fifth boom since the 1840s in Australia's wine industry development.

In contrast to its recent rapid rise, the Australian wine industry was slow to emerge in the first globalization wave in the latter decades of the 19<sup>th</sup> century despite plenty of suitable land, and was somewhat laggard at the tail end of that wave which ended when World War I broke out.

In the belief that much can be learnt from an evidence-based study of both the early and the more-recent history of the development of this industry, the present volume provides an analytical narrative of the long-run trends in its production, consumption and trade, and of the fluctuations around them. Many histories have been written in the past, but none have had access to the comprehensive set of data that has been assembled for this volume.

A great deal of economic and statistical analysis of these newly compiled data has yet to be undertaken. However, since the industry is about to launch into a new phase of strategic planning, this compendium and the associated database (at [www.adelaide.edu.au/wine-econ/databases](http://www.adelaide.edu.au/wine-econ/databases)) are being made freely available now to assist that process.

In this Executive Summary, key findings are briefly summarized below. They are not in order of importance but just in the order in which they emerge in the Chapters that follow.

### *Slow vine planting progress to mid-19<sup>th</sup> century*

During the first 50 years of British settlement in New South Wales, numerous settlers experimented with imported vines and wine making. Virtually none of them got to the stage of having a regular surplus for commercial sale, however. Domestic alcohol consumption prior to 1840 instead relied predominantly on imported wines along with imported spirits and beers.

Per adult consumption levels were similar to those in Britain and Ireland at the time (contrary to earlier claims by historians such as Russel Ward): about 14 litres of alcohol, made up of 11 litres from spirits, 2 litres from wine and 1 litre from beer.

### ***Slow embracing of wine as an alternative beverage to ‘rum’***

Australia's alcohol consumption dropped substantially during the depression of the early 1840s, but rose in the 1850s with the influx of male migrants and the boost in per capita incomes. Thereafter, as the dominance of adult males in the population diminished, so too did per capita consumption, but there was a gradual change in the mix away from spirits to beer and then also to wine.

Wine consumption grew slower than average incomes up to the early 1970s, and then grew faster than incomes as post-war migrants from southern Europe gradually influenced the nation's preferences.

### ***The very long-run trend***

Australia's wine industry expanded throughout most of the past 17 decades, but around that very long-run trend have been five distinct cycles in vine area and wine production.

The latest boom in plantings is the biggest of the five by far in absolute terms, but in proportional terms it is only moderate by Australian historical standards.

Each expansion of the bearing area of vineyards, when placed on a per capita basis, was very rapid; but in each case it was followed by a much longer period of considerable decline.

Those sharp increases and slower subsequent declines are also evident when the vine area is shown relative to the total crop area. That indicator has fluctuated around a declining long-run trend since the end of the 19<sup>th</sup> century.

Even so, wine production per capita and per dollar of overall GDP have trended upwards, due to increasing yields per hectare, thanks to an expanding share of vines being irrigated and more grapes being used for wine rather than other uses.

Only two of the four previous booms involved the industry becoming more outward-focused: the period just prior to the 1890s, and the post-World War I period prior to the depression of the early 1930s.

Both of those outward-focused cycles were partly induced by government support policies that led to surplus production.

The other two booms, 1855-71 and 1967-75, were driven almost entirely by domestic demand growth, generated by rapid immigration and income growth.

Prior to the 1890s, when exports were dominated by wool and gold, Australia had been a net importer of wine; but thereafter wine exports exceeded imports every year except during 1976-86 when mining exports boomed once again.

### ***The first cycle, 1855 to 1882***

The first boom (1855-71) was a direct result of the gold rush which started in Victoria in 1851. Within a decade Australia's non-native population trebled and its real disposable



income rose even more. So even though real wages were bid up and farm labour was scarce initially as men went off to the goldfields, the growth-induced boost in demand for wine stimulated a rapid expansion in its supply. By 1871 the area had expanded ten-fold and wine production had increased 17-fold.

That prolonged growth in wine supplies eventually outstripped growth in domestic demand in each colony, so export outlets were sought. Inter-colonial trade within the continent was one option, but transport costs were high and each colony also sought to protect its local producers by imposing high import tariffs.

Fortunately, British import duties and ocean shipping costs began to fall in this period, and legislative changes in 1861 created off-licence retailing there. That allowed Australia's exports to Britain to quadruple over the 1860s and double again by the mid-1870s.

Even so, throughout the 1860s and 1870s Australia's wine exports amounted to less than 3% of its production, so it did little to raise the very low returns to vignerons at that time. As a result, the area of grapevines during the 1870s fell 10% nationally and almost 30% in South Australia.

The poor export performance to the late 1870s was not without some highlights though. After the International Exhibition in Vienna in 1873, the *Morning Post* of 8 June 1874 proclaimed: "Australia promises ere long to become as celebrated for its wines as it is already for its wool and gold [and] the scope for further increase is almost unlimited." Similar accolades flowed from the International Exhibition of 1882 in Bordeaux.

### ***The second cycle, 1882 to 1915***

Those successes in International Exhibitions, together with the prospect of the forthcoming Federation removing the high inter-colonial trade restrictions by the turn of the century, encouraged growers to further expand the area under winegrapes.

True, there were phylloxera outbreaks in Victoria, but the Victorian Government responded with compensation for forced removal of diseased plants, and then in 1890 it offered subsidies to growers who replanted with resistant stocks.

In response, Victoria's vine area more than doubled between 1889 and 1894 – just as the 1890s' Depression hit and domestic alcohol sales were plummeting.

Phylloxera continued to spread in Victoria, causing its vine area to decline to the point that South Australia regained the lead in total vine area that Victoria had held for four decades.

South Australia's wine production per capita doubled between the five years preceding and the five years following Federation, to more than five times the national average, while that in other states remained flat or fell when inter-colonial trade barriers were removed.

In Western Australia, the vine area only started expanding rapidly when gold was discovered in the early 1890s. As in Victoria in the 1850s, that gold mining boom attracted financial capital from abroad and the colony's white population quadrupled in the 1890s.

National wine production by the turn of the century was three times its 1880 level. As it had grown faster than domestic demand, one-sixth of the newly federated country's wine production was being exported, despite considerable difficulties still associated with exporting from Australia at that time.

Exporting in this cycle was helped partly by the reduced competition from France and other suppliers to Britain following the arrival and devastating spread of phylloxera and mildew in Europe in the 1870s and 1880s.

An important impact on the industry following Federation was the imposition of tariff protection from imports of many manufactured products and some processed farm goods.

Dried vine fruit was one of the first farm products to be so protected. It received tariff protection that doubled the local price of drying grapes when introduced in 1904.

As well, the Australia Dried Fruits Association controlled over 90% of domestic production and was able to raise the domestic price by diverting supplies to distilleries, or to the export market with the help of a government export subsidy.

That scheme raised the price of winegrapes, and hence the cost of producing wine, but that cost was more or less than offset by a tax also on wine imports from early Federation days.

This cycle's export boom involved bulk full-bodied reds. It continued for two more decades after the initial build-up to 1895.

Macroeconomic conditions at home and abroad, not just industry-specific forces, impacted on those exports though: from the late 1880s to World War I, the share of wine production exported closely paralleled fluctuations in the share of all merchandise exports in GDP.

### ***The third cycle, 1915 to 1967***

Following World War I the vine area expanded rapidly, encouraged by the subsidized settlement on farms of ex-servicemen, particularly in the newly developed Murrumbidgee Irrigation Area of NSW and along the Murray River.

Annual output of wine more than doubled in the decade to 1925, leading to a glut especially of Doradillo grapes whose price fell by two-thirds in 1924.

The Australian Government decided to further assist producers in the newly planted areas by offering export assistance in the form of a bounty on fortified wines.

The export bounty almost doubled the price received by producer, which dampened domestic fortified wine sales at the same time as boosting production and exports of fortified wines.

Then in its June 1925 budget, the British Government introduced, by way of thanks for war contributions, a tariff preference for wines from the British Empire that effectively halved the duty paid by Australia in that market.

The industry continued to be assisted also by an import tariff on wine and brandy, a sales tax of 15% on imported but not domestically produced wine, excise taxes on beer and spirits but not on wine, and a lower excise tax on brandy than on other spirits.

The import tax on wine was non-trivial, generating a rate of industry assistance that was above the average for other manufactures and twice the average for the agricultural sector. That helps explain both the low share of imported wine in domestic consumption and the relatively low overall level of wine consumption throughout this cycle.

Together these policies gave a considerable boost to Australia's depressed producers of low-valued winegrapes and fortified wines during the interwar years.

The resulting bulk shipments of immature wines, and poor storage treatment in Britain, ensured they were low quality hence low priced by the time they were sold there. That generated a reputation for Australia as a supplier of poor-quality fortified wine, eclipsing its previous reputation as a promising red wine producer.

The Australian Government established in 1929 the Wine Overseas Marketing Board (later known as the Australian Wine Board). Like many marketing boards at the time, it tried to set a minimum price for export wine from 1930. However, the market price was barely half the set price, so the scheme was abandoned in 1936.

With returns to winemakers falling from the late 1920s, a vine-pull scheme by the South Australian Government was introduced in 1936. That contributed to two-thirds of the Coonawarra region's vines being uprooted.

Meanwhile, in Victoria's Yarra Valley, farmers began turning to dairying; and in the Hunter Valley of New South Wales, the acreage of vines was eventually halved.

Hence the total area of vines in Australia grew very little over this cycle, and it was five decades before the annual volume of wine exports achieved in the late 1930s (artificially boosted to build stocks in Britain for the foreshadowed war) was again reached.

The export assistance in the interwar period was a mixed blessing at best: being confined to fortified wines it undermined the growing British and continental European interest in Australian dry table wines that had been slowly building up over the previous few decades; by making it a specific rather than *ad valorem* duty it dampened the incentive to produce higher-quality wines; and by giving six months' notice of the intention to reduce the subsidy in late 1927 it encouraged shipments of immature wines that could not be stored well in Britain.

During World War II domestic wine consumption rose, because beer and spirits sales were rationed, while in the United Kingdom severe restrictions were placed on wine imports from 1941.

Then in 1947 Britain raised its tariff on fortified wines five-fold and kept it very high until the end of the 1950s, and the Australian government removed its wine export bounty.

After Australia removed its war-time grain rationing to breweries, beer again comprised three-quarters of all alcohol consumption in Australia.

Over the next three decades, however, the wine share was to double (as was the spirits share, much of it based on wine distilled into brandy), at the expense of beer sales.

The 50% rise in wine consumption in the 1960s was helped by a one-third increase in real income per capita, by brand advertising and generic promotion domestically, by the influx of wine-preferring immigrants from southern Europe, and by many more young Australians travelling to Europe.

The area of vines and wine production grew only slowly from the mid-1940s to the mid-1960s, and wine exports were flat. The Korean War-induced wool price boom and then subsidies to other farm products meant sheep, wheat, milk and tobacco production appealed more to farmers than winegrapes.

As well, tighter import restrictions on other manufactured goods boosted the import-competing industrial sector, while the removal in the early 1960s of a ban on iron ore exports triggered a boom in mining exploration, both of which indirectly dampened producer incentives in other sectors including wine.

### ***The fourth cycle, 1967 to 1986***

Britain hiked its tariff on fortified wines again in the late 1960s, and then joined the European Economic Community which allowed duty-free access to wines from the other EEC members from 1973.

Meanwhile, the mining boom at home and the spike in energy raw material and food prices internationally in 1973-74 and again in 1979-80 reduced the competitiveness of Australia's producers of other tradables including wine. So wine exports remained flat from the mid-1960s to mid-1980s, exports to the UK shrunk by nine-tenths, and wine imports exceeded exports during 1976-86. Grape and wine prices also remained low, particularly for reds.

A subsequent surge in demand for premium red wines stimulated an expansion in their production from the late 1960s. This was followed by an equally sudden surge in domestic consumer interest in premium white wines from the mid-1970s, which was followed in turn by a renewed interest in reds in the following cycle.

During this and the previous cycle the share of fortified wines in domestic sales shrank, from more than half to just 7%. In vineyards, premium table wine varieties, which were less than 20% of the area up to the mid-1960s, represented 40% by the mid-1970s.

Reforms of liquor licencing laws for restaurants and hotels, and the Trade Practices Act of 1974, made retail price fixing illegal and stimulated the emergence of liquor chain stores and wine discounting.

This period saw the commercial development of the 2- to 4-litre cask, or 'wine in a box', which added hugely to domestic demand at the lower end of the market.

Between 1978 and 1984 the volume of white wine sold in Australia in a plastic bag inside a box rose from 33 to 152 ML per year, while bottled red and white wine sales fell by one-quarter, from 73 to 55 ML.

Neither of the surges in production in the two decades to the mid-1980s, of first red and then white table wines, was export-driven.

The industry continued to be internationally uncompetitive and dependent on import restrictions on dried vine fruit and wine.

Then in 1984 the Government introduced a 10% wholesale sales tax on wine, and raised it to 20% two years later. That, plus the perceived over-supply situation especially in reds in the mid-1980s, meant the prospects for grapegrowers and winemakers looked bleak.

It seemed inconceivable to many observers at that time that another boom was about to begin, so the South Australian and Federal governments co-financed a vine-pull scheme in 1985-86.

### ***The fifth and current cycle, starting in 1986***

The most-recent boom began in 1986 with a steady increase in exports to take advantage of the historically low value of the Australian dollar, which was due to a sharp fall in prices of Australia's coal, grain and other primary export products.

The export expansion was so large as to raise wine's share of total merchandise value above the 0.9% record set in 1932, peaking in 2004 at 2.3%, just as mineral exports were taking off.

The wholesale value of Australian wine sales doubled between 1984-86 and 1992-94, and the domestic consumer price and the export price of Australian wine both grew by around 50% over that period.

Those price changes stimulated vine plantings, wine production and wine exports, and slowed the growth in domestic sales of Australian wine (as did another increase in the wholesale sales tax on wine from 1993).

Grapegrowers were the main beneficiaries of the initial increase in Australian wine prices. The average price received for winegrapes was three times higher in 1999 than at the start of that decade, even though the export price rose only 60%.

The proportion of Australia's grape production used for wine rose from 57% to 85% over the decade of the 1990s.

With these developments came a substantial increase in firm concentration. By 2014 the top three producers accounted for the majority of wine exports and for more than 40% of the annual crush, of the number of bottles of wine sold, and of the value of domestic sales.

Those largest of wineries were particularly suited to supply large volumes of popular premium wines to supermarkets in the UK and Australia.

The export surge increased substantially the incentive for investment in developing overseas markets for Australian wine. Generic marketing of Australian wine, together with the huge increase in the quantity and quality of Australia's exports, began to build the country's international reputation for popular commercial premium-quality wines.

While this fifth boom was largely market-driven it was also influenced by changes in government interventions. The steady reduction in manufacturing protection and in assistance to some other agricultural industries, that began in 1972 and was accelerated through the 1980s and 1990s, paralleled and thus offset the reductions in nominal rates of assistance to grape and wine producers.

The imposition from 1984 of the wholesale sales tax on wine dampened domestic sales but encouraged exporting, while the government's vine-pull scheme in the mid-1980s led to the loss of some valuable old vines but the replacement of others with more-profitable alternatives.

By way of consolation for raising the wholesale sales tax again in 1993, the government assisted new plantings of vines by providing for accelerated depreciation of vineyard construction costs, which contributed to the trebling of the vineyard area during the boom.

That huge expansion in vineyard plantings inevitably led to a surge in winegrape production three or so years later. Stocks of wine ready for sale trebled in the ten years to 2005.

Meanwhile, several New World suppliers had begun to emulate the Australian export-led experience, leading to a growth spurt in their wine exports just a few years behind Australia's. As well, several Old World suppliers plus Argentina and Chile were expanding their exports because of declining domestic consumption.

Thus Australian exporters began to face increasing competition just as the historically low value of the Australian dollar began its unprecedented decade-long rise after 2001.

The AUD appreciation contributed greatly to the subsequent decline in the AUD price of Australia's wine exports.

While the volume of those exports continued to expand each year until 2007 before stabilizing, their value plummeted as the AUD continued to rise in the wake of the massive mining investment boom.

The decline in wine export prices saw a parallel (and hence proportionately larger) decline in winegrape prices. By 2011 the average winegrape price had returned to the same nominal level as in 1989.

Domestic consumers benefitted from these developments: the retail price index for wine grew far less than the overall consumer price index every year of the past ten.

The appreciating value of the AUD also encouraged wine imports, which grew dramatically from the turn of the century.

New Zealand led the import charge with Sauvignon Blanc, followed by France with Champagne. Even though import prices were well above Australia's export prices, New Zealand's Sauvignon Blanc became the biggest selling white wine in Australia.

A direct consequence of the wine and grape price collapse was that both vineyard and winery asset prices plummeted after 2007, with some vineyards selling for no more than unimproved land value.

The collapse in asset values was partly because banks lost interest in financing the industry, and partly because listed corporations sought to shed their least-productive vineyard and winery assets to boost the rates of reported return on their remaining capital.

### ***Was the optimism at the start of the 5<sup>th</sup> cycle warranted?***

The latest boom differs from the earlier booms in several important respects that justified new optimism.

First, it was overwhelmingly export-oriented, in contrast with the first and fourth booms.

Second, it was mostly market-driven. This was not unlike the first two booms, but in contrast to the third (inter-war) boom that evaporated once government export assistance measures were withdrawn.

Third, the quality of wine output improved hugely relative to the cost of production.

Fourth, the aging of the population and the rapid growth in incomes in high and middle-income countries, at least up to the 2008 financial crisis, was boosting demand, as was the global spread of wine supermarketing.

Those contemplating new investments in Australia's wine industry at the end of the 20<sup>th</sup> century could be excused for not anticipating the rapidity with which other New World suppliers copied Australia's export-led growth model.

Nor could those investors have anticipated the combination of an unprecedented decade-long rise from 2001 in the value of the AUD, a long and widespread drought that stimulated major policy reforms affecting irrigation water pricing, and the global financial crisis from 2008 which reduced wine demand and weakened the US dollar, Euro and Pound Sterling.

### ***What did innovation and generic marketing and R&D contribute?***

One of the hallmarks of the export-oriented success of Australia's wine industry since the 1980s has been the very considerable degree of collaboration among its firms, including through levying themselves and attracting matching government funds for investments in generic promotion and research and development (R&D).

The extent of R&D investment was modest relative to value added when compared with other industries, yet the number of research papers on viticulture and oenology generated per litre of wine produced was very high compared with other wine-producing countries.

Studies have found that the portfolio of GWRDC research projects has yielded benefit/cost ratios ranging from 7:1 to more than ten times that level.

The industry has engaged in generic promotion of exports since the late 1920s (and it added generic marketing in the domestic market from the mid-1960s). Initially the focus was on broadly promoting 'Brand Australia', but since 2007 the campaign became more refined with an explicit objective of encouraging consumers to 'trade up' to progressively higher prices.

The strategy has been supplemented by regional promotion campaigns, funded by regional producer levies.

The budget for these generic promotion efforts is trivial relative to the value of national production and the extent of expenditure by European competitors. Moreover, despite the many misappropriations that have been uncovered, the EU's wine promotion budget from Brussels is to be more than doubled for the period 2014-18.

### ***How does Australia's wine industry growth compare historically with rest of the world's?***

As recently as 1980-84, the five key European wine-producing and -consuming countries (France, Germany, Italy, Portugal and Spain) accounted for just over half of global wine production and consumption. One hundred years earlier, they contributed three-quarters of global wine production, and (with Algeria) they accounted for 95% of global wine exports during the five decades to World War I.

By contrast, Australia prior to the 1990s always accounted for less than 1% of the world's vineyard area and wine exports. Even in the early 1990s Australia's shares of world wine production and consumption were less than 1.5%.

Early in the 20<sup>th</sup> century Australia's production was small relative also to that of Argentina, Chile and the United States, although its exports then and in the latter 1920s and in 2007 were greater than those of other New World producers. Australia had become the world's 4<sup>th</sup> largest exporter of wine by 2002, before Chile pushed Australia back into 5<sup>th</sup> place in 2012.

When expressed on a per capita basis, the differences between the Old World and New World are less stark, and the two groups are converging.

For most decades from the 1870s to the 1970s, Europe's four main wine-producing countries produced an annual average in excess of 100 litres per capita, but since the early 1980s those volumes have dropped to an average of just above 70 litres.

Among the New World countries, only Argentina and Chile produced more than 30 litres per capita per year prior to the latter 1990s, but Australia's per capita production rose from around 10 litres in the 1920s and 1930s to a peak of 60 litres by 2005-09, exceeding that of all other New World countries and just one-sixth below the 2010-13 average for the four main Western European exporters.

Australia slipped back to 52 litres per capita during 2010-13, by which time it was matched by New Zealand. Meanwhile, Chile has shot up to 75 litres, Argentina has fallen dramatically



to half Chile's, South Africa has fallen too to one-quarter of Chile's, and the United States has risen steadily but only to one-ninth that of Chile.

The vine intensity of cropping has an even wider range. Italy's share of crop area under vines was the highest in the world at 25% in the early 1960s. It had fallen to 15% by 1980-84 and to 8% by 2000-04, by which time Portugal had taken the lead at 12%. Spain is next at 7% in recent years. France and several other European countries are in the 3-4% range, the level that New Zealand recently reached, but the only other New World country above that is Chile, which recently shot up to 10%.

Australia, by contrast, has never had more than 0.35% of its crop area under vine, and has had less than half that for most years since the 1840s. Already China is approaching that intensity, averaging 0.33% in 2010-11.

This suggests suitable cropping land has not been the binding constraint on Australia's wine industry development. Even in the two most vine-intensive States (South Australia and now Tasmania) the share of crop area under vine is just a little above 1%.

A broader indicator that goes beyond the farm sector to economy-wide productive capability is the share of wine production volume or value relative to overall GDP. In the 19<sup>th</sup> century, the four main West European countries produced more than 60 kl of wine per real US million dollars of GDP). The range for those countries was still 15-35 kl in the late 1950s, but it had fallen below 5 kl by the early 1990s and to 3-4 kl by 2008. Australia was always below 2kl in the 19<sup>th</sup> century and less than 3 kl in the 20<sup>th</sup> century before peaking in 2004 at 3.1 kl, close to the Old World's current average.

As for exports, they did not exceed eight litres per capita per year for France and Italy in the 19<sup>th</sup> century and were less than five for most years of the first six decades of the 20<sup>th</sup> century. Spain, by contrast, exported more than ten litres per capita per year in the seven decades to the Great Depression (and Algeria more than 100 litres during 1900-60), but then less than five litres for the next three decades.

From the 1960s, as per capita domestic consumption fell in those West European countries, per capita exports grew steadily from less than five litres, reaching 22 in France, 28 in Portugal, 37 in Italy and 40 in Spain by 2010-13.

In the New World, per capita exports were always less than 2 litres prior to the 1990s, even in Australia in the 1930s. But since then it has risen dramatically in all New World exporting countries: as of 2010-13, it was 32 litres in Australia but was even higher at 40 litres in Chile and New Zealand, and eight litres in Argentina and South Africa.

While Australia was the leader among New World countries in contributing to the latest wave of wine globalization, the three biggest wine producing countries in Western Europe have been expanding their wine exports per capita steadily since the 1950s.

Another indicator of wine export intensity is the ratio of two shares: the share of a country's wine exports in the total value of its merchandise exports to wine's share of global merchandise exports. That index of comparative advantage was around 20 for Portugal prior to the mid-1980s, and by 2010-11 it was around nine for France and Portugal and around six for Spain and Italy.

In the New World the indexes of wine comparative advantage have shot up to 13 for Chile and New Zealand, six for Argentina and 4.5 for South Africa. For Australia, the index peaked at almost 11 in 2004 before falling by nearly two-thirds by 2013.

An important contributor to the sales of wine in any market is the rate at which consumers are discouraged via an excise or import tax. Apart from briefly in 1971-73, the only tax on wine consumption in Australia had been an import tariff until the imposition of a wholesale sales tax from August 1984. Beer and spirits consumption, by contrast, has always been subject to very heavy customs and excise taxation. Prior to the mid-1980s the Australian wine industry thus benefited from that tax regime, both directly via a protective import tariff on wine and indirectly via heavier taxation of alcoholic beverage substitutes in the domestic market.

Between 1984 and 1999, however, a wine sales tax applied and at an increasing rate until it was replaced in 2000 by a wholesale Wine Equalization Tax.

Australia's rate of wine consumer taxation is now high by OECD standards, and especially by the standards of significant wine producing/exporting countries. That is especially true at higher price points, because Australia's consumer wine tax is unusual in being ad valorem (a percentage of the wholesale price) rather than specific (in cents per litre of alcohol).

In 2012 Australia's wholesale tax per standard drink was the same as New Zealand's for commercial premium wines (22 cents) but higher at any price point above AUD7.50/litre. It compares with zero in Argentina, 3 cents in South Africa, 5 cents in the United States, and 6 cents in Canada – and just 1 cent in France and zero in other wine-exporting countries.

### ***Why such a sharp decline in profits and yet sluggish disinvestment in the past decade?***

In 2014, 84% of the industry's producers in Australia were not covering even their variable costs of production that year (which was even worse than the 77% survey finding for 2012),

The recent financial situation in Australia contrasts markedly with that in the United States, where for the past six years producers have had not only positive but relatively rosey financial results. In New Zealand, too, all but the smallest category of producers have been operating with healthy profits in all years since 2006, apart from a dip for some in 2010.

While some of those differences with Australia are due to real exchange rate changes, the volume of winegrape production in Australia has not diminished over the past ten years despite the halving of its average winegrape price.

When prices and profits slump, production does not decline even in the medium term: because each producer's investment involved large up-front sunk costs in assets that have no alternative use, they hang on in the hope that the downturn is only temporary or that others are exiting to speed adjustment.

Another reason for slow adjustment is that a large proportion of vigneron in regions near cities earn the majority of their income from other sources and continue to enjoy the lifestyle of being a part-time vigneron even when profits are low or negative.

Also, there are plenty of producers who continue to have access to credit or other funds even when the wine industry is depressed. Those that are in a position to purchase others' assets at low prices at such times are then in a stronger financial position as and when the industry returns to profitability.

Inevitably, though, the vineyard bearing area begins to shrink. Between 2008 and 2013 it fell by one-fifth, and there's been a further net reduction since then. A similar if more gradual fall in the vine area per capita occurred with the more-gradual mining boom of the 1970s/early 1980s, which was followed by a decade in which the vine area per capita hardly changed.

### ***In retrospect, was the industry helped or hurt by protectionism?***

While the Australian Federation began by eliminating barriers to interstate trade, it replaced them with tariff barriers to imports from abroad. The aim was mainly to encourage domestic manufacturing, but from the outset some import-competing agricultural industries also succeeded in securing such protection.

Dried vine fruit was one of the first farm products to get such protection, and from 1904 to 1939 that caused the price of grapes to average about 50% above what they otherwise would have been.

The extent of that support dropped during the two decades following World War II, but was still double that for other farm industries, and it rose again during the 4<sup>th</sup> wine cycle (1967-86) to three to four times that for agriculture as a whole.

Winemakers also have been protected by import tariffs, and at considerable rates in earlier decades but at just 5% in recent years (and zero for New Zealand wines).

Estimates of the wine nominal rate of assistance (NRA) averaged 23% during the 3<sup>rd</sup> wine cycle (1950-67), the same as for other manufacturing. During the 4<sup>th</sup> cycle (1967-86) the wine NRA averaged 32%, almost double the average for all other manufacturing of 17%.

Both those NRA averages have since diminished and both are now less than 4%, but prior to the 1980s wine import tariffs were virtually prohibitive, with imports rarely accounting for more than 1% of domestic consumption during the 3<sup>rd</sup> and 4<sup>th</sup> cycles.

The extent of support for the agricultural sector as a whole peaked in 1971, just before the Whitlam Labor Government was elected the next year and began dismantling farm support programs.

All import tariffs were cut overnight in 1973 by one-quarter, reducing manufacturing protection to that extent.

Then the Hawke Labor Government floated the AUD in December 1983 and introduced major microeconomic reforms including programs to phase out import tariffs and quotas and production and export subsidies by the new millennium.

In short, throughout all but the last years of the 20<sup>th</sup> century, manufacturing has been protected and the agricultural sector as a whole strongly discriminated against by Australia's trade-related policies. Yet within that broad picture, grape and wine producers received relatively favourable treatment throughout the last century.

Protectionism in general leads to an inefficient allocation of the nation's resources, is taxing of consumers, and inhibits innovation and productivity growth, and the same could be argued about supports for Australia's wine industry.

By discouraging imports and raising wine prices, consumers drank less wine and were less aware than they would have been of the wide range of qualities and varieties of wines and brandies available elsewhere.

Those policies, together with the assistance to fortified wine exports in the interwar period, also lowered the incentive for producers to raise their productivity and specialize in the wines in which they were most competitive globally.

It was only when those policies were phased out from the mid-1980s that the wine industry became far more dynamic, innovative, and internationally competitive – notwithstanding the recent slump.

### ***Regional developments from the late 20<sup>th</sup> century***

The Australian wine industry's export-led growth and quality upgrading since the 1980s has added remarkable wealth and vitality to many rural regions of Australia. It has also altered the characteristics of grape and wine production in those various regions.

Since 2003 some areas have increased their share of the national vineyard a lot (Coonawarra, Adelaide Hills, Riverina) while others have seen their share fall a lot (most notably the Murray Darling region of Victoria).

The country's hot zones accounted for 48% of the country's winegrape area in 2001, 46% in 2006, and 42% in 2012. Another 42% of the area comprises warm zones.

The cool regions, such as the Adelaide Hills, Tasmania, Mornington Peninsula and Yarra Valley, accounted for 12% of the bearing area in 2006, but those regions expanded their plantings by two-fifths over the first decade of this century and by 2012 comprised 15% of the national area.

Tasmania is the coolest region, and its share of the national winegrape area was less than 0.2% in 1990, but it rose to 0.5% in 2001 and 0.8% by 2012. With less than 1% of Tasmania's crop area devoted to vineyards, it still has enormous potential to expand, should climate change encourage more growers to move to higher latitudes.

There is also the option of moving to higher altitudes such as in the Adelaide Hills: by 2008, 30% of that region's crop land was under vines, up from virtually zero in the early 1970s.

Certainly yields per hectare typically are lower and more variable in cooler regions, but higher prices compensate more or less for that: in 2008 the cool-region average price was one-quarter above that for warm regions and almost three times above that for hot regions.

Prices were lower in 2013 than a decade earlier in virtually all but the premium cool-climate regions, and the proportional fall was especially largest in the four large hot regions.

In 2008, two-thirds of all winegrapes were sold in the \$400 to \$650 per tonne range, but by 2014 most were sold at less than \$450.

The average price in 2014 was \$441, halfway between the averages for red and white winegrape varieties (\$540 for reds, \$340 for whites).

Despite their low prices, the massive volumes of production in the hot regions are enough to ensure that they comprise four of the top five regions in terms of gross value of winegrape production. The Barossa Valley is ranked 3<sup>rd</sup> by that criterion, while McLaren Vale and Margaret River take 6<sup>th</sup> and 7<sup>th</sup> place.

Regions also vary in the extent to which their wineries are export focused. Since 1870 South Australian wineries have always been the most export-focused. In recent decades that State has accounted for the processing of around 70% of the country's total export volume, although New South Wales and then Victoria have increased their shares a little since 2000.

By 2013 the price dispersion across regions was far greater than at the turn of the century. Average prices ranged from around \$350 in the hot-climate regions to seven times that (almost \$2500) in cool Tasmania and Mornington Peninsula.

The dispersion is almost as wide for just Shiraz winegrapes, suggesting that for versatile varieties it is regional rather than varietal characteristics that determine their quality/price.

Another indicator, the so-called Varietal Similarity Index (VSI), captures the extent to which each region's mix of winegrape varieties in their vineyards differs from the global average mix. According to that indicator, there has been a considerable decrease in the diversity of Australia's regions in terms of their vineyards' varietal mix, relative to the global average.

### ***Which regions have adjusted most since the latest downturn?***

Between 2001 and 2008, Australia's cool and warm regions had the highest rates of vine area expansion.

Cool-climate regions of other countries also expanded in the first decade of this century: in the US, the vine area increased 55% in Sonoma County of California, 108% in Oregon State, and 158% in Washington State, while New Zealand's area grew 220%. Presumably a similar force was at work in all three New World countries, namely, an increasing appreciation for finer wines as incomes and familiarity with wine grew.

By 2012, however, when Australia had almost 21,000 fewer hectares than in 2008, every State except Tasmania had seen its area shrink.

The shrinkage was least in South Australia (a 1% drop to 70,000 ha) and greatest in Victoria (a one-third drop to 24,700 ha, all but 4% of which was in its hot irrigated regions). Western Australia had a one-fifth drop to 10,300 ha, and New South Wales had a one-tenth drop to 38,300 ha.

Almost none of the falls in vine area were in cool climate regions, and the 9% drop in warm regions was only half as large as the 19% drop in hot regions.

Within each of the climatic regions the change was far from uniform though. Eight cool-climate regions shrank, offsetting smaller gains in ten other cool regions. In the hot regions, Riverina and Lower Murray had gains but they only slightly offset the losses, which were largest in the big irrigated regions along the rest of the Murray River.

As for the warm regions, the biggest vineyard losses in New South Wales were in the Hunter Valley, Mudgee and Cowra with only a slight offset in Orange; in South Australia the regions of Langhorne Creek and Currency Creek had the largest losses.

These adjustments suggest that while climate change may have driven part of that adjustment, some was also the result of having planted in less-suitable places or with less than optimal varieties during the immediately preceding boom period.

The lack of area reduction in regions near cities probably reflects the fact that many small producers there are enjoying the lifestyle of being a vigneron and are willing to finance that indulgence with off-farm income or assets acquired elsewhere.

The rebate on the Wine Equalization Tax of 29% on the first \$1.7 million of sales each year also has helped small wineries to stay in business.

### ***Varietal developments since the 1950s***

Several indicators have been compiled that capture changes in the varietal mix in Australia and its wine regions.

The indicators reveal that the varietal distinctiveness of Australia vis-à-vis the rest of the world, and the varietal differentiation between regions within the country, are far less than for other countries. This pattern has become even more pronounced since 2000.

Annual data on Australia's winegrape varietal mix, available for the country as a whole from 1956, reveal the swings away from reds in the latter 1950s, then towards reds from the mid-1960s to the early 1980s, and again from the late 1990s.

They also reveal the move from non-premium to premium varieties: the latter were barely 20% of the total bearing area in the 1950s, but since the turn of the century they have accounted for more than 90%.

Among the reds, the initial dominance of Garnache (Grenache) for port production was gradually eclipsed first by Shiraz and then also Cabernet Sauvignon, plus Merlot from the late 1990s.

Among the whites, the varieties of importance for fortified wines dominated in the 1950s and 1960s along with Semillon.

The fortified focus (and the use of multi-purpose grapes such as Sultana) was gradually supplemented with Riesling from the 1970s to the early 1990s, while Chardonnay – today's dominant white – began to make its mark only from the 1980s.

Associated with this dramatic change in the varietal mix in Australia's vineyards is a change in the country of origin of the varieties being made into wine. In the 1950s Spanish varieties made up about half of Australia's area, and French varieties one-fifth. Today, French varieties account for all but one-tenth of the area and Spanish varieties comprise less than 3%.

Much publicity has been attached to the increased plantings of so-called emerging or alternative varieties that are diversifying Australia's vineyards. Of those varieties not in the world's top-20 list and which have expanded from less than 200 ha. in Australia in 2000, there are ten whose areas have grown significantly since then. But in aggregate those ten raised their share of Australia's total winegrape area between 2001 and 2010 by only 1.7%.

The eight varieties whose area in Australia expanded most over the first decade of this century are, apart from Viognier, all in the top 20 globally. The share for Shiraz alone rose 6 percentage points over that decade, while Chardonnay's rose 5 points and the shares of Sauvignon Blanc and Pinot Gris each rose 2 points.

Not surprisingly, emerging varieties are being displayed on wine labels as soon as possible by producers seeking to differentiate themselves in novel ways. Eleven of the emerging varieties are among the 35 most-frequently mentioned varieties on Australian bottles sold – even though those 11 varieties in aggregate accounted for only 1.4% of the value of winegrape production in 2012.

Despite this flurry of new varieties appearing on Australian wine labels, the increase in varietal diversity of Australia's vineyards observed between 1956 and 1984 had reversed considerably by 2012, when there were just 25 varieties that had shares of national area and production greater than 0.2%.

### *Australia's varietal distinctiveness globally*

The earlier-mentioned Varietal Similarity Index or VSI between Australia and the world rose by more than one-third between 2000 and 2010 to 0.62, indicating a substantial drift in Australia's varietal mix toward the world aggregate mix over that decade.

Meanwhile, the average of the VSIs for all other countries is much lower and hardly changed, at 0.35. In other words, Australia was much less distinct than the average country in its varietal mix in 2000, and its distinctiveness became even less so by 2010.

Since France is the country whose varietal mix is most similar to the world mix, this means in effect that Australia has become more like France: the two countries had a VSI of 0.47 in 2000 and 0.58 in 2010.

A key reason for Australia's varietal mix becoming more like the global mix has to do with Syrah. The popularity which Australia brought to Syrah in the 1990s has led to many other countries expanding their plantings of this variety.

In 1990 there were 35,000 bearing hectares, making it 35<sup>th</sup> in area ranking of all winegrape varieties globally. But by 2000 there were 102,000 hectares, and by 2010 that had risen to 186,000, bringing Syrah to the 6<sup>th</sup> position on that global ladder and less than one-third below the areas of the two now-most-widespread varieties, namely Cabernet Sauvignon and Merlot.

Over the decade to 2010, the Syrah area grew more than either Cabernet or Merlot – in fact only Tempranillo expanded faster globally.

Certainly Australia contributed to that expanding area of Syrah, but expansion was even greater in France and Spain. Australia is no longer as globally dominant in this variety: its share of the global Syrah area has dropped from 29% in 2000 to 23% in 2010, even though Syrah increased its share of Australia's own vineyards over that decade, from 22% to 28%.

### ***Regional differences in the varietal mix within Australia***

Varietal differences between regions within Australia are more muted than is the case within other countries, despite the very large differences in growing conditions across Australia.

Of the three most-similar regions in the world to each of Australia's 94 regions in 2010, less than 7% were non-Australian regions. In New Zealand, by contrast, more than two-thirds of the three most-similar regions to each of its ten regions were in other countries.

It is true that some regions in Australia have managed to pull away from the pack and so are more differentiated from the national mix now than in 2000. However, a little over one-fifth of Australia's 74 regions, comprising 40% of the national winegrape area in 2010, changed their varietal mix hardly at all over that decade.

### ***Varietal Quality Differences within Australia***

Given that different varieties grow better in some regions than others, and that consumer tastes change and over time, it is not surprising that there is also considerable dispersion in the national average prices by variety.

In 2001 the difference between the lowest and highest average varietal prices was more than six-fold, and it shrunk very little by 2010 despite the two-fifths fall in the nominal average price for all varieties.

The ranking from lowest- to highest-priced varieties changed a lot over that decade though, reflecting the fact that the mixes of varieties in all three climate zones in Australia have altered considerably.



### ***Varietal prices and January temperatures***

In the Northern Hemisphere it is common to observe an inverted U-shape relationship between the price of winegrapes and the summer temperature. Across Australia's regions, by contrast, that relationship tends to be only negative for observed temperatures.

As the number of cool-climate regions expands that relationship in future years may become a little more like Europe's, but that tendency may be offset by the facts that Australia's climate continues to warm and the January mean temperatures are becoming higher and are bringing forward the harvest dates.

The current pattern of lower prices in warmer regions is likely to mean that climate change will lower Australia's average winegrape price, unless vignerons switch to Southern European varieties more suited to our relatively warm climate.

### ***What are the market prospects for the rest of this decade?***

The Australian wine industry is not alone in feeling challenged during the past few years. Common contributors include the following:

- a chronic oversupply of winegrapes and wine in the European Union,
- retail concentration of supermarkets, with the largest developing their own labels by buying bulk wine,
- tight regulatory environments for wine distribution in such settings as Ontario, many of the US states and Scandinavia,
- the global financial crisis from 2008,
- expanding supplies in emerging markets such as China,
- consumer health and environmental concerns,
- anti-alcohol campaigns by health and road safety lobbyists, and
- great uncertainties resulting from climate change and associated policy responses.

Australian producers have had to deal also with such things as:

- a high-valued currency that has made Australian wines less competitive,
- large stocks of unsold wine (thanks to the rapidity of vineyard expansion),
- a fashion swing against Australian wine especially in the UK and US,
- a fashion swing in Australia toward New Zealand's Sauvignon Blanc, and
- major reforms to irrigation water institutions and policies.

Symptoms of those difficulties for the Australian industry include large declines in winery profits, the cut in winegrape prices particularly in the hot irrigation areas, more than 15% of domestic sales being supplied by imports (compared with just 3% at the start of the millennium), and almost three-fifths of Australia's wine exports in 2014 being in bulk containers (compared with one-seventh during 1996-2003).

Climate change also is likely to be a bigger challenge for Australia than for many other wine-producing countries. The majority of Australia's winegrapes are produced in the hot irrigated regions around the Murray and Murrumbidgee Rivers. Those regions are becoming warmer and drier, and have seen a slowdown in river flows.

There is also an increasing demand from the community for a larger share of those reduced river volumes to be saved for environmental flows and urban uses, so there will be less scope in the future for irrigation to compensate for reduced precipitation.

The quality of the main international winegrape varieties currently grown in the hot regions deteriorates as the growing temperature rises, so producers are having to go to the expense of searching for and planting or grafting alternative varieties that will be more suitable. By contrast, global warming will improve winegrape quality in much of temperate Europe.

Daunting though the above lists of challenges looks, some of those adverse developments are only short term. Also, there are several positive signs emerging. One is the cautious optimism of economic recovery that is showing up in the United States and parts of the recessed economies of Europe.

A second encouraging sign was the substantial take-up of the European Union's offer to pay winegrape growers to grub up vines during 2009-11.

There has also been some grubbing out of unprofitable vineyards in the hot irrigated areas of California in recent years, as well as in Australia.

Third, expected demographic changes in the United States over the next two decades suggests wine consumption there will grow considerably faster than overall population.

Fourth, the Asian market is growing steadily. Not only is its population expected to rise by 700 million people by 2030, but its share of global income (ignoring Japan) is expected to double, to around 23%.

Already the middle classes in those emerging economies are importing both popular and fine wines, but at above-average prices. In China, for example, wine from grapes in recent years has accounted for just 2 percent of the volume of alcohol consumption but for 8 percent of the value of alcohol sales.

The average unit value of wine exports to all East Asian countries from Australia is very high. During 2011-14 it averaged \$6.40 per litre, compared with less than \$2.20 to all other destinations, and for exports to China (by far the biggest Asian wine market) the average price was more than \$5.70.

Australia's export prospects depend very much on exchange rate movements. With the recent devaluation of the AUD, those prospects are looking much brighter, and imports into Australia will be less competitive.

It needs to be kept in mind, though, that Australia's per capita income growth may slow and possibly decline with the mining investment boom coming to an end, which will dampen domestic demand growth.

### ***What about the varietal mix in Australia's various regions?***

Australia's mix of winegrape varieties is not very different from the rest of the world's and, since 2000, it has become even less differentiated. Whether that is a good thing commercially is unclear, especially for Australia's hottest regions. Do Australian producers benefit enough

by emulating France's varietal mix to offset any economic downsides, for example from being less differentiated from the world mix, or from growing varieties that are less than ideal for the terroir of Australia's various regions?

Even though there are very large differences in growing conditions and especially climates across Australia, cross-regional varietal differences within Australia are much less than is the case within other countries. Perhaps this is a consequence of producers finding it easier to market well known 'international' (mostly French) varieties than trying to differentiate their offering and region with less-familiar varieties.

The current homogeneity suggests there is plenty of scope to explore alternative varieties in the various regions of Australia as grapegrowers consider ways to adapt to climate changes. Australia's various regions to date have made only a little headway in diversifying their vineyards, despite much discussion of alternative or emerging varieties.

### ***Policy and institutional implications***

How might Australia strengthen its competitive edge over the next decade or so? Looking beyond the immediate difficulties, there are reasons to be cautiously optimistic about the Australian wine industry's future.

Recovery won't be easy, and may not be as quick as the resurgence from its mid-1980s slump. Certainly major adjustments will be required for many participants. However, to the extent there is a willingness to continue to invest for the long term (rather than just focusing on quarterly returns to shareholders), and if the earlier spirit of collaboration within the industry can be re-invigorated, a return to at least normal levels of profitability should be possible before long.

One adjustment already under way is in marketing. The earlier emphasis in generic marketing on 'Brand Australia', of providing sunshine in a bottle, has switched to a marketing strategy that places far more emphasis on regional characteristics and higher-quality wines.

That idea was taken further with the creation in 2009, by a dozen long-established, mid-sized, quality-driven, high-profile, family-owned Australian wineries, of the 'First Families of Wine' group: together it represents 16 Australian regions across four states, and between them those producer have more than 1200 years of winemaking experience.

Following the merger of Wine Australia and GWRDC on 1 July 2014 to form the Australia Grape and Wine Authority, the industry is now developing a 5-year strategic plan which is expected to have a stronger focus on building and promoting the country's fine wine offering. The aim is to go beyond offering good value wine to making the world aware Australia also has great wine.

Getting that message across in not only Australia's traditional markets but also in Asia will require a larger budget than AGWA's predecessor organizations have had in the past, especially given the commitment by the European Union to more than double its generic promotion expenditure over the next five years.

In terms of private-sector promotion by individual large wine companies, they already have well-recognized labels, including five of the top dozen wine brands globally plus Penfolds. The first four represent low-priced labels though, which are coming under stronger competition from Argentina, Chile and South Africa

As for the R&D portfolio, the returns from such investments have been very high in the past. Returns in the next two decades are likely to be even higher, bearing in mind marketplace changes and long-term uncertainties such as climate change, water and other environmental policy reforms, and prospective alcohol tax changes at home and abroad.

As with generic promotion, returns to the various players along the value chain and to different types of producers and different regions from R&D investments will not be equal.

Wine consumer tax policy reform could contribute to the transition to higher-quality wine production. If Australia were to switch from an ad valorem to a volumetric tax, that would encourage the transition to finer wines while weakening the case by anti-alcohol lobbies for a higher *rate* of tax on wine.

In particular, it would make it easier for smaller fine-wine producers to sell all their product on the domestic market, thereby avoiding the high fixed costs of breaking into new export markets.

There is the risk that any change to the method of taxing wine consumers will be accompanied by a hike in the extent of taxation. That would need to be countered by the argument that moderate wine consumption can have positive health and social externalities.

Advocacy by the industry on wine tax policy and myriad other issues is likely to be more successful the more the industry can speak with a united voice. The industry has managed recently to join its generic promotion and R&D bodies, but it still has two advocacy groups.

### ***Some lessons from history***

Lessons can be learnt from the past that are pertinent to the industry's current opportunities and challenges. They are laid out here as dot-point responses to a series of questions that have arisen in the course of the present study.

*Why did the Australian wine industry not take off in the latter half of the 19<sup>th</sup> century when Europe's wine industry was being ravaged by phylloxera and mildew?*

- It had no large firms at that time, and the overall scale of industry was too small;
- Spain was on France's doorstep and far more capable of rapidly expanding its exports to its neighbour.
- Algeria was a close-by territory so that, as soon as French producers became established there, competitors were cut off by discriminatory import restrictions, including against Spain.

*Why did the industry grow so slowly during most of the 20<sup>th</sup> century?*

- The creation of the Australian Federation led to the removal of inter-colonial trade barriers which assisted the South Australian wine industry greatly, but at the expense of wine producers in other mainland states.

- However, from Federation to the 1970s Australia adopted a highly interventionist set of trade and industry policies that protected producers from international competition and slowed innovation and hence productivity and income growth.
- The grape industry was one of the first agricultural industries to successfully lobby for such assistance, and wine imports also have been subject to tariffs from early last century. That meant both parts of the wine industry were sheltered from the cool winds of international competition. That assistance was also an offset to the negative effects on production costs of high protection to other industries.
- In the interwar years the industry was also distorted by policies that assisted exports but in a very discriminating way, favouring only fortified wine exports to Britain.

*How important were macroeconomic conditions to the industry's cycles?*

- Very: Australia suffered three severe economic depressions (in the early 1840s, early 1890s, and early 1930s) which dampened both domestic demand for wine and the availability of finance to help producers weather those downturns.
- Also, the Global Financial Crisis from 2008 and associated changes in exchange rates dampened demand for Australian wine on both sides of the North Atlantic.

*How important were the fortunes of other sectors of the Australian economy to the industry's development?*

- Very: the gold rushes in the 1850s and 1890s (and the copper boom in South Australia in the 1840s) had generally positive effects because they brought permanent immigrants and capital from abroad which grew the domestic demand for wine.
- The ban on iron ore exports from the 1930s to the 1960s delayed the start of a mining boom in response to Japan's industrialization, which benefitted wine and other tradable industries relatively but meant the economy grew less rapidly than it might have in the 1960s and 1970s.
- The latest two mining booms, in the 1970s/early 1980s and especially in the first dozen years of the present century, contrasted with the 19<sup>th</sup> century mining booms in that they attracted few extra permanent residents and were financed mostly by footloose overseas capital. Being export-demand driven, those mining boom involved major real exchange rate appreciations followed by major and faster depreciations. Since the wine industry was far more open to international competition in the past two decades than it had been throughout most of the 20<sup>th</sup> century, those exchange rate gyrations had a major impact on the wine industry's current cycle (contributing positively to the start of its boom, negatively to its end, and potentially positively again if the AUD remains at its current low level for some years to come).

*How have successful investors in the wine industry behaved in past cycles?*

- Cycles are inevitable for perennial crop industries, so canny investors with finance and market outlets have bought assets in slumps, giving them a reasonable return on those low-priced assets and readying them for take-off in the next boom when they can sell those assets at higher prices and lower their capital base to concentrate on brand investment.

*What can be done to shorten the current slump and reduce the amplitude of future cycles?*

- The industry as a whole needs to invest more in at least four areas: generic promotion; technical, policy and market research; data on industry developments; and collaborating better on these and other issues including advocacy.

- Governments need to keep out of grape and wine markets and confine their activities to generating public goods and overcoming market failures such as the free-rider problem of collecting levies for generic promotion and R&D.

### *A final word*

It is almost two centuries since John Macarthur and Gregory Blaxland invested in vineyard developments in New South Wales. It is therefore worth recalling the words of the late Baroness Philippine de Rothschild, who liked to tell visitors to her château that “wine making is really quite a simple business, only the first 200 years are difficult.”

# Chapter 1:

## A guide to the industry's growth and cycles

### 1.1 Introduction

Less than a generation ago, a few visionary leaders were optimistic that far more investment funds could be attracted to expand the Australian wine industry. Their optimism was triggered by the change in liquor retailing laws in the United Kingdom, to allow supermarketing of wine to increasingly more affluent baby boomers, plus the low value of the Australian dollar (AUD) in the mid-1980s. Those leaders developed a 30-year strategic plan, laying out 30-year targets for production and exports by 2025 (AWF 1995). The plan created a demand from prospective investors for more information on the industry, including on past investment booms and slumps. In response, the Winemakers Federation of Australia, the South Australian Government and the Grape and Wine Research and Development Corporation provided funds to support during the summer of 1997/98 a compilation of pertinent historical data. The resulting report (Osmond and Anderson 1998) was modest, but it served its purpose of providing basic background data and a few summary indicators for first-time would-be investors and other analysts.

Despite the clear evidence in that report of each previous boom being followed by a long period of stagnation, investment in Australian vineyard expansion flooded in and many of the WFA's 30-year targets were exceeded within a decade of the strategic plan's release.

Even in the best of circumstances, the consequent growth in winegrape and thus wine output was bound to generate a marketing challenge in the new millennium. However, a series of exogenous events added to the downward pressure on prices and profits. That perfect storm of shocks included a multi-year drought, the global financial crisis that began in 2008, a dramatic mining-induced appreciation of the Australian dollar, rapid wine export expansion by competitor countries,<sup>6</sup> and an austerity dictate in 2013 by a new Chinese Government aimed at reducing conspicuous consumption in that burgeoning market.

That coincidence of shocks brought to a sudden halt the fifth boom in Australia's wine industry development. This is therefore an appropriate time to re-visit the long history of the industry's booms and plateaus, and to draw out more clearly the lessons that can be learnt from that history, so as to provide a better foundation for understanding the industry's prospects for recovering from the current slump and establishing a more-sustainable growth path. To that end, the data in Osmond and Anderson (1998) have been revised, updated, and much-expanded into the present volume, again with much-appreciated financial support from

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<sup>6</sup>A conference in Adelaide as early as 2001 focused on the dramatic globalization of and increasing competition in the world's wine markets in the last decade of the previous millennium. See Anderson (2004) for revised and updated papers.

the Grape and Wine Research and Development Corporation (prior to its absorption on 1 July 2014 into the new Australian Grape and Wine Authority).

Apart from their usefulness in their own right to industry participants as they develop their next strategic plans, the series of data collected here include variables required not only for describing *what* happened *when* and *where* as the industry developed (the purpose of the present volume), but also for analysing more thoroughly *why* it developed in the ways revealed by the data, and what the *consequences* were relative to what they might have been/could be under alternative policies, institutions and market developments. The latter is a task for a follow-on research project, ideally to be done in comparison with wine industry developments in other countries over the same periods.<sup>7</sup>

This volume is thus limited to providing an empirical narrative of Australia's wine industry ups and downs, informed by a set of charts and tables. It complements the large number of history book that have been published, none of which have had the advantage of having in front of them the breadth and depth of statistical material assembled for this volume.

Colonial and State details are provided from when the earliest reliable industry statistics became available for the various colonies just after the economic recession of the early 1840s, while intra-State regional data and grape varietal information are confined to the most-recent few decades.

The Australian industry has not developed on its own of course. It could not have begun without initially importing vine cuttings, wines, production technologies, and a consumer taste for wine and other alcohols. The industry also has been dependent on export markets to varying extents for some of its growth since the 1850s. Competition in foreign markets – and also in Australia's domestic market – from other producers and exporters has played a significant role throughout most of that long period.

Some of the drivers of the Australian industry's growth and cycles are shared with other countries, so a comparative analysis is needed to be able to distinguish them from purely local drivers over which the industry may have had more influence (Hatton, O'Rourke and Taylor 2007). Those comparative data (see Anderson and Nelgen 2011) reveal that Australian wineries led the way among New World wine exporters in the current globalization wave. However, the Australian wine industry was slow to emerge in the initial decades of European settlement despite plenty of suitable land, and was somewhat laggard at the tail end of the first globalization wave that ended 100 years ago.

Long time series of annual data are easy to come by for only a small sub-set of the variables economists need to explain trends, fluctuations and turning points in the industry's development, and to understand its structural changes in terms of what winegrape varieties are grown and where wine is produced within the continent. To guide the labour-intensive task of searching for and compiling series that are not so readily available, or selecting proxies for them, a conceptual framework that lays out the likely development drivers is

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<sup>7</sup> Analyses of these newly compiled data and compilations of similar data for other wine-exporting countries are getting under way, starting with an assembly of wine trade data by Pinilla (2014). The purpose of releasing this comprehensive Australian collection now, and also making it freely available as an Excel database (Anderson and Aryal 2015), is to encourage other analysts in both Australia and other wine-exporting countries to contribute to such an enterprise.



required. For those readers wishing to reflect in depth on the drivers, such a framework is provided in the Annex to this chapter.

The standard way an economist begins to analyse developments in the market for a product is to list the key variables affecting its supply and its demand. For thousands of years production was a very simple exercise. It involved no more than using clay to produce a vessel for storing the product (called a *qveri* in Georgia, where wine production is reputed to have begun more than 8000 years ago – see McGovern 2003, 2009), and then gathering berries from wild vines and immersing them in the vessel and waiting for them to ferment with the help of natural yeasts on the berry skins. The only input (including for the storage vessel) was own-labour, and since wine was produced for consumption with family and friends rather than for sale, that was the extent of the value chain.

Australia does have native current bushes, but since they produce a sparse crop of very small berries it is not surprising that there was no equivalent of the Georgian enterprise when European settlers arrived in 1788. In their first 50 years some settlers in New South Wales experimented with imported vines and wine making, but virtually none of them got to the stage of having a regular surplus for commercial sale. Domestic alcohol consumption prior to 1840 instead relied predominantly on imported wines along with imported spirits and beers, supplemented with only a small amount of domestic legal production of spirits and beers and a larger amount of home-brewed beer.

While precise estimates are impossible to generate, Butlin (1983) suggests the mix of wine, spirits and beer and the total volume of alcohol consumption per capita in New South Wales during 1800-20 was probably similar to that in Britain at the time once allowance is made for the much higher proportion of adult males in the colony's population. Powell (1988) has made the appropriate conversions and suggests an estimated average of 13 litres of alcohol per person in NSW during 1800-20 compared with the UK's 14 litres in 1800 and 11 litres in 1816 (reported also in Lewis 1992). This is thus contrary to earlier claims by many commentators, and even historians as prominent as Russel Ward (1966), that New South Wales as a penal colony was far more alcoholic than European countries. In the 1830s Australia's estimated per capita consumption (ignoring illegal production) was about the same as in the century's first two decades, at 15 litres of alcohol, made up of 12 litres from spirits, 2 litres from wine and 1 litre from beer (Dingle 1980). Australia's consumption dropped substantially during the depression of the early 1840s, but rose in the 1850s with the influx of male migrants and the boost in per capita incomes – already the highest in the world (Maddison 2013) – thanks to the gold mining boom. Thereafter, as the dominance of adult males in the population diminished (Chart 32), so too did per capita consumption (Charts 34 and 33). By the 1890s' economic depression it was down to 5 litres of alcohol per capita in Australia: a bit over two-fifths each from beer and spirits, and less than one-seventh from wine (Chart 36). Alcohol consumption has declined at an even steeper rate when expressed relative to real GDP (Chart 37). Wine consumption per capita remained relatively flat prior to World War II but has trended upwards with GDP per capita since then (Chart 38).

During subsequent decades the wine value chain in Australia, as elsewhere, has become progressively more complex. Nonetheless it is still dominated by two prime activities: grape growing and wine making.<sup>8</sup> The latter has focused on three types of

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<sup>8</sup> Indicators of many other activities along the wine industry's modern value chain are not included in this volume. Those activities include supplying inputs into grape growing (cuttings from nurseries, spray chemicals, machinery services), inputs needed to make wine marketable (barrels, bottles, caps, labels), finance for the very

products: table wines (both still and sparkling), fortified wines, and wine that is distilled into grape spirit including for conversion to brandy. In 2010, table wines accounted for 98% of Australia's wine production, with fortifieds accounting for 1.3% and brandy just 0.9%. From the mid-1920s to the early 1970s, however, the share being distilled was always more than 40%, and around one-third of wine output was fortified. The prices consumers are willing to pay for those different products depend most importantly on consumers' incomes and their tastes and preferences at the time, and on consumer prices (inclusive of any taxes) of each of those products and of substitutes offered by producers of other beverages including imported wines.

As for wine's key input of grapes, they can also be dried or consumed directly as fresh table grapes or in other forms such as a non-alcoholic juice. Over the past decade no more than one-tenth of Australia's grapes have been destined for non-wine uses, but as recently as 1993 wine's share of grape uses was only 70% and it has been considerably lower than that in some earlier periods. So although grapes are a perennial crop, supply of winegrapes can be varied even in the short run: the quantity of grapes crushed for wine each year depends on the relative price or implicit value of grapes in winemaking versus those other possible purposes. Over the long run, the domestic supply of winegrapes depends on the opportunity cost of the land, water, labour and capital to be used for that purpose.

Over most of the long history of the wine industry, the perishability of winegrapes effectively rendered them nontradable internationally, or even inter-regionally within large countries. Ocean transport costs prior to the 20<sup>th</sup> century also made it prohibitively expensive for inter-continental trade in bottled wine, so wine was typically shipped in large barrels for subsequent bottling in the country of destination. That, plus blending possibilities at the destination, meant producers had limited control over the quality and branding of the product sold at its destination and hence of the eventual price they received. However, by the latter half of the 20<sup>th</sup> century, transport costs had fallen sufficiently for bottled, branded product to be sold over long distances, and for grapes or juice to be transported inter-regionally. That raised greatly the returns from mass production of homogenous wine and for investment in brand development. Then by the end of the 20<sup>th</sup> century a further transformation in transport costs took place: plastic wine bladders of 24,000 litres, for 20-foot shipping containers that otherwise carried only 9,900 litres of bottled wine in cartons, improved sufficiently in quality to become a viable shipping option. They have also become available in smaller sizes, down to 10,000 litres, to allow smaller batches to be blended at the destination bottling plant. That development means wineries are now less dependent on local grapes to satisfy demands at home or abroad for their branded commodities, particularly at the lower end of the bottle price range, since it is now affordable to import bulk wine from lower-priced locations to either the home winery or, in the case of export wine, to the bottling plant in the destination country. Globalization of the wine industry has thus taken another major leap, with nearly half the volume of New World wine exports (and 58% of Australia's) now in bulk. In each of those countries the price of all but ultra-premium winegrapes now closely tracks the unit value of their exports.

Investments in all three key components of the modern wine industry (vineyards, the winery, brand development) require large amounts of capital up front which, once invested, becomes a sunk cost. Given the uncertainty about future profitability in this (somewhat

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substantial up-front investments and to pay grapegrowers prior to the wine's sale (from banks and stock exchanges), wine marketing (advertising/promotion), and wine distribution (transporters, negotiant exporters/importers, wholesalers, retailers and, most recently, online providers and their storers and shippers).

fashion-driven) industry, it is not surprising that when new opportunities arise, investments are made cautiously at first until prospective profit signals become clearer. It is equally unsurprising that when profits slump, disinvestments in the industry tend to be drawn out over many years as producers hang on in the hope that the downturn is only temporary (Dixit and Pindyke 1994). Such slow downward adjustment is made even slower as the proportion of producers who are earning the majority of their income from other sources grows.

## 1.2 Candidate indicators of wine industry developments

The key variables for which there are long time series for indicating the growth, plateaus and slumps in the wine industry are hectares of vines and litres of wine produced and exported. Changes in these variables are indicators of extensive growth (or, if negative, of decline).

With so many other changes at home and abroad over the past two centuries, it is helpful in comparing over time and across countries to focus also on intensive growth indicators. On the supply side of the wine industry they include the following for a region or nationally:

- vine area per capita;
- vine area as a share of total crop area;
- wine production per capita;
- wine production per \$ of real GDP;
- wine exports per capita; and
- share of wine sales abroad/exported.

It is also helpful to focus on demand-side developments, since producers have the opportunity to influence that demand through their investments in marketing and in their lobbying for lower domestic consumer taxes on wine and greater access to markets abroad. Indicators of intensive growth in the domestic wine market include the following:

- wine consumption per capita or per adult;
- wine's share of total alcohol consumption; and
- wine consumption per \$ of real GDP.

How internationally competitive the industry is at a point in time can be captured by several additional indicators, such as:

- share of the domestic market supplied by local rather than imported wine;
- ratio of wine exports net of imports to wine exports plus imports in volume terms;
- ratio of wine exports net of imports to wine exports plus imports in value terms;
- share of wine in the country's total value of merchandise exports; and the
- ratio of that share to the share of wine in the value of global merchandise exports.

Annual data on all of these key indicators of domestic growth and international competitiveness are provided in Section I of this Compendium's charts and tables, along with data on many other indicators and variables. The rest of this chapter draws on them in an effort to improve our understanding of *what* happened *when* and *where* as Australia's wine industry developed over the past 170 years.

It would be helpful also to examine indicators of the quality of production and exports. Quality indicators could be the unit value of exports and the prices received by grapegrowers and winemakers. However, given the enormous heterogeneity of grapes and wines, heavy caveats to such prices are in order and no long series of producer prices have been collected. Even the more-recent winegrape price series tend to refer to the initial price notified to the grower, which is often subject to an upward or downward adjustment once the quality of the wine produced from them has been assessed by the winery and the winery's supplies of and demand for each category is more certain.

Other common indicators of the development of an industry include the productivity of its firms' and their profitability. Yield per hectare, the most common indicator of crop land productivity, is not very helpful in the case of winegrapes though, since the quality and price of winegrapes typically are negatively correlated with yield per hectare (and even more so with yield per vine).

The nature of the various types of firms in this industry means that profitability indicators too are scarce. Independent winegrape growers are almost all family farms rather than listed companies, so they do not need to publicly disclose their earnings. That is also the case for most of the long-established wineries. Of the small proportion of wineries that are publicly listed on the stock exchange, they do not separate their grapegrowing, winemaking and wine marketing profits. Many of the large listed companies are also involved in other industries (brewing, spirits, luxury goods, tobacco), so their wine profits are often difficult to extract from their disclosed aggregated accounts. Even if the company sold only wine, its reported rate of return on capital can easily be manipulated by altering the extent to which it owns physical assets such as vineyards, wineries, and storage or transport facilities. And if it operates as a multinational company, as is the case for several of the largest wineries, the scope for tax-minimizing transfer pricing – especially now that so much wine is exported in bulk for bottling in the destination country – further reduces the reliability of the firm's annual report as an indicator of industry profitability.

The rest of this chapter provides a guide to the overall development of the industry in each of the colonies and nationally. Chapter 2 then looks in more detail at how the various regions within each State have developed in recent decades. Regional identification has become one of the means by which producers have chosen to differentiate their product as wine globalization proceeds.

Australian producers have also chosen to differentiate themselves from those in the Old World by clarifying on their labels the winegrape variety or varieties (or cultivars) used to produce each wine. Varieties also vary hugely in their suitability under different climatic conditions, and in their usefulness for particular styles of wine. Chapter 3 therefore includes data on the evolution of the mix of winegrape varieties grown over the past six decades for which reliable data are available. Those varietal data are available also at the regional level since the end of the 20<sup>th</sup> century.

It is not possible to explain the trends and cycles in this industry with only grape and wine data of course. Also important are developments in other parts of the economy and society. For that reason, a fourth group of tables is included, providing annual state and national data on population, total crop area, real GDP in total and by sector, government assistance to other sectors, sectoral and total merchandise trade, foreign exchange rates, the nation's international terms of trade, and national rates of interest and inflation.

### 1.3 The five cycles to date

*“The production of wine in Australia has not increased as rapidly as the suitability of soil and climate would appear to warrant. The cause of this is probably twofold ... Australians are not a wine-drinking people and consequently do not provide a local market for the product, and ... the new and comparatively unknown wines of Australia find it difficult to establish a footing in the markets of the old world, owing to the competition of well-known brands. Active steps are being taken in various ways to bring the Australian wines under notice, and it may be confidently expected that when their qualities are duly recognised the wine production of this country will exhibit a rapid development.”*

The above statement is a quote from the *Yearbook of Australia 1922* (p. 279). That potential had been recognised for a long time, for almost the same statement appears in the Federation’s first *Yearbook* published in 1908. Moreover, thirty years earlier it was claimed that “many of the leading wine merchants of London and other important commercial centres admit that Australia promises to become a powerful rival in the world’s markets with the old-established vineyards of Europe” (Irvine 1892, p. 6).<sup>9</sup>

Clearly the Australian wine industry has had a long gestation period. Until the 1970s domestic consumption per capita had grown only very slowly. True, exports have boomed several times in the past, but in each case those booms have plateaued and, because of an expanded acreage, grapegrowers went back to receiving low returns. Indeed in the latter 1970s/early 1980s exports were so low that Australia became a net importer of wine again, as it had been prior to the 1890s. As recently as 1985 the Federal Government introduced a vine-pull compensation scheme to encourage grapegrowers to move to alternative crops, so dire was the wine industry’s view of its prospects at the time. Yet like a phoenix, the industry rose again and grew with renewed vigour during the 1990s and early 2000s. The real value of both winegrape and wine production grew at more than 10% per year and the share of wine sales in export markets rose from just 2-3% in the mid-1980s to more than 60%.

The history of fluctuating fortunes raised the obvious question of whether the export-oriented wine boom of the 1990s would be followed by yet another crash, at least in winegrape prices if not in wine production and exports. The wine industry was very bullish, having in 1995 set itself targets of exporting \$1 billion worth of wine by the turn of the century (up from \$470 million in 1995-96 and less than \$100 million per year in the 1980s) and of trebling the real value of wine production within 30 years (AWF 1995). Others, aware of the boom-bust cycles of the past both in Australia and elsewhere, were more sceptical.

In the event this latest boom lasted one-third longer than any of the previous four booms. It was triggered by the low AUD in 1986 which made exporting more profitable, and it peaked in 2007 in terms of bearing area and export expansion. Exportable wine output expanded initially by diverting grapes from non-wine uses, allowing wine exports to grow

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<sup>9</sup> Such an admission was not yet forthcoming from the French, however. At the international wine competition of the Vienna Exhibition of 1873, for example, the French judges, on hearing of the identity of the wines they had judged blind, are reported to have resigned when they learnt a prize-winning shiraz was not French but from Bendigo, Victoria (Beeston 2001, p. 62).

even though the national grape bearing area was virtually no higher in 1995 than in 1985 (Chart 1). Further expansion was stimulated by the almost doubling of the average AUD unit value of exports between 1993 and 2001, when the value of the AUD bottomed out at 49 US cents. By 2004 wine production per dollar of GDP reached a record level, well above the previous peaks in 1947 and 1927, and the share of vineyards in the total crop area peaked in 2007 at the highest level since the start of the 20<sup>th</sup> century apart from during the disruptions of World War II (Chart 11). But from 2001 the AUD rose for more than a decade in the wake of Australia's mining boom. That contributed to the average AUD price of wine exports halving in nominal terms over the next dozen years (Chart 2), and to growth in exports from the other New World countries (Chart 3). Australia's index of comparative advantage peaked in 2004 and, with Chile, was the highest in the world in 2005,<sup>10</sup> but by 2012 its index was the lowest and less than half that of France (Chart 4).

These past three decades are but the latest of a series of booms and slumps in the industry's history. Before examining in more detail why this latest boom lasted as long as it did but no longer, it is helpful to first review the nature of the previous cycles.

### ***1.3.1 Growth and structural changes since 1788: an overview***<sup>11</sup>

There were four acres of vines in Parramatta in 1791 and a few more had been planted by Blaxland by 1816. Macarthur had a further 20 acres at Camden by 1820, Blaxland exported a tiny sample in 1822, and Wyndham Estate (originally Dalwood) was established in the Hunter Valley in 1828 and had two acres of vines by 1832. But it was James Busby's planting of European vines in the Sydney Botanic Gardens following his trip to France and southern Spain in 1832 that triggered the development of the Australian wine industry. Even though his plantings in the Botanic Garden were neglected, he had the foresight to send duplicates to Macarthur, to Melbourne and to South Australia, from which their spread began.

An overview of trends and cycles in the industry can be quickly grasped from Charts 5 to 10 and Table 1. While it is difficult to allocate a precise year to the start or finish of each cycle, Chart 5 nonetheless shows five distinct cycles around the long-run upward trend in grapevine acreage. The absolute size of each of the five booms in bearing area is best seen from Chart 5a, while their relative magnitude is more discernible from the log-linear scaling of Chart 5b. Certainly the latest boom in plantings is the biggest of the five by far in absolute terms, but in proportional terms it is only moderate by Australian historical standards.

Wine production of course fluctuates more than vine area because of seasonal factors and the changes over time in the relative profitability of directing multipurpose grapes to wineries versus to the drying or fresh markets. That makes it less easy to see the cycles around the sharp upward trend in the twentieth century annual production data shown in Chart 6a, but they are more discernible in Chart 6b which shows that expansion on a log-

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<sup>10</sup> Except for the former Soviet republics of Moldova and Georgia, almost all of whose exports at that time continued to go to Russia and other former Soviet republics. But see Anderson (2012) on subsequent developments in Georgia's exports.

<sup>11</sup> Very readable histories of the Australian wine industry can be found in Laffer (1949), Halliday (1994), Rankine (1996), Dunstan (1994), Beeston (2001), Faith (2003), Allen (2012) and Walker (2012). Aspects of the history of South Australia's industry during the nineteenth century are recorded by Bell (1993, 1994) and Griffiths (1966). Unwin (1991) places Australia's history in global perspective in his superb history of the world wine industry stretching back well before Christ, as does Simpson (2011) in his in-depth history of the first globalization wave that ended at the start of the World War I.

linear scale. Chart 6b also reveals the dominance of South Australia in Australian wine production throughout the period since 1850.

As for the export orientation of those booms, Chart 7 shows that only three of them involved the industry becoming more outward-focused: the period just prior to the 1890s, the post-World War I period prior to the depression of the early 1930s, and of course the most-recent and much longer boom from the mid-1980s. The other two booms, 1855-71 and 1967-75, were driven almost entirely by domestic demand, generated by rapid immigration and income growth. Prior to the first of those export booms Australia had been a net importer of wine (Chart 8), but after 1890 exports exceeded imports on a sustained basis (Table 13).

Bearing in mind the fluctuating rates of population and income growth over this long period, it is helpful to also examine in this overview the key intensive growth indicators. While vine area and wine production fluctuate around a rising trend over virtually all the period, as do exports apart from interruptions during the first and second world wars (Chart 9), that is not true of vine area per capita. On the contrary, Chart 10 shows that each expansion has been very rapid but is then followed by a much longer period of considerable decline in the bearing area of vineyards per capita. That chart also shows that despite the near-trebling in vine area over the two decades straddling the new millennium, the per capita area did not quite reach the record level of 1924 before it began to decline again after 2007. Those sharp increases and slower subsequent declines are also evident when the vine area is shown relative to the total crop area (Chart 11). That indicator has fluctuated around a declining long-run trend since the end of the 19<sup>th</sup> century. Even so, Charts 10 and 11 reveal that wine production per capita and per dollar of overall GDP have trended upwards, due to increasing yields per hectare as the share of vines being irrigated expanded or more grapes being used for wine rather than for drying or fresh consumption.

With this overview in mind, we now turn to examine in some detail each of the previous four cycles which provide helpful background for examining the distinguishing features of the latest boom and slump.

### ***1.3.2 Slow birth: the first five decades of British settlement***

The vines planted immediately upon British settlement of New South Wales in 1788 did lead to some wine being produced, but just as a small sideline for household use rather than commercial sale. Fifty years later the Australian colonies had less than 200 hectares of grapevines, and only a portion of their grapes was used for making wine, the rest being for table grapes and dried vine fruit. Annual wine production (including for distillation into brandy) was well under 100 kilolitres prior to 1840. South Australia probably would have contributed more from the late 1830s had there not been an early discovery of copper just north of the Barossa Valley, production and exports of which boomed in the latter 1840s (Table A10). Wine and other farm industries also would have grown more had the demand for wool for Britain's booming textile mills not been so strong throughout the 19<sup>th</sup> century.<sup>12</sup> Wool's high price and relatively low transport cost per dollar of product meant wool dominated Australia's exports in every decade up to the early 1960s, apart from the short periods during and following the gold rushes of the 1850s and 1890s (Table A15).

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<sup>12</sup> Between the 1820s and the start of the 20<sup>th</sup> century, about one-quarter of Britain's imports were wool and cotton, and their share did not fall below one-tenth until the latter 1950s (Anderson 1992, Table 2.5).

The initial lack of domestic consumer interest in wine is understandable given that the settlers were mainly from Britain and Ireland, where in the late 18<sup>th</sup> and early 19<sup>th</sup> centuries beer and spirits dominated the drinking habits of all but the upper classes. It was only as new migrants began settling in Victoria, South Australia and Western Australia from the late 1830s that demand for wine began to grow. Then supply expansion was suspended when a severe recession hit Britain which temporarily starved the Australian colonies of finance for development and income for spending in the early 1840s (McIntyre 2012).<sup>13</sup>

Only two wine brands established prior to that brief economic recession have survived to today (Wyndham Estate in the Hunter Valley north of Sydney in 1828 and Houghton in the Swan Valley of Western Australia in 1836), but several more enduring ones were established in the next ten years, notably Lindeman's in 1843 in the Hunter and then, in South Australia, Penfolds in 1844, Chateau Reynella in 1845, Gramp in 1847, Yalumba in 1849, Seaview in 1850, Seppelt in 1851 and Hardys in 1853 (Tables 22 and 23(b)). Their owners were among the firms positioned to take advantage of the boom in demand following the start of the gold rush in 1851.

### ***1.3.3 The first cycle: 1855 to 1882***

The gold rush caused Australia's white population to almost treble in the 1850s, raising substantially the domestic demand for alcoholic beverages including wine. Despite that expanded supply of labour, wages rose dramatically in the early 1850s as men went off to the Victorian goldfields (Maddock and McLean 1984). That squeezed grape and wine production and profitability, with wine output in 1855 being only 70% of that in 1851. However, by the mid-1850s the dramatic extent of the increases in the continent's population and income was perceived correctly to lead to an expansion in demand for many products, including wine. As a result, the area of grapevines began to increase rapidly, trebling in the latter half of the 1850s in South Australia where wine production quadrupled. By 1871 the area had expanded ten-fold for Australia as a whole, and wine production had increased 17-fold (Tables 2 and 9).

The consequent growth in wine supplies was so fast that it outstripped the growth in domestic demand in each colony, so export outlets were sought.

Inter-colonial trade within the continent was one option. However, transport costs were high, and each colony also sought to protect its local producers by imposing high import tariffs. In 1858 the duties on wine coming into South Australia, Victoria and New South Wales were already quite high at 2.2, 4.4 and 6.6 cents per litre, respectively, but by 1876 they had been raised to nearly 9 cents per litre and by the early 1890s to the virtually prohibitive levels of 11 cents per litre for still wine and twice that for sparkling wine (Table 18(a)).

Fortunately, British import duties and ocean shipping costs began to fall in this period.<sup>14</sup> Specifically, Britain in 1860 abolished the import tariff preference for South African

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<sup>13</sup> Real per capita GDP in Britain fell by more than 3% in each of 1840, 1841 and 1842, and it took until 1846 before the average income in Britain returned to its 1839 level (Maddison 2013). The impact on the Australian economy was compressed into a 2-year recession, with real per capita GDP falling 8.4% in 1842 and less than fully recovering in 1843 (Table A4). The owner of the first vineyard in South Australia to export wine (Echunga Springs in the Adelaide Hills) was one of many to be bankrupted during that sharp downturn (Mathews 2013).

<sup>14</sup> On the economic history of Britain's wine import policies and its impact on France's exports, see Nye (2007).



wine (which had been taxed at half the rate of other wines), and by 1862 had lowered the tariff on all wine with less than 26<sup>0</sup> proof spirit (equivalent to 14.9% alcohol) to 1/- instead of 5/9 per gallon (Unwin 1991, p.328). That made the dry wine duty only two-fifths that for the more-alcoholic fortified wines from Portugal and Spain -- having been nearly double the duty on fortifieds for most of the previous one hundred and sixty years (Kelly 1867, p. 6). While the abolition of South Africa's tariff preference caused British imports of Cape wine to plummet, the general cuts in dry wine tariffs, together with the creation of off-licence retailing (thanks to legislative changes in 1861), allowed Australia's exports to Britain to quadruple over the 1860s and double again by the mid-1870s.<sup>15</sup> This, however, was from a very low level first established in the mid-1850s: throughout the 1860s and 1870s Australia's modest wine exports amounted to less than 3% of its production (Chart 7 and Table 11).

Exports were inhibited not only because the wine produced was generally of extremely low quality (mostly dry red, shipped bulk in hogsheads only weeks after the grapes had been crushed), but also because up until then very little had been invested in securing quality packaging, marketing and distribution arrangements in Britain (Bell 1994; Irvine 1892). Meanwhile, from the late 1860s producers suffered very low returns as a consequence of the rapid supply expansion outstripping demand growth. Kelly (1867, p. 1) opened his book by claiming that no industry in South Australia was as depressed as wine at that time. So poor were returns that the area of grapevines fell 10% nationally and almost 30% in South Australia during the 1870s (Table 2).

The poor export performance to the late 1870s was not without some highlights though. An important foundation for the future was the establishment in Britain of two firms distributing and promoting Australia's better wines: Auld and Burton's Australian (later Emu) Wine Co. from 1862, and P.B. Burgoyne and Co. from 1872. Those firms ensured the best of Australia's wines were included in European wine competitions, and to great effect. After the International Exhibition in Vienna in 1873, the editorial of the *Morning Post* of 8 June 1874 proclaimed:

*"Australia promises ere long to become as celebrated for its wines as it is already for its wool and gold. ... Australia carried off the only Diploma of Honour awarded at the Vienna Exhibition for wines in competition with wines of all other countries, and took a larger percentage of the wine prizes generally at that Exhibition in proportion to the number of its entries than any of its rivals. ... We cannot do better than quote the official report made in March last to the Commissioners of Her Majesty's Customs: 'The Australian wines are wonderfully advanced in improvement of quality and area of production since the Exhibition of 1862, while the scope for further increase is ... almost unlimited: they have generally a full, rich, vigorous character and quality. Some few are especially fine in all that constitutes a high-class wine, and will bear comparison with the best European growths, while the average of the remainder, compared with the bulk of Continental wines, omitting the best, is higher in quality,*

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<sup>15</sup> Britain's annual imports of Cape wine fell from 3.4 to 0.2 million litres between 1857-59 and 1867-69 while its imports from Australia quadrupled, from 0.07 to 0.28 million litres. Both suppliers were, however, dwarfed by France, Portugal and Spain, whose combined annual imports into Britain amounted to 67 million litres during 1867-69. The volume of French imports also quadrupled over the 1860s because of the same tariff changes that favoured Australia (Laffer 1949, pp. 118 and 123). For further details of the wine trade as it relates to Britain at that time, including the important role of the new off-licence retailing in expanding hugely the accessibility of wine to household consumers, see Briggs (1985) and Francis (1972).

*strength and body, as also in character and flavour.*’ ” (quoted from Laffer 1949, pp.69-70).

Similar accolades (along with some critical reports) flowed from the International Exhibition of 1882, which happened to be in Bordeaux. This recognition provided some hope for the future, and that export future was not long in coming.

### ***1.3.4 The second cycle: 1882 to 1915***

The successes in International Exhibitions, together with the prospect of Australian Federation by the turn of the century which would see the removal of the high inter-colonial trade restrictions, encouraged growers to expand the area under winegrapes substantially. True, there were phylloxera outbreaks in Geelong in the latter 1870s and then gradually other parts of Victoria (Pope 1971). But the Victorian Government responded with compensation for forced removal of diseased plants, and in 1890 offered subsidies of £2 per acre (\$10 per hectare) to replant with resistant stocks over the subsequent three years. As a result, Victoria’s vine area more than doubled between 1889 and 1894, from 5,200 to 12,300 hectares (Table 2) – just as the 1890s’ Depression hit and domestic alcohol sales were plummeting (as they did again during the 1930s’ Depression, see Chart 34). Rutherglen especially expanded, to compete with still red wines being imported from South Australia. That vineyard expansion meant that Australia’s overall vineyard area and production of wine grew substantially during the 1880s and early 1890s, at about 11% and 8% per year, respectively (Table 1).

The industry’s growth continued unevenly across the colonies. Victoria’s excessive subsidy-induced vineyard expansion in the early 1890s was not coupled with quarantine precautions and so Phylloxera spread, reaching Rutherglen by 1899 whose vines were devastated by 1906. Victoria’s area stagnated and declined and its area peak in 1895 was not reached again until almost three decades later (Table 2). South Australia’s share of the country’s vine area, which fell from more than half in the early 1860s to less than a quarter by the late 1880s, then doubled by 1915 to regain the lead Victoria had held for four decades (Chart 12). South Australia also took the lead from 1906 in vine area per hectare of total crop area (Chart 13 and Table 4), as its producers responded rapidly to the fall in interstate barriers to wine trade following Federation in 1901.<sup>16</sup> Its wine production per capita – which from 1850 was always above that of other colonies/states – doubled between the five years preceding and the five years following Federation, to more than five times the national average, while that in other states remained flat and subsequently fell (Chart 14).

In Victoria, wine production grew rapidly in the 1860s from a very low base and then stagnated in the 1870s, averaged about 40% more in the 1880s, and then was double that average in the 1890s. In New South Wales, by contrast, there was no growth in the area of vines and production of wine in the 1890s.

Meanwhile, in Western Australia, the vine area only started expanding rapidly when gold was discovered in the early 1890s (Tables 2 and 9). As in Victoria in the 1850s, that gold mining boom attracted many migrants, together with financial capital. The colony’s white population quadrupled in the 1890s and, with it and the associated income growth, land

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<sup>16</sup> Once those tariffs were eliminated on interstate trade following Federation, South Australian exports to other States grew to 1500 kl by 1906, while all other states except Victoria were net importers of wine by that year (Table 18(b)). Victoria was a slight net importer even at the time of Federation (Table 14(c)).

development was encouraged. The growth in the supply of local labour, together with the fall in demand for labour in non-mining sectors due to the early 1890's recession, meant real wages did not rise much in WA despite the gold rush. This allowed the colony's crop area to grow ten-fold in 15 years from the mid-1890s, compared with only doubling in the rest of Australia. That is, the mining boom did not have a negative effect on the State's farm sector in general (Anderson 2014b). However, its wine industry evidently was unable to compete with other agricultural industries at that time, because the region's vine area and output of wine shrunk over that pre-world War I period.

Close behind the vineyard expansions in South Australia and Victoria were expansions of winery capacity and improvements in wine-making technology. Given the heavy capital intensity of quality winemaking, this was associated with a concentration of winery ownership across Australia -- particularly by the three big family dynasties in South Australia at the time: Hardys, Penfolds and Seppelt (Hardy Family 1953, Caillard 2013 and Seppelt 1951). That consolidation in winery ownership, with the help of the Emu Wine Co. (established 1862) and P.B. Burgoyne and Co. (established 1872) as importers in London, no doubt contributed to the industry's success in exporting as the new century and Federation approached.

The rapid growth in national wine production and exports was such that by the turn of the century production was three times its 1880 level. Moreover, one-sixth of the newly federated country's wine production was being exported -- notwithstanding the considerable difficulties still associated with exporting from Australia at that time (Irvine 1892). Australia's early export success in this cycle was helped partly by the reduced competition from France and other suppliers to Britain following the arrival and devastating spread of phylloxera and mildew in Europe in the 1870s and 1880s (Unwin 1991, pp. 284-96; Campbell 2004).

The build-up in exports during that first export boom, largely involving bulk full-bodied reds, was sustained for two more decades after the initial build-up from 1885 to 1895, before being interrupted by World War I (Chart 7 and Table 11). While strong prejudices against New World wine remained in many quarters, a firm reputation for Australian dry wines had been established in Europe in the generic sense at least, even though varietal, regional and winery brand labelling was still absent (and would be until the 1950s).

However, by 1895 two-fifths of France's vine area had been transplanted onto American rootstocks and yields per hectare rose rapidly with the demise of phylloxera. As a result, France's total production in the following 15 years was 60% above that of the 15 years to 1895. This depressed prices for wine in Europe and contributed to the cessation of acreage and production growth in Australia through to World War I.

Two key domestic contributors to the industry's second expansion prior to that plateau were therefore the anticipation of Federation, which would expand aggregate domestic demand for wine by disallowing interstate restrictions on trade, and winery modernization and ownership concentration across Australia that was in part stimulated by that freeing of interstate trade.

One further impact on the industry following Federation was the imposition of tariff protection from imports of many manufactured products and some processed farm goods. Dried vine fruits were one of the first and most protected such goods, receiving tariff

protection that doubled the local price when first introduced in 1904 (Table A9). That year also saw the formation of the Australia Dried Fruits Association, which by controlling over 90% of domestic production was able to raise the domestic price by diverting supplies to distilleries, or to the export market with the help of a government export subsidy (Sieper 1982). That raised the price of winegrapes as well, and hence the cost of producing wine. That cost was more or less than offset by a tax also on wine imports, which has prevailed to the present (although the most-favoured-nation rate is only 5% currently).

However, the four pre-conditions that made the export take-off in this cycle possible were the removal by Britain in 1860 of tariff preferences for South African wine and the subsequent lowering in 1862 of its tariff on dry table wines from 5/9 to 1/- per gallon,<sup>17</sup> the legislation in 1861 that allowed off-licence retailing in Britain, the establishment of firms in Britain specializing in the importation, distribution, and promotion (including in prestigious and well-publicised international wine shows) of Australian wines, and the lowering of inter-continental ocean transport costs.

The development of the steamship played a crucial role in making intercontinental trade cheaper. Knick Harley's (1988) index of British ocean freight rates remains relatively constant between 1740 and 1840, before dropping by about 70% between 1840 and 1910: a dramatic decline that was mirrored on sea routes worldwide (Harley 1988, Findlay and O'Rourke 2007, Mohammed and Williamson 2004). Transport cost declines from around 1860 to World War I were especially large (Table A20). On top of that, the increasing speed of ocean transport has implied cost savings additional to those indicated by freight rate data, especially for perishable products.<sup>18</sup> For Australia, transport costs were especially large in the early decades of European settlement (Blainey 1966).

Those falling transport costs, like declines in wine import tariffs abroad, do not affect all products equally of course, and the share of production exported is affected by numerous other forces as well. Yet the share of wine production exported closely paralleled the share of all merchandise exports in GDP from the late 1880s to the First World War (Chart 15). That suggests macroeconomic conditions at home and abroad, not just industry-specific forces, can have a non-trivial impact on the performance of the wine industry.

### ***1.3.5 The third cycle: 1915 to 1967***

Towards the end of and following World War I there was a rapid vine area expansion (Chart 1). This was encouraged by the subsidized settlement on farms of ex-servicemen, particularly in the newly developed Murrumbidgee Irrigation Area of NSW and along the Murray River (Davidson 1969, Ch. 4). Annual output of wine more than doubled in the decade to 1925, leading to a glut especially of Doradillo grapes whose price fell by two-thirds in 1924. Having been fueled by government assistance with land development and water infrastructure, the Australian Government decided to further assist producers in the newly planted areas by offering export assistance in the form of a bounty on wines with at least 34<sup>0</sup> proof spirit (that is, fortified wines with more than 19% alcohol, for which the non-premium Doradillo variety was relatively well suited).

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<sup>17</sup> Equivalent to a drop from 12.6 to 2.2 cents per litre. For comparison, the unit value of Australia's wine exports at the beginning of the 20<sup>th</sup> century was less than 7 cents per litre (Table 15).

<sup>18</sup> O'Rourke and Williamson (2002) and Findlay and O'Rourke (2007, pp. 402-405) point to the huge declines in commodity price gaps between Europe and both America and Asia between about 1840 and 1913 as additional evidence of the fall in transport costs.

The Wine Export Bounty Act, passed in 1924, provided the equivalent of 6 cents per litre plus excise duty drawback on the fortifying spirit, making a total of 8.8 cents per litre (Laffer 1949, pages 78 and 134). This came at a time when the average unit value of Australia's wine exports was less than 10 cents per litre (Table 20). This generous export subsidy was intended to make Australia better able to compete with much-closer Portugal and Spain in the British market for sweet fortified wines.

Since an export subsidy is the equivalent of a production subsidy and a domestic consumption tax, this bounty dampened domestic fortified wine sales, and table wine production, at the same time as boosting production and exports of fortified wines (and more so for lower-valued grapes and fortified wines, since the export bounty was a specific rather than an *ad valorem* duty).<sup>19</sup> Chart 31 shows that Australia's table wine production diminished substantially over the inter-war period, reaching one-fifth of its 1923 level by the late 1930s. Production and consumption of beer rose rapidly in the 1930s (Charts 33 and 34), presumably as a cheaper substitute for domestic consumers in the wake of the diversion of grapes to the production of fortified wine for export.

The fortified wine export subsidy was not all that assisted grapegrowers from the mid-1920s period of surpluses and low prices. In its June 1925 budget, the British Government introduced, by way of thanks for war contributions, a tariff preference for wines from the British Empire. As a result, Australian table wines faced a British tariff of 2/- and its fortified wines 4/- per gallon, compared with 3/- (raised to 4/- at the Ottawa Conference in 1932) and 8/-, respectively, for wines imported by Britain from Europe.

As well, the industry continued to be assisted by an import tariff on wine and brandy, a sales tax of 15% on imported but not domestically produced wine, excise taxes on beer and spirits but not on wine, and a lower excise tax on brandy than on other spirits. The import tax on wine was non-trivial, which helps explain both the low share of imported wine in domestic consumption and the relatively low overall level of wine consumption throughout this cycle (Charts 8 and 34). The extent to which those support measures raised the domestic prices of grapes and wine is indicated by the estimated nominal rates of assistance (NRAs). As reported in Table A9, the NRA for drying grapes averaged 25% in the interwar period and 10% in the two decades thereafter. Meanwhile, the NRA for wine from import tariffs averaged 24% over the 1950s and 1960s, which was slightly above the average for other manufactures and twice the average NRA for the agricultural sector.

Together these policies gave a considerable boost to Australia's depressed producers of low-valued winegrapes and fortified wines during the interwar years. They also encouraged wine importers in Britain to expand purchases ahead of sales when the Australian Government in 1927 gave six months' notice that it was going to reduce the export subsidy by one-quarter: there was a big surge and then temporary downturn in exports at the end of the 1920s (before they levelled out at an average of 16 million litres per year for the 1930s –

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<sup>19</sup> The export subsidy had been partly a response to a large hike in 1918 in what until then had been a very small excise tax on fortifying spirit. That excise tax rate was raised again (almost doubled) in 1930. Lobbying from the industry caused the Government to put the boost in revenue from that second increase into a Wine Export Encouragement Trust Account, which largely financed the export bounty until its abandonment in 1947. In the meantime, the rate of the bounty had been lowered gradually by a total of two-thirds but also the excise tax on fortified wine had been cut by two-fifths in the turmoil of Government responses to the 1930s Depression (Laffer 1949, pp. 78-79).

see Table 13). Many of the wines shipped in 1927 were rushed in order to qualify for the higher bounty before it was reduced, in the sense that they had not been given time to mature. That, together with poor storage treatment in Britain, ensured they were of low quality by the time they were sold there. This meant they not only fetched a low price but also secured a reputation for Australia as a new supplier of poor-quality fortified wine.

In a further response, the Australian Government established in 1929 the Wine Overseas Marketing Board (later known simply as the Australian Wine Board when its promotion mandate broadened to include the domestic market). Like many marketing boards at the time, it tried to set a minimum price for export wine during 1930-36, but had to abandon it as the market price was barely half the set price.

With returns to winemakers falling from the late 1920s, they wanted to reduce by 25% the prices they paid growers for winegrapes. In response, the South Australian Grapegrowers Cooperative was established as a competing winemaker, but that did little to stem the erosion in returns. In 1936 a vine-pull scheme sponsored by the South Australian Government saw two-thirds of Coonawarra vines uprooted. Meanwhile, in Victoria's Yarra Valley, farmers began turning to dairying, and in the Hunter Valley of New South Wales the acreage of vines was eventually halved. Not surprisingly, the total area of vines in Australia grew very little over this period (Chart 5). And it was five decades before the annual level of wine exports achieved in the late 1930s (artificially boosted to build stocks in Britain for the foreshadowed war) was again reached (Charts 7 and 9).

In short, the wine industry was boosted by government supports in the early part of the interwar period in terms of vine area and production volume, but those enlarged supplies depressed prices and rewards to producers even before the Great Depression of the early 1930s. The share of production that was exported rose, but only to take advantage of Australian and British trade policies to sell the irrigation-induced surplus of low-quality grapes rather than as a way to develop a sustainable market. The key causes of the boom in volume were all government-induced: the subsidized settlement of returned ex-servicemen on farms particularly in the newly expanding irrigation areas where low-priced water was made available largely at public expense, the provision after 1924 of an export subsidy for fortified wines, and the halving of tariffs in Britain for wines imported from the British Empire.<sup>20</sup>

The export subsidy was a mixed blessing for at least three reasons: by confining it to low-quality fortified wines it undermined the growing British and continental European interest in Australian dry table wines that had been slowly building up over the previous few decades; by making it a specific rather than *ad valorem* duty it dampened the incentive to produce higher-quality wines; and by giving six months' notice of the intention to reduce the subsidy in late 1927 it encouraged shipments of immature wines that could not be stored well in Britain, which damaged further Australia's reputation as a reliable supplier of quality wines.<sup>21</sup>

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<sup>20</sup> Together these changes meant Australia exported more wine to Britain in the 1926-40 period than did France (Laffer 1949, p. 125). Between the 1860s and the 1920s France, Portugal and Spain each supplied more than 20% of British wine imports and together the combined import share of those three countries exceeded 80% each decade. Australia's share of British wine imports was just 5% in the first two decades of the 20<sup>th</sup> century and 9% in the 1920s, but it rose to 21% in the 1930s (Anderson and Nelgen 2011, Table 268).

<sup>21</sup> Two other changes in the 1930s of relatively minor immediate significance to the Australian industry were the signing of the preferential trade agreement between Canada and Australia in 1931 and the lifting of prohibition on alcohol sales in the United States in 1933.

During World War II domestic wine consumption rose (Charts 34 and 35). This was partly because beer and spirits sales were rationed, and the rations were cut by one-third in March 1942. Interstate trade in alcoholic beverages was banned during the war also, to conserve transport fuel. And the United Kingdom placed severe restrictions on wine imports in January 1941, providing only a small quota for Australia (Laffer 1949, pp.87-94). That plus difficulties in obtaining space on ships meant Australia's annual wine exports to Britain during 1940-45 were only one-fifth those in the 1930s (and only one-tenth during 1941-44 – Table 11).

Following World War II, consumers in the United Kingdom moved away from wine once the war-time rationing of grain used in beer production was lifted. Partly this was because of long-established preferences, but two policy changes gave a helping hand. One was that Britain raised its tariff on fortified wines five-fold in 1947 and kept it very high until the end of the 1950s (when it was lowered but was still double the inter-war rate). The other was that, in Australia, the wine export bounty was no longer provided after 1947-48.

Meanwhile, Australia's liquor licensing laws (whereby, among other things, purchased meals involving wine had to be completed by 8pm) continued to discourage wine relative to beer consumption. Thus by the latter 1950s, after war-induced grain rationing to breweries and rations on beer and spirits consumption were removed, beer again comprised three-quarters of all alcohol consumption in Australia compared with as little as one-seventh coming from wine (and most of that fortified).

Over the next three decades, however, the wine share was to double (as was the spirits share, much of it based on wine distilled into brandy), at the expense of beer sales (Chart 35). The 50% rise in the 1960s was helped by a one-third increase in real income per capita (Table A4), by brand advertising and generic promotion domestically by the industry's Wine Bureau, by the influx of wine-preferring immigrants from Southern Europe, and by the fall in the real cost of air travel and of discounts for under-25s that encouraged young people to travel to Europe. Even so, annual wine consumption took until the early 1970s to exceed ten litres per capita (Table 12), and the transition from sweet fortified to table wine consumption was only gradual.

As for supply, despite new irrigation schemes at Loxton in South Australia and Robinvale in Victoria, the area of vines and wine production grew only slowly from the mid-1940s to the mid-1960s (Charts 5 and 6). During that time the Korean War-induced wool price boom and then subsidies to other farm products such as wheat, milk and (e.g. in the King Valley) tobacco appealed more to farmers. As well, tighter import restrictions on manufactured goods boosted the import-competing industrial sector, while the removal in the early 1960s of a ban on iron ore exports triggered a mining boom, both of which indirectly dampened incentives in other sectors including wine. As a consequence, wine production grew only 3% per year between 1946 and 1966, and wine exports remained flat (Table 1 and Charts 6 and 7).

### ***1.3.6 The fourth cycle: domestic demand changes, 1967 to 1986***

Britain hiked its tariff on fortified wines again in the late 1960s, and then joined the European Economic Community which gave duty-free access to wines from the other EEC members from 1973. Meanwhile, the mining boom at home was reducing the competitiveness of

Australia's non-mineral exporters. So for both demand and supply reasons, wine exports remained flat from the mid-1960s to mid-1980s, and exports to the UK shrunk by nine-tenths (Chart 7 and Table 11).<sup>22</sup> Grape and wine prices also remained low, particularly for reds. The low red prices attracted the attention of domestic consumers, and a taste swing ensued. In turn numerous companies – many of them with no experience in making and marketing still wines – perceived opportunities for taking over brands through mergers or acquisitions (Table 23(a)). The surge in demand for domestic premium red wines from the late 1960s stimulated an expansion in their production. This was followed by an equally sudden surge in domestic consumer interest in premium white wines from the mid-1970s, which was followed in turn by a renewed interest in reds in the following cycle. During these two cycles the share of fortified wines in domestic sales shrank, from 53% to just 7% (Chart 40(a) and Table 34(a)).

The producer responses to these consumer demand changes are reflected in the changes in bearing areas of different winegrape varieties. Chart 40(b) shows that premium table wine varieties were less than 20% of the area up to the mid-1960s, whereas they represented 40% by the mid-1970s (and more than 90% by the turn of the century). Within the premium category, that Chart shows first the surge in reds in the decade to the mid-1970s, then the surge in whites at the expense of reds for a decade (followed by a resurgence of reds and then of whites yet again). Details of the changes in the vineyard area and consequent wine crush changes are reported in Table 35.<sup>23</sup> Notice from that Table that the proportions of premium varieties increased noticeably in the decade to the mid-1980s, from 27% to 36% in bearing area and from 19% to 25% in grapes crushed, the lower shares for crush reflecting the generally lower yields per hectare for premium as compared with non-premium varieties. (In the following decade that trend accelerated, and by the mid-1990s the proportions of premium varieties in the area planted and grapes crushed were around 65% and 55%, roughly double the proportions of the mid-1980s.)

Clearly, tastes/fashions in wine can change quickly and unpredictable, making life very difficult for those grapegrowers who were slow to adapt to the changes in demand. The move from tea-drinking to coffee-drinking over the 1960s and 1970s is symbolic of the gradual adoption of Continental tastes in Australia (Halliday 1994, Figure 8), which included a move to wine drinking. Reforms of liquor licencing laws for restaurants and hotels helped. So too did the Trade Practices Act of 1974, which made retail price fixing illegal and stimulated the emergence of liquor chain stores and wine discounting.

Meanwhile, there were numerous takeovers of old family wineries by large corporations during this period (see Table 23(a)). In some cases this added a sharper commercial edge to production, R&D and marketing, not least because companies listed on the stock exchange had to regularly report their net returns to shareholders.

Among other things, this period saw the commercial development of the 2- to 4-litre cask, or 'wine in a box', which added hugely to domestic demand at the lower end of the market. White wine eclipsed reds in the domestic market by 1976 (Table 34(a)), and continued to skyrocket: the volume of white wine sold in Australia in a plastic bag inside a

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<sup>22</sup> Wine exports were so low in the mid-1960s that the Australian Wine Board closed its Wine Centre in London.

<sup>23</sup> The ABS data in Table 35 are from the viticulture series, which differ slightly from those reported by ABS in its wine series (used in the Tables in Section II), for reasons the ABS cannot fully explain (see pp. 61-63 of the 1997 issue of ABS Cat. No. 1329.0).



box rose from 33 to 152 million litres per year between 1978 and 1984,<sup>24</sup> while bottled red and white wine sales declined from 73 to 55 million litres (Table 34(d)). That was not enough to make the industry internationally competitive, however, particularly with the Australian dollar appreciating in the mid-1970s and again in the early 1980s thanks to rises in the international prices of some of Australia's primary export products (shown in Chart 23).

The move away from reds was partly triggered by a histamine health scare associated with red wine consumption (later shown to be a fiction). It was partly also because the reds produced to meet the domestic demand growth from the mid-1960s were of relatively low quality or not aged sufficiently when released for sale. One reason for the low quality is that Grenache grapes, whose demand had fallen away with the decline in sales of ports, were being used without great finesse in dry wine production. Meanwhile, a new production technique involving stainless steel pressure tanks was able to bring out more fruit flavours and aromas in white wine, making it relatively more attractive particularly for newcomers to table wine consumption. A subsequent new technique for producing sparkling whites at low cost added to that in the 1980s, as did the fashion swing by wine consumers towards Chardonnay from the mid-1980s (a grape variety that played no part in the earlier swing to white wines). Allowing the sale of wine in supermarkets added to that domestic consumer trend toward whites, since at that time women did most of the shopping for food and beverages in those stores and they preferred whites to heavier red wines.

In short, the fourth boom was driven mostly by domestic developments, and occurred despite exporting becoming even more difficult (with the hike in British import duty on fortified wines in 1969 and the UK's subsequent entry into the EEC in 1974, and with the appreciation of the Australian dollar in the mid-1970s and again around 1980 thanks to rises in the international prices of food and energy raw materials (Chart 24) and hence in Australia's exports of primary products. Factors contributing to domestic demand growth were the 'Europeanization' of Australian consumer habits which, among other things, led to reform of liquor licencing laws, and the outlawing of price fixing, which stimulated the spread of liquor chain stores and wine discounting. Supply factors which contributed to the boom were the takeover of family wineries by corporates that led to more-effective marketing and faster adoption of innovations, and in particular the commercial development of wine-in-a-box. Even so, there was a gradual fall in the vine area per capita in the ten years following the mining boom's take-off in the mid-1970s (Chart 27).

That is, neither of the surges in production in the two decades to the mid-1980s, of first red and then white table wines, was export-driven. On the contrary, exports had remained of minor and declining importance over those two decades and the two preceding them. Exports even were below wine imports during 1976-86, for the first time since the 1880s (Chart 8 and Table 13). The industry continued to be internationally uncompetitive and dependent on import restrictions on dried vine fruit and wine (and lower consumer taxes on wine and brandy than on other alcoholic beverages). Over this two-decade cycle the nominal rate of assistance averaged 20% for drying grapes and 30% for winegrape production, and 32% for wine making (Table A9). The effective rate of assistance for wine (the extent to which value added has been raised in this industry, after taking account of the higher prices winemakers had to pay for grapes) was 64% in 1984, or three times the average for other manufacturing industries.

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<sup>24</sup> The cask was first introduced to the market by Penfolds in 1967, but that first prototype failed to keep oxygen out of the bag. It took another decade of experimentation before the technology was perfected.

Given that high level of industry assistance, it was therefore not a complete surprise that, in the August 1984 budget, the Australian (Hawke Labor) Government introduced a 10% wholesale sales tax on wine,<sup>25</sup> and raised it to 20% two years later.<sup>26</sup> That plus the perceived over-supply situation especially in reds in the mid-1980s meant the prospects for grapegrowers and winemakers looked bleak – so much so that the South Australian and Federal Governments financed a vine-pull scheme in 1985-86. By paying growers \$3250 per hectare to remove their vines, it contributed to the one-ninth net reduction in vineyard bearing area between 1985 and 1987 (see Chart 5). At the time it seemed inconceivable to many observers that another boom was about to begin.

### ***1.3.7 The fifth and current cycle: export take-off from 1986***

The latest boom began in 1986 not with a vine planting expansion, but rather with a steady increase in exports to take advantage of the historically low value of the Australian dollar (Chart 23). That export growth was possible partly because of a continuing decline in the proportion of wine production being diverted for distillation (Chart 31), and partly by a rapid increase from the early 1990s in the share of grape production going into wine, as well as by almost no growth in the volume of domestic wine consumption per capita over the 1980s and early 1990s (Chart 34). The latter slow growth in volume of domestic consumption occurred despite a considerable growth in disposable income in Australia, and was because consumers were moving away from quantity and towards higher quality wines (Wittwer and Anderson 2001), that is, away from non-premium (especially fortified and flagon) wines to premium still wines in bottles (Chart 41).

The export boom was so large as to raise wine's share of total merchandise value above 1% for the first time. The previous peak, which had been just below 0.9% in 1932 when other exports were severely depressed, was surpassed in 1998. The new peak was reached in 2004 at 2.3%, just as mineral exports were taking off (Tables 17 and A15). The boom continued until 2007, but had an inflection point in the late 1990s (Charts 5(b) and 6(b)). Because of that, we begin by examining the first dozen or so years of this period.

The very slow growth in still wine consumption per capita in the final two decades of the 20<sup>th</sup> century contrasts sharply with its doubling in the 1970s (Chart 40(a)). The 1970s growth was mostly due to increased demand for non-premium white wine, whereas in the later period, as just mentioned, consumers substituted quality for quantity, especially in reds. That maturing of the Australian palate coincided with the industry's highly successful change in emphasis towards improving the quality of Australian wine production. Those trends, clearly evident in the vineyard area data summarized in Chart 40(b)), were in response to

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<sup>25</sup> Although beer and spirits have always attracted excise taxes in Australia, it was not until August 1970 that an excise tax (of 50 cents per gallon) was imposed on wine. So unpopular was the tax that it was halved in March 1972 and completely removed in December 1972 by the then-new Whitlam Labor Government (see Table 19). The Fraser Coalition Government that followed resisted re-introducing it, but the next (Hawke Labor) Government did not.

<sup>26</sup> On top of that there was a 15% tax levied at the State level until 1997 and thereafter by the Commonwealth and passed back to the States. Those sales taxes subsequently morphed into a 29% wholesale Wine Equalization Tax (WET) that replaced them when the 10% retail Goods and Services Tax (GST) was introduced in 2000 (Anderson 2010b). Why an ad valorem rather than volumetric tax was imposed on wine from 1984 is unclear, but presumably it was preferred by the wine industry since only a small fraction of domestic consumption was high-priced so the dollar per litre impact on most wine sales was modest, and the price elasticity of demand for the latter is higher than for the former.

the changes in domestic producer prices favouring premium reds and despite increases in the taxes on domestic wine consumption (Wittwer and Anderson 1998a and b, 2001, 2002).

The wholesale value of Australian wine sales doubled between 1984-86 and 1992-94 (excluding State and Federal sales taxes). Most of that growth came from export sales: they grew 18-fold while domestic sales grew only three-fifths over that period (Table 38). Associated with these changes were hikes in the prices of Australian (and to some extent imported) wines. On average, the domestic consumer price and the export price of Australian wine both grew by around 50% over that period. Those price changes no doubt stimulated vine plantings, wine production and wine exports: the volumes of wine production and exports were, respectively, 25% and more than 1000% greater in 1992-94 than 1984-86. However, domestic sales of Australian wine grew less rapidly thereafter, due not only to the average export price rising which diverted sales abroad, but also to the increase in the wholesale sales tax from 20% to 31% in 1993 (before it was reduced to 26% from 1995).

Grapegrowers were major beneficiaries of the increase in Australian wine prices. The average price received for winegrapes was three times higher in 1999 than at the start of that decade, even though the export price rose only 60% (Chart 17). Most of the production response is accounted for by an expansion in the area of bearing winegrapes, rather than through increases in yield per hectare. The increased volume of winegrapes came about partly also by diverting grapes from other uses; and the value of grape output was also raised by grafting higher-valued winegrape varieties onto existing multi-purpose rootstocks. As a result of these changes in the vineyard, the proportion of Australia's grape production used for wine rose from 57% to 85% over the decade of the 1990s (Chart 39(a)).

An important contributor to this production and export growth relates to ownership concentration. There has been a huge increase in the number of Australian wine producers (currently more than 2500, compared with fewer than 200 in the early 1970s, 300 in the early 1980s and 620 in 1990 – see Tables 21 and 26 and Chart 22). Most of the new wineries are very small though (Chart 43). During the 5<sup>th</sup> boom there were numerous mergers and takeovers by larger firms to form even larger conglomerates. The three biggest of those are detailed in Table 23(b): Treasury Wine Estates, Accolade and Pernod Ricard.

Treasury Wine Estates is a result of the Australian brewer Foster's taking over Southcorp, which included the iconic brand Penfolds, and adding it to its Beringer Blass Wine Estates business. Beringer Blass began with Wolf Blass and Mildara Wines combining in 1991 to form Mildara Blass. Penfolds (which acquired Allied Vinters in 1985 and so added Wynns, Seaview, Tulloch and Killawarra, and was renamed Southcorp in 1994) acquired Coldstream Hills and Devil's Lair in 1996. That same year Foster's bought Mildara Blass and Rothbury Estate. Australian producers moved closer to the American market with the takeover of California's Beringer Wine Estates by Foster's to form Beringer Blass Wine Estates in 2001, the same year Southcorp and Rosemount Estate merged. Beringer Blass added T'Gallant in 2003 before acquiring Southcorp in 2005 to form Foster's Wine Estates. In 2010 that was separated from the beer business to form the listed company Treasury Wine Estates, which claims to be the world's largest premium wine company in value terms.

Accolade has its origin with Thomas Hardy & Sons making its first corporate acquisition in 1976 by purchasing the London-based Emu Wine Company, which included Houghton (Western Australia's largest winery) and Morphett Vale. The company purchased Chateau Reynella in 1982, where Thomas Hardy had commenced his employment south of

Adelaide 130 years before, and converted it to its headquarters. Further expansion came in 1992, when Hardy merged with Berri Renmano Limited (itself a merger of two Riverland Cooperatives) to form what then became Australia's second largest wine group, BRL Hardy Limited. In 2003, the brands of BRL Hardy and those of New York-based Constellation Brands were merged to create the world's largest international wine business in volume terms. Constellation acquired Vincor International in 2006, adding the West Australian brands of Amberley and Goundrey to the Hardy portfolio. In 2008, The Hardy Wine Company changed its name to Constellation Wines Australia. Constellation sold their Australian arm in 2011 – for a small fraction of their 2003 purchase price – to a private equity firm Champ who re-named it Accolade Wines.

In 1989 the French spirits company Pernod Ricard purchased Orlando Wines, and then in 1990 it added Wyndham Estate to form the Orlando Wyndham Group. In 2005 Pernod Ricard took over Allied Domecq and the New Zealand business unit Allied Domecq NZ was integrated into the company which was renamed Pernod Ricard Pacific in 2006, made up of business units throughout the Pacific region. As part of that re-structure, Pernod Ricard Australia was formed to take over the Australian sales marketing and distribution responsibilities of the Pernod Ricard brand portfolio (which includes numerous spirits brands), whilst Orlando Wines focused on the production of the Australian wine brands of Pernod Ricard.<sup>27</sup>

The net result has been a substantial increase in firm concentration: whereas in 1978 those crushing more than 1000 tonnes accounted for 17% of wine firms, by 2014 they accounted for just 4-5% of all wine firms (Table 21(d)). The top three producers in 2014 accounted for more than 40% of the annual crush, of the number of bottles of wine sold, and of the value of domestic sales, and for the majority of wine exports. (See Table 22 for rankings of the top 30 wineries, Table 24 for others that were first established more than 100 years ago, and Table 25 for other wineries considered to be in the top 100 in terms of quality.)

This concentration provided the opportunity to reap large economies of scale not only in wine making but also distribution and brand promotion, including through establishing their own sales offices abroad rather than relying on distributors.<sup>28</sup> The large volumes of grapes grown and purchased<sup>29</sup> by these firms from numerous regions enable them to produce large volumes of consistent, popular wines for specific markets abroad. Indeed some types (e.g., Lindemans Bin 65 Chardonnay) were sold only in export markets initially and not released in Australia until several years later.

In particular, the production of large volumes of low-end premium wines that used grapes from several regions, so as to ensure little variation from year to year, suited perfectly the customers of large UK supermarkets. By the mid-1980s those supermarkets, dominated

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<sup>27</sup> In 2010 Pernod Ricard re-named its global wine brand company Pernod Ricard Winemakers (formerly Premium Wine Brands).

<sup>28</sup> The corporatization of firms helped in raising the enormous amounts of capital required for rapid expansion in the 1990s and beyond. The capital intensity of winegrape growing in the late 1990s was about 50% above that of other agriculture, and that of winemaking is more than one-fifth higher than that of other manufacturing.

<sup>29</sup> Wineries that chose to be dependent on purchased grapes went out of their way to build better relationships between the grapegrower and winemaker during the initial expansion phase (Hoole 1997). Ten-year contracts were not unusual in the 1990s, which encouraged lenders to finance expansion of first vineyards and then wineries. However, as the prices of winegrapes fell in the new millennium and renewed contracts were for much shorter periods, those relationships understandably soured somewhat.

by Sainsbury's, Marks and Spencer, Waitrose and Tesco, accounted for more than half of all retail wine sales in the United Kingdom (Unwin 1991, p. 341). Given also Australia's close historical ties with Britain, it was the prime target in the first decade of this latest boom.

The timing for this export surge was catalysed by the devaluation of the Australian dollar in the mid-1980s, which was due to a sharp fall in prices of Australia's coal, grain and other primary export products ((Charts 23 and 24, and Tables A14 and A15). That devaluation, together with low domestic prices for premium red grapes at the time, increased substantially the incentive for investment in developing overseas markets for Australian wine. Other factors expanding demand abroad for Australian wine at the time were food-safety scares associated with Chernobyl in April 1986 and scandals involving additives in Austrian and Italian wines (Rankine 1996). Also helpful in raising Australia's profile abroad was the wine by an Australian sailing team of the America's Cup in 1983, the first visit by a group of Master of Wine graduates in 1984, and the release in 1986 of the popular comedy movie *Crocodile Dundee* (just as the *Lord of the Rings* and *Hobbit* movies have boosted New Zealand's wine sales in the past decade). Meanwhile, competition from other New World countries was minimal: from South Africa because of anti-apartheid sentiment, from South America because of its macroeconomic and political instability, and from the United States because the high value of its dollar ensured its exports were minimal. Generic marketing of Australian wine by the Australian Wine Export Council (particularly following Hazel Murphy's appointment in London in 1985), together with the huge increase in the quantity and quality of Australia's exports, began to build the country's international reputation for popular commercial premium-quality winegrape growing, wine making, and wine marketing.

This fifth boom was largely market-driven but was also influenced by changes in government interventions. The steady reduction in manufacturing protection and in assistance to some other agricultural industries, that began in 1972 and was accelerated through the 1980s and 1990s, paralleled and thus offset the price-reducing effect of reductions in nominal rates of assistance to grape and wine producers from 20-32% to below 5% over those two decades (Chart 53 and Table A9). The imposition from 1984 of the wholesale sales tax on wine dampened domestic sales but encouraged exporting, while the governments' vine-pull scheme in the mid-1980s led to the loss of some valuable old vines but the replacement of others with more-profitable alternatives. By way of consolation for raising the wholesale sales tax again in 1993, the government did assist new plantings of vines by providing for accelerated depreciation of vineyard construction costs over just four years for tax purposes (even though the average life of the investments involved is closer to thirty years). That provision contributed non-trivially to the rapid acceleration in vineyard bearing area, which almost trebled during the boom (Chart 1 and Table 2).

How close did the boom bring the industry towards its targets for 2025? In 1994-95 the wine industry developed and published its *Strategy 2025*, laying out its targets for 30 years hence (AWF 1995). At the time those targets were considered rather optimistic, since they involved a three-fold increase in the real value of wine production, 55% of it for the export market. Getting half way to those targets requires having 80,000 hectares of winegrapes bearing enough for a crush of 1100 kt to produce 750 million litres of wine at a wholesale pre-tax value of \$3 billion (\$4/litre) in 1995-96 Australian dollars. By the turn of the century the industry had reached that half-way point for achieving its targets 30 years out -- that is, in just five vintages!

That huge expansion in vineyard plantings inevitably led to a surge in winegrape production three or so years later, and hence also in wine output shortly thereafter. Much of the new plantings were red varieties, so those wines spend a year or more in barrel in contrast to mostly un-oaked whites, but even so the stocks of wine ready for sale more than trebled in the ten years to 2005 (Chart 30).

Meanwhile, several New World suppliers had begun to emulate the Australian export-led experience, leading to a growth spurt in their wine exports just a few years behind Australia's (Chart 3). Also, several Old World suppliers plus Argentina and Chile were expanding their exports because of declining domestic consumption. Thus Australian exporters began to face increasing competition just as the historically low value of the Australian dollar began its decade-long rise after 2001. The latter contributed greatly to the decline from that time in the AUD price of Australia's wine exports. The volume of those exports continued to expand each year until 2007 though, such was the need to dispose of rapidly growing stocks. Thereafter, when the volume of exports stabilized, their AUD value plummeted (Charts 2 and 16) as the Australian dollar continued to rise in value in the wake of Australia's unprecedented improvement in its international terms of trade and the massive mining investment boom (Chart 23 and Tables A13 to A18). The extent of that decline in the average wine export price from 2001 is as spectacular as its rise in the previous decade (Chart 2).

The resulting decline in AUD wine export prices saw a parallel decline in winegrape prices that was interrupted only by a short spike in 2008 following the drought-induced shortfall in production in the 2007 vintage (Chart 20). By 2011 the average winegrape price had returned to the same nominal level as in 1989 (Chart 17). Domestic consumers have benefitted from this because the retail price index for wine has grown far less than the overall consumer price index every year since 2003 (Table 41).

The appreciating value of the AUD also encouraged wine imports, which have grown dramatically since the turn of the century (Chart 21 and Table 13). New Zealand has led the charge, followed by France (Chart 28). Most of the wine from France has been relatively highly priced Champagne, while that from New Zealand has been mostly Sauvignon Blanc while had a unit import value of around US\$8 a litre during its first decade, compared with just US\$5 for the wines being imported from Italy and Spain (Chart 29). Those import prices are well above Australia's export prices, which averaged just US\$2.80 during 2000-10 and in 2011-13 were for the first time equalled by Chile and surpassed by the United States (Chart 19). New Zealand's Sauvignon Blanc has become the biggest selling white wine in Australia, eclipsing Australian Chardonnay in the latter part of the past decade, and has been a non-trivial contributor to the fall in the price of Australia's white wines and winegrapes. The surge in imports from New Zealand was particularly sharp from 2005, when the Australian Government agreed that New Zealand wineries could receive the same rebate of the 29% wine equalization tax on their wines sold in Australia (up to the ceiling of AUD1.7 million of sales per winery per year).

A direct consequence of the wine and grape price collapse was that both vineyard and winery asset prices plummeted after 2007, with some vineyards selling for no more than unimproved land value even though the average cost of planting a vineyard was in the vicinity of AUD30,000 per hectare. The collapse in value was partly because banks lost interest in financing such purchases, and partly because listed corporations sought to shed their least-productive vineyard and winery assets to boost the rates of reported return on their

remaining capital. The slump was in sharp contrast to the growth in industry asset prices in the United States and Western Europe which reached record levels in local currency terms at the start of the millennium's second decade, thanks to the weakening of the US dollar and Euro and the growth in demand for iconic wines and wineries by Chinese buyers.

#### **1.4 Was the optimism at the start of the 5<sup>th</sup> cycle warranted?**

The past cyclicalities of the wine industry in Australia and abroad was well known to established firms. Yet the industry's past history also was encouraging, because the latest boom differs from the earlier booms in several important respects.

To reiterate, the first boom from 1854 was almost exclusively driven by domestic demand growth following the trebling in Australia's population in the 1850s, but the excessive volume of wine from that expansion was not able to be exported profitably, largely because of high duties on inter-colonial trade and poor marketing and high transport and communication costs in exporting to the Old World.

The second boom from the 1880s was due to a mixture of domestic and export demand growth, the latter involving better marketing and lower transport costs of mostly generic bulk (rather than winery bottled and branded) dry red wine sales to a relatively open British market. That market absorbed as much as one-fifth of Australia's production early in the 20<sup>th</sup> century, before World War I intervened.

The acreage boom induced by soldier settlement after World War I provided the basis for the next export boom from the mid-1920s, helped by irrigation and land development subsidies, a fortified wine export subsidy, and a 50% imperial tariff preference in the British market for fortified wines. The decline in domestic consumption, induced by the export subsidy and the Great Depression, added to wine exports in the 1930s – which by then accounted for more than one-fifth of production. The removal of the export subsidy, plus the huge hike in UK tariffs on fortified wine in the latter 1940s, caused a severe decline in export orientation, while the return to normal beer consumption after war-induced grain rationing kept down domestic wine sales growth.

The fourth boom, following two post-war decades of slow growth in the industry, was entirely domestic as tastes became more European, as licencing and trade practice laws changed with income growth, as corporatization of wineries led to more-sophisticated domestic marketing and new innovations (including casks), and as Britain's wine import barriers rose again. Initially domestic demand grew for red wine. Then the cask attracted a new clientele of white wine drinkers, causing Australia's per capita consumption to more than treble during the fourth cycle.

The fifth and latest boom is different in several important respects from the earlier ones. Firstly, the fifth boom was overwhelmingly export-oriented (Figure 2 and Table 1). This contrasts with the first and fourth booms at least, which were primarily domestic. It also differs from the inter-war boom, when exports were more a way of disposing of soldier-settlement induced surplus low-quality fortified wine production than a pre-planned growth strategy.

Secondly, the latest boom was market-driven (apart from the tax incentive to expand plantings via the tax-reducing accelerated depreciation allowance for some vineyard construction costs). This was not unlike the first two booms in the 19<sup>th</sup> century, but it contrasts markedly with the third (inter-war) boom that evaporated once government assistance measures (an export subsidy and preferential tariff access to the United Kingdom market) were withdrawn. What triggered the recent growth in export demand for Australian wine was the change in UK liquor licensing laws in the 1970s, allowing supermarkets to retail wine to the (by then adult) post-war baby boomers. Given also Australia's close historical ties with Britain, and the exceptionally low value of the Australian dollar in the mid-1980s, it is not surprising that Australian companies recognised and responded to this new market opportunity. Australian wineries were able to do so faster than European suppliers because the latter were hamstrung by myriad regulations and were somewhat insulated from market forces by price supports (Meloni and Swinnen 2013).

To exploit the new market opportunity in the UK required large volumes of consistent, low-priced branded premium wine. Land- and capital-abundant Australia had the right factor endowments to supply precisely that. High labour costs were overcome for larger firms by adapting and adopting new techniques for mechanical pruning and harvesting, thereby generating large economies of size, especially in the hot areas along the Murrumbidgee and Murray rivers where irrigation water was (as in most countries) greatly under-priced. That stimulated a number of mergers and acquisitions among Australia's wine firms that resulted in several very large wine companies able to reap scale economies not only in grape growing and wine making but also in viticultural and oenological R&D, in accumulating market intelligence globally, in innovative brand promotion and related marketing investments, and in distribution. It also enhanced their capacity to bargain with emerging retail giants. The volumes of grapes grown and purchased from numerous regions by these large firms enabled them to provide massive shipments of consistent, popular wines, with little variation from year to year, for the British and American supermarkets.

The third major difference between the recent and earlier booms is that the quality of wine output improved hugely during the past two decades, relative to the cost of production. Moreover, for the first time, the industry was in a position to build brand, regional, and varietal images abroad to capitalize on those improvements in the quality of its grapes and wines. That image building was partly generic, with the help of the Australian Wine Bureau's activities in Europe, but mostly came from the promotional activities of individual corporations and their local representatives abroad. The promotional efforts were helped by being able to point to the legislated wine quality standards in the Australian and New Zealand Food Standards Code, and to the fact that Australian wines over-delivered in terms of value for money in Northern Hemisphere markets until exports from other Southern Hemisphere and Southern European producers began to offer stiffer competition. Australia's average export price rose three times more than the global average over the 1990s. However, since 2006 the volume of exports has grown only for wines priced below A\$2.50 a litre (Chart 18). This is partly a consequence of the phenomenal success, particularly in the United States, of Casella's Yellowtail label since it was first introduced in 2001; but it is also partly due to the rapid increase in the use of bulk containers for shipping wine in bladders for bottling in the Northern Hemisphere. The share of bulk wine in total exports has grown more rapidly for Australia than for other key exporters since the turn of the century (Chart 26), and by 2014 had reached 58%.



A fourth feature distinguishing the most-recent boom period was a consequence of the rapid growth in incomes that accompanied the latest wave of globalization, and the aging of the population, in high and middle-income countries. Associated with that was an ever-wider appreciation of the desirability of moderate over heavy drinking, and of the possible health benefits of a moderate intake of red wine in particular. That ensured a consumer trend towards spending on quality rather than quantity of wine (and on wine in preference to beer and spirits). At least up to the 2008 financial crisis on both sides of the north Atlantic, this was especially so among the post-war baby boomers in OECD countries reaching middle age with more disposable income and time to indulge in wine-inclusive dining as their children reach adulthood.

Another feature of that maturing taste for wine is the desire for more diversity, which causes intra-industry trade to grow. That is, wine sellers even in wine-exporting countries are importing wines to widen the range available for their consumers. As a relative newcomer in many markets, the Australian wine industry benefitted from this during its fifth boom – even though it subsequently has had to compete with an increase in imports in its own domestic market as incomes surged and the AUD appreciated in the wake of Australia's recent mining boom.

Moreover, those contemplating new investments in Australia's wine industry at the end of the 20<sup>th</sup> century could be excused for not anticipating the rapidity with which both other New World suppliers and producers in the Old World copied Australia's successful formula for export-led growth. Nor could those investors have anticipated the combination of an unprecedented decade-long rise from 2001 in the value of the AUD, a long and widespread drought that stimulated major policy reforms affecting irrigation water pricing, and the global financial crisis from 2008 which reduced wine demand and weakened currencies on both sides of the north Atlantic Ocean. Using their model of the world's wine markets (Wittwer, Berger and Anderson 2003), Anderson and Wittwer (2013a,b) estimate that the real exchange rate changes between 2007 and 2011 alone reduced Australia's annual wine exports by 64 ML while boosting exports of the United States by 19 ML and of Western Europe by 167 ML. In addition to losing export sales, those changes in real exchange rates meant Australian producers had to compete more with import competition in the domestic market. One-third of the estimated extra imports due to currency changes were from New Zealand, because of the greater real appreciation of the Australian dollar compared with the New Zealand dollar.

## **1.5 What did innovation and generic marketing and R&D contribute?**

During the past three decades, the Australian wine industry improved its competitiveness in no small measure by large investments not only in vineyards, wineries and wine brand marketing but also in the creation and dissemination of production and market knowledge plus investments in generic wine marketing. One of the hallmarks of the export-oriented success of Australia's wine industry since the 1980s has been the very considerable degree of collaboration among its firms, including through levying themselves and attracting matching government funds for investments in generic promotion and R&D.

At the outset of Australia's settlement by Europeans, vine experimentation was by trial and error by individual interested entrepreneurs, with plenty of innovation being done at the firm level. An early influential viticulturist was James Busby, who emigrated from near Bordeaux in France to Australia in 1824 where he was appointed to run an agricultural school which specialised in viticulture. In 1831, Busby undertook a three-month tour of Spain and France and returned with a collection of vine cuttings and started the first source block in Sydney's Botanic Gardens, along with duplicate blocks in Victoria and South Australia.

Innovation can be boosted with the help of formal education in viticulture and oenology, through boosting the supply of both scientists and practitioners capable of making use of newly generated technologies.

Australia's investment in formal grape and wine education and training dates from the establishment in 1883 of Roseworthy Agricultural College (now part of the University of Adelaide). Viticulture was compulsory and oenology was an optional field of study in its Diploma in Agriculture, with a Diploma in Oenology being added in 1936. In 1975 the Riverina College of Advanced Education (now Charles Sturt University) in Wagga Wagga in New South Wales became the second Australian tertiary institution to offer wine education and training, under Brian Croser's leadership. The program was broadened in 1997 when it became part of that university's National Wine and Grape Industry Centre. Then the wine industry's take-off in the 1990s saw many other universities begin to offer courses, including in wine business and marketing.<sup>30</sup>

Formal wine research began in 1934 with funding to the University of Adelaide from (what soon became) the Australian Wine Board. The Board's annual reports indicated high rates of return from its initial research investments, and this led in 1955 to the creation of the Australian Wine Research Institute and in 1988 to the establishment of the Grape and Wine Research and Development Corporation (GWRDC), although it was called a Council until 1991.

It took until then for the first professor of oenology to be appointed in Australia. Terry Lee took up that appointment at the University of Adelaide while continuing as the Director of AWRI. In his Inaugural Lecture in October 1991, he pointed out that AWRI had insufficient funding to undertake viticultural research in previous decades. A viticulturalist was first appointed to AWRI only in 1990, and Australia's first professorial Chair in viticulture was established at the University of Adelaide in 1991. That was the year in which the industry successfully bid for federal funding to support the establishment of a Cooperative Research Centre for Viticulture. The CRCV subsequently enjoyed a second period of 7-year funding before being wound up in 2006.

The GWRDC is funded by producer levies which the Federal Government matches dollar-for-dollar up to a maximum of 0.5% of the gross value of output of grapegrowers (in the case of growers) and of the winegrape crush (in the case of wineries). Producers initially opted for low levies, but they were raised in 1999 and again in 2005 such that in 2010-13 they were around 0.7% of the value of wine sales (Table 41 and Chart 42) and so a little more than 1% of value added in these two activities. Private-sector research and that by

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<sup>30</sup> However, several of those newer programs have gone into hybination or ceased with the downturn in demand for such courses after 2007.

universities, CSIRO and State Departments of Agriculture not funded by GWRDC would add a little more to that, especially in earlier years.

This represents a relatively modest investment in R&D compared with the averages for OECD countries of around 2% of agricultural and 3% of manufacturing value added (Pardey et al. 2006). It looks especially modest in comparison with the aggregate rural R&D investment in Australia which in 2008-09 amounted to 3.6% for the gross value of farm production (\$1.5b out of \$42 billion, of which one-quarter was private – see Productivity Commission (2011)).

Despite that modest budget, the outputs from past R&D investments remain impressive. Data from the Web of Science database suggest Australia was 2.8 times as intense in producing research papers on viticulture and oenology as the rest of the world per litre of wine produced in 1992-96 (exceeded only by the United States – see column 4 of Table 42). The latter intensity has since dropped (e.g., to 1.5 in 2002-06), but that is understandable in the wake of Australia's rapid expansion in wine production.

In terms of research payoff, one study found that the 2002 portfolio of GWRDC research projects was expected to yield a 9:1 benefit/cost ratio, and that a sample of past projects yielded ratios ranging from 7:1 to 76:1 (McLeod 2002). These are at least as high if not higher than the returns to agricultural research in general (Hurley, Rao and Pardey 2014).

As for generic marketing, the industry has engaged in promotion of exports since the formation in 1929 of the Wine Overseas Marketing Board (later to become the Australian Wine Board or AWB). In 1965 the AWB added generic marketing in the domestic market, hiring Len Evans to lead that effort. These activities expanded following the AWB's conversion in 1980 to the Australian Wine and Brandy Corporation (AWBC), and especially with the AWBC's hiring of Hazel Murphy to lead promotion in Britain from 1985 through the Australian Wine Bureau (she stayed until 2003) and the creation of its Australian Wine Export Council in 1992.<sup>31</sup>

Initially the AWBC focused on broadly promoting 'Brand Australia' but, with the launch of the *Directions to 2025* strategy paper (AWBC and WFA 2007), that campaign became more refined and directed towards four segments of the market with an explicit objective of encouraging consumers to 'trade up' to progressively higher prices. The four segments are Brand Champions (the easy drinking commercial segment that spearheaded Australia's export drive in the 1990s), Generation Next (appealing to younger social drinkers attracted by innovative packaging and style), Regional Heroes (varietal wines that have a sense of place of origin), and Landmark Australia (high-quality, globally recognised iconic wines).

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<sup>31</sup> AWBC has had five other tasks in addition to generic marketing. One is to ensure that exported wine meets the product standards of the country of destination, so that the reputation of the industry as a whole is not jeopardised by any sub-standard shipments. Another is to supervise its Label Integrity Program. A third has been to establish the regional boundaries for the purpose of legally registering Geographical Indications. A fourth is to lobby directly and via Australia's Department of Foreign Affairs and Trade for greater market access abroad through a lowering of tariff and non-tariff import barriers. And fifth, AWBC has been the systematic provider of strategic information on wine market developments at home and abroad. These and GWRDC's R&D tasks have been enfolded into the Australian Grape and Wine Authority when it was formed on 1 July 2014 by merging AWBC and GWRDC.

The *Directions to 2025* strategy has been supplemented by regional promotion campaigns (funded entirely by regional producer levies), and by the activities of a new grouping of “Australia’s First Families of Wine”. The latter is made up of a dozen of the oldest family companies not listed on the stock exchange and hence not subject to the same financial ‘short-termism’ of listed companies.

The budget for these generic promotion efforts is trivial relative to the value of national production and the extent of expenditure by European competitors, however. In 2011-12, for example, Australia’s expenditure on generic promotion was barely A\$9 million or 0.7 cents per litre of wine produced, which is equivalent to 0.2% of the value of production. That same year, Bordeaux alone spent A\$23 million, or 3.3 cents per litre. The European Union supplements regional and national promotion expenditures, and during 2009-13 it provided 522 million Euros for wine promotion. That supplement alone is equivalent to 0.6 Australian cents per litre of EU wine produced. Moreover, despite the many misappropriations that have been uncovered, that EU promotion expenditure is to be raised to 1156 million Euros for the period 2014-18 (European Court of Auditors 2014). That would raise the EU’s investment to around 1.3 cents per litre, or double the rate recently spent in Australia – and that is just the supplement from Brussels, which adds to what will be spent by national governments and wine regions themselves on generic promotion.

## **1.6 Australia’s wine industry growth in international historical perspective<sup>32</sup>**

As recently as 1980-84, the five key European wine-producing and -consuming countries (France, Germany, Italy, Portugal and Spain) accounted for 58% of global wine production and 53% of global wine consumption. They also accounted for 45% of the world’s area of vineyards, including those vines not dedicated to wine. One hundred years earlier, they contributed three-quarters of global wine production, or four-fifths if Austria and Hungary are included. Moreover, with the French colony of Algeria they accounted for more than 95% of global wine exports during the five decades to World War I.

By contrast, Australia prior to the 1990s never accounted for more than 0.7% of the world’s vineyard area and 0.9% of global wine exports, and prior to 1970 its share of global wine production was always below 0.9%. Even in the early 1990s Australia’s shares of world wine production and consumption were less than 1.5%. Early in the 20<sup>th</sup> century Australia’s production was also small relative to that of Argentina, Chile and the United States (Chart 44), although its exports then and in the latter 1920s and 2007 were greater than those of other New World producers. Indeed Australia had become the world’s 4<sup>th</sup> highest exporter of wine volume by 2002, before Chile pushed Australia back into 5<sup>th</sup> place in 2012 (Chart 45).

More-interesting comparisons are obtained, however, by expressing those indicators on per capita or per \$ of real GDP bases, since Australia’s economy was smaller than many European and New World ones over much of the past 200 years.

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<sup>32</sup> International data in this section are from Anderson and Nelgen (2011) post-1960 and from Anderson (2015) pre-1960, the latter building on Pinilla (2014). The pre-1960 (and especially pre-1900) data are preliminary and subject to on-going refinements. On wine’s globalization in general, see Anderson, Norman and Wittwer (2003) and Anderson (2004).

For most decades from the 1870s to the 1970s, Europe's four main wine-producing countries produced an annual average in excess of 100 litres per capita, but since the early 1980s those volumes have dropped to an average of just above 70 litres (Chart 46(a)). Among the New World countries, by contrast, only Argentina and Chile produced more than 30 litres per capita per year prior to the latter 1990s, but Australia's per capita production rose from around 10 litres in the 1920s and 1930s to a peak of 60 litres by 2005-09, exceeding that of all other New World countries and just one-sixth below the 2010-13 average for the four main Western European exporters. Australia slipped back to 52 litres during 2010-13, virtually matched by New Zealand. Meanwhile, Chile has shot up to 75 litres, Argentina has fallen dramatically from a peak of 90 litres in the latter 1960s to now just 36 litres, South Africa has fallen from a peak in the early 1980s above 25 to 19 litres, and the United States remains at less than nine litres per capita but up from less than four litres prior to 1970 (Chart 46(b)).

The vine intensity of cropping has an even wider range. Italy had more than 4 million hectares of vines throughout the first half of the 20<sup>th</sup> century, and its share of crop area under vines was the highest in the world at 25% in the early 1960s. It had fallen to 15% by 1980-84 and to 8% by 2000-04, by which time Portugal had taken the lead at 12%. Spain is next at 7% in recent years, the same as Moldova and followed by Georgia at 5-6% (the same as Algeria was in the early 1960s). France and several other European countries are in the 3-4% range. That is the level New Zealand has recently reached, but the only other New World country above that is Chile, which recently shot up to 10%. Australia, by contrast, has never had more than 0.35% of its crop area under vine (Chart 47), and less than half that for most years since the 1840s. Already China is approaching that intensity, averaging 0.33% in 2010-11. This suggests suitable cropping land has not been the binding constraint on Australia's wine industry development. Even in the two most vine-intensive States (South Australia and now Tasmania) that rate is just a little above 1% (Table 4).

A broader indicator that goes beyond the farm sector to economy-wide productive capability is the share of wine production volume or value relative to overall GDP. In the 19<sup>th</sup> century, the four main West European countries produced more than 60 kl of wine per real US\$ million of GDP (apart from France where it dropped below 40 kl after France was hit with phylloxera in the 1870s and 1880s). The range for those countries was still 15-35 kl in 1958, but it had fallen below 5 kl by the early 1990s and to 3-4 kl by 2008 (Chart 48), by which time it was slightly below the level in Bulgaria, Hungary and Romania. Australia, by contrast, was always below 2kl in the 19<sup>th</sup> century and less than 3 kl in the 20<sup>th</sup> century before peaking in 2004 at 3.1 kl. By 2008 the levels in the New World were very close to those of the key producing countries in Europe: around 4kl in Italy, Portugal, Spain, Chile and South Africa, 3.3 in Argentina, 2.9 in France, 2.6 in New Zealand and 2.4 in Australia (Chart 47). The ranking was slightly different for the *value* of wine production as a share of GDP at current prices in 2009 (from Anderson and Nelgen 2011, Tables 86 and 159), at which time there were at least a dozen countries ahead of Australia (Chart 48).

As for exports, they did not exceed eight litres per capita per year for France and Italy in the 19<sup>th</sup> century and were less than five for most years of the first six decades of the 20<sup>th</sup> century. Spain, by contrast, exported more than ten litres per capita per year in the seven decades to the Great Depression (and Algeria more than 100 litres during 1900-60), but then less than five litres for the next three decades. From the 1960s, however, as per capita domestic consumption fell in those West European countries, per capita exports grew steadily from less than five litres, reaching 22 in France, 28 in Portugal, 37 in Italy and 40 in Spain by

2010-13 (Chart 50(a)). In the New World, it was always less than 2 litres prior to the 1990s, even in Australia in the 1930s. But since then it has risen dramatically in all New World exporting countries: as of 2010-13, it was 32 litres in Australia but was even higher at 40 litres in Chile and New Zealand, and eight litres in Argentina and South Africa (Chart 50(b)). Thus while Australia was the leader among New World countries in contributing to the latest wave of wine globalization, the three biggest wine producing countries in Western Europe have been expanding their wine exports per capita steadily since the 1950s.

Another helpful indication of wine export intensity is found by generating the ratio of the share of wine exports in the total value of merchandise exports to wine's share of global merchandise exports (Balassa 1965). That index of comparative advantage was around 20 for Portugal prior to the mid-1980s (and more than 40 for Georgia and Moldova as recently as 2000-04), and by 2010-11 it was around nine for France and Portugal and around six for Spain and Italy (Chart 51(a)). Meanwhile, in the New World the indexes had shot up by 2010-13 to 13 for Chile and New Zealand, six for Argentina and 4.5 for South Africa (Chart 51(b)), while for Australia the index peaked at almost 11 in 2004 before falling by nearly two-thirds, to 3.6 in 2013.

An intriguing question is why Australia (or other New World countries) seemed to make so little headway into exporting to Europe in the last quarter of the 19<sup>th</sup> century when the Old World was struck so severely by phylloxera. Chart 50(a) reveals that Spain became a far more important exporter between the latter 1870s and the early 1890s – to the same extent that France became less able to export (Chart 52). The other major supply response to phylloxera was the migration of many French producers to Algeria, whose exports subsequently took off at the expense of Spain in the two decades both prior to and following World War I (Meloni and Swinnen 2014).<sup>33</sup> It was only during the lead-up to and following Algeria's independence from France in 1962 that Algeria's importance in world wine exports shrunk and that of Italy and then France grew (Chart 52). Presumably it was the proximity of both Spain and Algeria to France that made them far more able to make up for France's lost production and export capability between the 1880s and 1960.

An important contributor to the sales of wine in any market is the rate at which consumers are discouraged via an excise or import tax. Apart from briefly in 1971-73, the only tax on wine consumption in Australia had been an import tariff until the imposition of a wholesale sales tax from August 1984. Beer and spirits consumption, by contrast, has always been subject to very heavy customs and excise taxation. Those taxes contributed one-third of the New South Wales' tax revenue in the middle of the 19<sup>th</sup> century (Table 19(a)), and one-quarter of the new Federation's tax revenue in the early 20<sup>th</sup> century (Table 19(b)). Prior to the mid-1980s the Australian wine industry thus benefited from that tax regime, both directly via a protective import tariff on wine and indirectly via the heavy taxation of alcoholic beverage substitutes in the domestic consumer market.

Between 1984 and 1999, however, a sales tax applied and at an increasing rate until it was replaced in 2000 by a wholesale Wine Equalization Tax (so-called because it replaced the sales tax of 41% with a WET of 29% which, with the newly introduced 10% goods-and-

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<sup>33</sup> Even though some French winemakers moved to northern Spain too, phylloxera eventually also invaded some Spanish regions from the end of the 19th century. However, the disease spread only slowly there, due to the large distances between Spain's wine regions and the fact that by then the remedy to graft European varieties onto North American rootstocks had been discovered. Hence wine production suffered less, as well as later, in Spain than in France.

services tax on retail sales, equated to the previous sales tax). As a result of those tax hikes, Australia's rate of wine consumer taxation is now high by OECD standards, and especially by the standards of significant wine producing/exporting countries (Berger and Anderson 1999, Anderson 2010c, Anderson with the assistance of Aryal 2014). It is especially true at higher price points because Australia's consumer wine tax is unusual in being ad valorem (a percentage of the wholesale price) rather than specific (in cents per litre of alcohol). That can be seen by expressing tax rates as ad valorem equivalents or as volumetric rates per standard drink of alcohol,<sup>34</sup> and at a selection of still wine price points. Table 43 shows the consumer tax equivalent (CTE)<sup>35</sup> for regular beer (5% alcohol, A\$2/litre wholesale pre-tax), for spirits (40% alcohol, A\$15/litre wholesale pre-tax), and for wines at four different wholesale pre-tax prices assuming all wines have an alcohol content of 12.5%.<sup>36</sup> In that Table 43 excise (but not VAT/GST) taxes in 2012 and 2014 are shown for wines, beers and spirits expressed as a percentage of the selected wholesale pre-tax prices shown at the top of each column. For commercial premium wines (the sort that would retail at AUD12 for a 750ml bottle in Australia inclusive of GST), those rates are depicted in Chart 54, where it is clear that in 2012 Australia's 29% was the highest tax rate among the significant wine-exporting countries: the majority have zero taxes on such wines, France has 0.7%, South Africa 4%, the United States 6% and Canada 8%. At higher price points, such as for super premium wine category in the middle of Table 43, only Korea and Norway among OECD countries had a higher tax rate than Australia's 29%.

Table 44 shows the excise taxes in 2012 and 2014 for wines, beers and spirits expressed in Australian cents per standard drink of alcohol. The rates are converted from the national currencies at the exchange rates shown in the final column. In 2012 Australia's wholesale tax per standard drink was the same as New Zealand's for commercial premium wines (22 cents) but higher at any price point above AUD7.50/litre. It compares with zero in Argentina, 3 cents in South Africa, 5 cents in the United States, and 6 cents in Canada – and just 1 cent in France and zero in the other Old World wine-exporting countries. True, wine is taxed less than spirits in all but Japan, and it is taxed at a similar or lower rate than beer in all but a handful of countries. But again Australia is taxing wine relative to other alcoholic beverages more than most wine-exporting countries, the main exception being Chile where beer is very lightly taxed.

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<sup>34</sup> One standard drink in Australia is 12.5 ml of pure alcohol (and so is equivalent to 250ml of beer at 5% alcohol or 12.5° Plato, or 100 ml of wine at 12.5% alcohol, or 31.25ml of spirits at 40% alcohol). Thus the specific tax rate becomes an AUD tax per standard drink by multiplying by 0.000125 the regular-strength beer, wine and spirits tax rates per hectolitre per degree of alcohol. See [www.alcohol.gov.au](http://www.alcohol.gov.au)

<sup>35</sup> The ad valorem consumer tax equivalent (CTE) is defined as the percentage by which the pre-tax wholesale price has been raised by beverage taxes (but not including any value-added or goods-and-services tax. Most countries also have a VAT or GST applying to beverages, but since those taxes apply at the retail level to most other goods as well we do not add them to the beverage-specific taxes. The foreign exchange rates used to convert specific tax rates expressed in national currencies to the Australian currency are based on Reserve Bank of Australia rates on 3 January 2012 and 1 July 2014 ([www.rba.gov.au](http://www.rba.gov.au)).

<sup>36</sup> The chosen wholesale pre-tax price for non-premium wine such as sold in casks (A\$2.50/litre), with a 29% excise tax (WET), a 33% mark-up to retail, and the 10% GST, implies a retail price in Australia of \$18.90 for a 4-litre cask. For commercial premium wine, A\$7.50/litre wholesale implies, with a 29% excise tax (WET), a 50% mark-up to retail and 10% GST, a retail price of \$12 for a 750ml bottle; and for super-premium and sparkling wine (A\$20 and \$25 per litre, respectively) and the same mark-ups as commercial premium implies a retail price of around \$32 and \$40, respectively, for a 750ml bottle.

## 1.7 Why such a sharp decline in profits and yet sluggish disinvestment?

At its 2014 Outlook Conference, the Winemakers' Federation of Australia reported its survey results suggesting that 84% of producers in Australia were not covering even their variable costs of production that year. That was even worse than its survey finding for 2012, namely 77% (WFA 2014). The situation in Australia contrasts markedly with that in the United States, where for the past six years producers have had not only positive but relatively rosey financial results (Silicon Valley Bank 2015, Figures 19 and 20). In New Zealand, too, all but the smallest category of producers have been operating with healthy profits in all years since 2006, apart from a dip for some in 2010 (Deloitte and NZW 2014). As already indicated, some of those differences with Australia are certainly due to real exchange rate changes (Anderson and Wittwer 2013a,b). But Australia's volume of winegrape production has not diminished over the past ten years despite the halving of the average winegrape price (Chart 20), so that price is expected to continue to be very low in 2015.

An additional reason for the persistence of low prices in Australia in recent years, compared with the end of previous booms, has to do with the changed destination of grapes. Instead of most grapes being multi-purpose and the majority destined for non-wine uses, and for most of the wine that was produced being used to create fortified wine or distilled, today well over 90% of grapes are used for wine and all but 2% of that wine is for making table wines (Charts 31 and 39). Competition from imports has depressed returns in the fresh and dried grape markets, fortified wines have gone out of favour, and brandy too is mostly imported now. As a consequence, when winegrape prices are low there are no longer the options of directing grapes to the fresh fruit market or to drying, or to process them for the fortified wine or brandy markets: evidently the rewards would be even lower.

Several reasons have been mentioned already as to why, when prices and profits do slump, production does not decline even in the medium term and disinvestments in the industry tend to be minimal or drawn out over many years. One is that each producer's investment involved large up-front sunk costs in assets (vineyards, wineries, brands) that have no alternative use, so producers hang on in the hope that the downturn is only temporary. Another reason is that a large proportion of vignerons in regions near cities earn the majority of their income from other sources and continue to enjoy the lifestyle of being a part-time vigneron even when profits are low or negative.

Also, there are plenty of producers who continue to have access to credit or other funds even when the wine industry is depressed. Those that are in a position to purchase others' assets at low prices at such times are then in a stronger financial position as and when the industry returns to profitability. Their purchase does nothing to reduce the industry's aggregate assets or production, but it does mean a smaller number of stronger firms remain in the industry.

Inevitably, though, the vineyard bearing area has begun to shrink. Between 2008 and 2013 it fell by one-fifth, and there's been a further net reduction since then. A similar if more gradual fall in the vine area per capita occurred with the more-gradual mining boom of the 1970s/early 1980s. It was followed by a decade in which the vine area per capita hardly changed (Chart 25), which raises the question – addressed in Chapter 4 – about how long the current slump might last.



## 1.8 In retrospect, was the industry helped or hurt by protectionism?

The Australian Federation began by eliminating barriers to interstate trade (Section 92 of the Constitution) but replacing them with tariff barriers to imports from abroad. The aim was mainly to encourage domestic manufacturing, but from the outset some import-competing agricultural industries also succeeded in securing such protection (Anderson and Garnaut 1987). Dried vine fruit was one of the first farm products to get such protection, and from 1904 to 1939 that caused the price of grapes to average about 50% above what they otherwise would have been. The extent of that support dropped to about 10% for the two decades following World War II, but was still double that for other farm industries; and it rose again during the 4<sup>th</sup> wine cycle (1967-86), to three to four times that for agriculture as a whole. During the 4<sup>th</sup> wine cycle (1967-86) winegrapes received even more support with a NRA of 27%, compared with 20% for grapes for drying and just 7% for agriculture as a whole.

Winemakers also have been protected by import tariffs, at considerable rates in earlier decades but at just 5% in recent years (and zero for New Zealand, whose wineries also have received the WET rebate on sales in Australia since 2005 up to \$1.7 million per year per winery). Estimates of the wine NRA are available since 1950, and they averaged 23% during 1950-67, the same as for other manufacturing. During the 4<sup>th</sup> wine cycle (1967-86) the wine NRA averaged 32%, almost double the average for all other manufacturing of 17%. Both averages have since diminished and both are now less than 4% (Chart 53), but prior to that wine import tariffs were virtually prohibitive, with imports rarely accounting for more than 1% of domestic consumption during the 3<sup>rd</sup> and 4<sup>th</sup> cycles (Chart 8).

The extent of support for the agricultural sector as a whole peaked in 1971, just before the Whitlam Labor Government was elected the next year and began dismantling farm support programs. All import tariffs were cut overnight in 1973 by one-quarter, reducing manufacturing protection to that extent. The subsequent conservative Fraser Government temporarily reversed that process by introducing highly protective import quotas on cars and textiles, but then the Hawke Labor Government floated the AUD in December 1983 and introduced major microeconomic reforms. Those reforms included programs to phase out import tariff and quotas and production and export subsidies by the new millennium (which raised the share of exports in GDP by almost two-fifths Table A16). Thus throughout all but the last of the 20<sup>th</sup> century manufacturing was protected and the agricultural sector as a whole was strongly discriminated against by Australia's trade-related policies (Anderson, Lloyd and MacLaren 2007, Lloyd and MacLaren 2015b), as reflected in the estimated Relative Rates of Assistance shown in Table A9. Yet within that broad picture, these estimates suggest grape and wine producers received relatively favourable treatment throughout the last century.

Protectionism in general leads to an inefficient allocation of the nation's resources, is taxing of consumers, and inhibits innovation and productivity growth, and the same could be argued about supports for Australia's wine industry. By discouraging imports and raising wine prices, consumers drank less wine and were less aware than they would have been of the wide range of qualities and varieties of wines and brandies available elsewhere. Those policies, together with government assistance to fortified wine exports in the interwar period, also lowered the incentive for producers to raise their productivity and specialize in the wines in which they were most competitive globally. It was only when those policies were phased

out from the mid-1980s that the wine industry became far more dynamic, innovative, and internationally competitive – notwithstanding the recent slump.

Before turning to the question of what the next phase of the industry's development might look like (Chapter 4), it is helpful to pause to examine in more detail the evolution of the industry to date in terms of regional and varietal diversity and specialization (Chapters 2 and 3 respectively).

## Annex to Chapter 1: Conceptualizing the market for a nation's wine

It is helpful to view the national market for Australian-produced wine at any point in time as in Figure A1, where for simplicity's sake it is assumed the product is homogeneous, there are no marketing/distribution margins, and:

- $S_d$  is the quantity of Australian wine available for sale at different prices (the industry's cost curve);
- $D_d$  is the quantity of Australian wine demanded domestically at different (excise tax-inclusive) prices;
- $D_x$  is the quantity of Australian wine demanded abroad at different (ex-winery) prices; and
- $D_t$  is the horizontal sum at each price of the quantity on the  $D_d$  and  $D_x$  curves, which therefore kinks to become flatter at K.

Equilibrium in this market is at point E, where the price is P, the quantity sold on the domestic market is  $Q_d$ , the total quantity sold is  $Q_t$ , and the quantity exported is  $Q_t - Q_d$  (call it  $Q_x$ ).

The industry's direct contribution to the national economy's Gross Domestic Product (GDP) that year is represented by the triangle P'EP, where P' is the price below which no domestic wine would be produced. This area represents the industry's 'value added' over and above all its costs of production including for grapes, those costs being represented by the area P'EQ<sub>t</sub>O. The industry also contributes to consumer welfare, which is determined by the consumers' willingness to pay. In Figure A1 the triangle PJP'' represents domestic consumer welfare.

Historical data on wine production and export volumes ( $Q_d$  and  $Q_x$ ) are available. But since in practice this product is very heterogeneous – even between what is sold domestically and what is exported – it is not very meaningful to seek average wine price data. In any case such data are not readily available, except for wine exported or imported where the unit value can be derived from trade volume and value data.

### *Drivers of the market for domestically produced wine*

What are the most likely shifters of the curves in Figure A1 and hence the main drivers of the industry's trends, fluctuations and structural changes? They include but are certainly not limited to changes in the following:

#### *Domestic supply curve, $S_d$*

- Price of domestic grapes for non-wine use (table/fresh, drying, juice)
- Price of imported bulk wine for blending with wine produced from domestic grapes
- Aust R&D investment (or spill-in from R&D abroad)
- Temporary yield reductions such as due to diseases or bad-weather events
- A rebate on excise taxes
- Price and availability of vineyard irrigation water
- Opening stocks-to-sales ratio

- Investor incentives from government (e.g., accelerated depreciation of capital expenditure for income tax purposes)
- Boom/slump in sectors producing other tradable products
- Import protection for sectors producing other tradable products
- Interest rate

*Domestic demand curve,  $D_d$*

- Australia's adult population, age distribution, and tastes/preferences
- Australia's per capita income
- Excise taxes (and any associated rebate) on wine and on other alcoholic beverage substitutes
- Generic and brand promotion domestically
- Domestic retail and hospitality regulations and responsible drinking rules such as drink-driving laws
- Domestic consumer prices (in AUD) of wine imports, which depend on import tariffs or other restrictions at Australia's border (which can vary by source and may be zero under bilateral preferential arrangements, and may also be subject to a rebate on the domestic excise tax or its equivalent, as currently for New Zealand wineries)
- Domestic promotion of imported wines

*Export demand curve,  $D_x$*

- Competition in 3<sup>rd</sup>-country markets from other wine-exporting countries, which depends on their:
  - investments in R&D and in promotion (or their spill-in from Australian R&D)
  - currency's real exchange rate (which can be affected by a boom/slump in their other tradables' sector)
  - diseases or bad-weather events
  - interest rate
  - subsidies to their production, distillation or exports, or for removal of vines
- Per capita income and taste/preference changes abroad
- Generic and brand promotion of Australian wine abroad
- Retail and hospitality regulations and responsible drinking rules abroad
- Import restrictions abroad (including any preferential or discriminatory access to foreign markets relative to competitors)
- Export bounties/subsidies
- Ocean transport and intercontinental communication costs relative to competitors
- Stevedoring and other costs of getting from the winery to being on board the ship (depends on internal transport and port infrastructures)
- Institutions such as export inspection services and foreigners' unique labelling laws and technical standards

***Drivers of supply of domestically produced winegrapes***

The demand curve for winegrapes is of course derived from the demand curve for wine, while the supply curve for winegrapes is a function of not only their price but also, in the case of multipurpose grapes, their price for non-wine uses (table/fresh, drying, juice) and of crucial variable inputs such as irrigation water. The interaction of those winegrape demand

and supply curves determines the equilibrium quantity and price of domestic winegrapes at any point in time.

Available indicators of that quantity are the volume of grapes delivered to or crushed by wineries. Where gross value data also are available, the average price or implicit unit value of winegrapes crushed can then be calculated.

For earlier periods when even grape crush volume data were not recorded, the area of vineyards provides a (cruder) indicator of the marketed quantity. Insofar as some vineyards are not bearing in any year (too young, too old, diseased), the vine bearing area would be a less-exaggerated indicator of winegrape quantity – but it is still exaggerated to the extent that not all grapes are used in wine production.

Since grapes are a perennial crop involving a high-cost up-front investment with no yield for the first two or three years, and the future demand for grapes is uncertain, the decision as to whether, when and how much to expand or contract plantings is complex. It depends on expected prices and interest rates, but producers will vary in their expectations. Hence if an expansion or contraction is to occur, it will tend to happen only gradually as more and more become convinced that a change in prices will persist long enough to be worth responding to (Dixit and Pindyck 1994). Meanwhile, the actual price of grapes will move away from its trend level while this slow supply adjustment is occurring and then gradually move back to trend as the last of the adjustment occurs. Should there be excessive exuberance on the part of investors in response to high winegrape prices, and firms have incomplete information on the extent of new investments by other firms, there is a risk of overshooting in aggregate, which will then be followed by a sharp fall in grape prices three to five years later once that excessive planting transposes into excessive wine ready for sale.<sup>37</sup> For this reason it is helpful to have an up-to-date time series of winegrape prices so as to foresee changes in the need for further adjustment.

### ***Economywide drivers of domestic supply of and demand for winegrapes and wine***

Wine is only a very small part of the exports or imports of almost all countries, including Australia. Booms or slumps in the wine industry therefore have very little macroeconomic impact. The reverse is not true though: macroeconomic changes can have major impacts on the wine industry. Growth in income per capita and adult population boost domestic demand, and the business cycle leads to fluctuations in income and thus consumer spending around their long-run trend. Since wine has a relatively high income elasticity of demand, such fluctuations can cause non-trivial shifts in the demand curve for wine.

If there is a boom in one of the economy's main tradable sectors, that strengthens the country's real exchange rate and draws resources to that sector, and to the sectors producing nontradables such as services, and thus away from other sectors producing tradables, including therefore wine. It also raises national income and so boosts the domestic demand for both locally produced and imported wines. Together those forces reduce the volume of wine exported and the domestic-currency price of those exports, and hence their aggregate

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<sup>37</sup> The 3-5 year delay between new planting and extra wine for sale, and the fact that many producers expand their vine area with less than full knowledge of the extent to which others are expanding at the same time, have been *for at least two millennia* the reasons behind grape and wine market cyclicity (Unwin 1991, pp. 359-60).

value – and conversely if there is a slump in one of the economy's main tradable sectors (Corden 1984). Such a boom in a key export sector could be supply driven (e.g. the discovery of a mineral or energy raw material deposit), or demand driven (e.g., a rise in the international price of that sector's output). In the latter case it will show up as an improvement in the country's commodity terms of trade and encourage new investment in that booming sector. The more the funding for that new investment comes in from abroad, the earlier and larger will be the initial appreciation in the real exchange rate, before it depreciates as the boom moves from its investment phase to its export phase and begins returning dividends to the foreign investors (Freebairn 2015).

In addition to those cyclical forces, long-run economic growth at home and abroad alters a country's comparative advantages. According to trade theory, we should expect agricultural trade to occur between relatively lightly populated economies that are well-endowed with agricultural land and those that are densely populated with little agricultural land per worker (Krueger 1977). This theory is further developed by Leamer (1987), who points out that if the stocks of natural resources are unchanged, rapid growth by one or more countries relative to others in their availability of produced capital (physical plus human skills and technological knowledge) per unit of available labour time would tend to cause those economies to strengthen their comparative advantage in non-primary products. And as port etc. infrastructure is developed and costs of trading internationally fall for the country, more products would move from the nontradable to the tradable category (Venables 2004). By contrast, if key import-competing sectors are protected by barriers to imports such as tariffs, they will draw resources from other sectors and strengthen the country's currency while reducing national income. This will shift inward the curves for domestic demand for and supply of winegrapes and wine.

At early stages of development of a country with a relatively small stock of natural resources per worker, wages would be low and the country is likely to have an initial comparative cost advantage in unskilled labour-intensive, standard-technology manufactures. Then as the stock of industrial capital grows, there would be a gradual move toward exporting manufactures that are relatively intensive in their use of physical capital, skills and knowledge. Lightly populated natural resource-abundant economies such as Australia's, however, are likely to have high wages and to invest more in capital specific to primary production.

The above theory of changing comparative has been used successfully to explain Asia's resource-poor first- and second-generation industrializing economies becoming more dependent on imports of primary products from their resource-rich trading partners (see, e.g., Anderson and Smith 1981). But how helpful is that theory for explaining comparative advantage in wine?

Grape-based wine is dependent on winegrapes as an input, and they are too perishable to be transported internationally without at least the first stages of processing. The lowest-quality winegrapes and wine can be produced in less-than-ideal regions and sold as an undifferentiated commodity without a great deal of knowhow, but only at prices barely above the cost of production for most vignerons. To produce a higher-quality product that can be differentiated from other wines by consumers, and thus attract a higher price, requires far more technological knowledge and skills in grape growing, wine making and wine marketing in addition to access to high-quality vineyard land or at least grapes therefrom. To be economically sustainable the producer also needs ready access to financial capital to cover

the very considerable up-front establishment costs and to finance the years when receipts fall short of outgoings, including the first seven years before cash income begins to exceed cash outlays. Secure property rights over the vineyard land are essential as well, since the lifetime of vines is at least 30 years and can be much longer.

Of particular importance as determinants of a country's competitiveness in producing wine rather than other farm products are the three T's of terroir, traditions, and technologies.

Terroir refers to various pertinent aspects of climate, topography, soils, geology, etc. that determine the quality of the vine's growing conditions. Vineyard site selection therefore is crucial. Experience has determined the best sites and most-suitable grape varieties in long-established regions, whereas in new regions science has to be used to speed the process of approaching the potential of any region to produce quality winegrapes. The conventional wisdom is that winegrapes grow best between the 30° and 50° temperate latitude bands north and south of the equator, and where rain is concentrated in the winter and summer harvest times are dry. Lower latitudes typically result in lower-quality winegrapes, although moving to higher altitudes can help because temperatures decline about 5° centigrade per 1000 metres of elevation (Gladstones 1992; Ashenfelter and Storchmann 2014). Site selection is helped by the fact that some winegrape varieties are able to perform over a wider range of terroir than others.

Traditions determine not only how a product is produced but also the extent of local consumer demand. This is important for wine because typically local demand is the easiest and least costly for producers to satisfy, as there are relatively high fixed costs of entry into new export markets (Friberg, Paterson and Richardson 2011). Stigler and Becker (1977) argue that economists should begin by assuming tastes are stable over time and similar among people, and then focus on explaining differences in consumption patterns using standard determinants such as relative prices and real incomes. Social norms and religion can also influence interest in consumption of alcoholic beverages, and those can alter with economic integration/globalization (Aizenman and Brooks 2008).

Also, when preferences are non-homothetic, trade patterns can be affected by growth in domestic demand (Markusen 2013). The income elasticity of demand for wine is typically below one and falling in traditional wine societies, but wine tends to have an income elasticity of demand greater than one in emerging economies in which wine is exotic (Fogarty 2010). In such emerging economies its comparative advantage in wine would decline as per capita income rises unless its wine productivity grew sufficiently faster than domestic incomes, other things equal.

As for technologies, there is always potential to improve on traditional production, processing, entrepreneurship and marketing, be that by trial and error of practitioners over the generations or via formal investment in private and public research and development (R&D). The New World wine-producing countries have been more dependent on newly developed technologies and less on terroir than have producers in Europe, although both sets of countries have made major R&D investments – and expanded complementary tertiary education in viticulture, oenology and wine marketing – over the past half-century (Giuliana, Morrison and Rabellotti 2011). Those technologies potentially are transferrable to other countries and can even become globalized, as has happened with grain technologies (Olmstead and Rhode 2007). That innovation process has been greatly accelerated over the past two decades through two mechanisms. One is the emergence of fly-in, fly-out

viticulturalists and winemakers from both Old World and New World wine-producing countries (Williams 1995). The decline in airfares has made it far more affordable for young professionals to work in both hemispheres each year, doubling their vintage experiences and learning and spreading new technologies quickly. The other mechanism is via foreign direct investment joint ventures: by combining two firms' technical and marketing knowledge, the latest technologies can be diffused to new regions more rapidly.

How important modern technologies are relative to terroir in determining wine comparative advantage is a moot point. One recent statistical study suggests terroir is not as dominant as is commonly assumed – even in regions as established as Bordeaux (Gerguad and Ginsburg 2008). Another study, of vineyard sale values in Oregon, finds that while appellation reputation has some economic value, each location's physical attributes are not closely related to wine prices (Cross, Plantinga and Stavins 2011). A recent book by Lewin (2010) begins its section on wine regions with the New World rather than the Old World, to emphasize the point that wines almost everywhere are manipulated by winemakers as they endeavour to make use of available knowledge to produce the products most desired by their customers. What they choose to produce is increasingly being affected by how they can maximize profits through satisfying consumer demand, rather than by what they prefer to make with their available resources.

New technologies in agriculture have long tended to be biased in favour of saving the scarcest factor of production, as reflected in relative factor prices. Hayami and Ruttan (1985) emphasize that the focus of R&D investments thus has been driven in part by changes in factor prices, and in particular by the rise in real wages. That has resulted in the development and/or adoption of labour-saving technologies such as mechanical harvesters and pruners for vineyards and super-fast bottling/labelling equipment for wineries in viticultural land-abundant, labour-scarce countries such as Australia. The adoption of labour-saving technologies has helped countries with the highest and fastest-rising real wages retain their comparative advantage in what traditionally had been (at least at the primary stage) a labour-intensive industry. This in turn means poorer countries need to find sources of comparative advantage other than just low wages.

Relative factor endowments affect the comparative advantage of a country in terms also of the quality of its exported products. New trade theory provide reasons to expect richer, capital-abundant countries to export higher priced, higher-quality goods (Fajgelbaum, Grossman and Helpman 2011; Nayak 2011). Care is needed when using the unit value of exports as a quality indicator though. This is because improvements in bladders for transporting wine in 20-foot shipping containers have been so great in the past decade that half of all New World wine is now shipped in bulk, up from only one-quarter in 2004 (Rabobank 2012, 2014) – and much of that change is because a rapidly rising proportion of commercial premium wine is being bottled in the destination country.

A further influence on an industry's productivity is the openness of the overall economy to international trade and investment. There is a rapidly expanding literature of industry studies based on firm-level survey data that is providing strong support for the theory (summarized in Helpman, Marin and Verdier 2008) that overall trade policy reform boosts the rate of industry productivity growth. This is relevant in the Australian context because the Labor Government from 1983 undertook major economic reforms that included floating the currency and opening the economy to allow greater international trade and foreign investment.



It appears more-productive firms are innately better at exporting, so opening an economy leads to their growth relative to the least-productive firms (Bernard et al. 2007, 2012). That leads to better exploitation of comparative advantage in terms not only of industries but also of firms within each industry. If those more-productive firms are also foreign owned, then becoming more open to foreign direct investment multiplies the gains from product trade openness. It need not be just the most-productive firms that engage in exporting though. For lower-productivity firms, incurring the fixed costs of investing in foreign markets may be justifiable if accompanied by the larger sales volumes that come with exporting. Lower trade costs will induce these firms to simultaneously export and invest in productivity (Melitz 2003, Melitz and Ottaviano 2008, and Melitz and Redding 2014).

### ***Additional drivers of industry development***

This conceptual framework is based on two important assumptions requiring qualification: that wine is a homogeneous product, and that there is no value chain of distribution activities.

In practice of course wines are extremely heterogeneous, and are made more so in the eyes of consumers by wine writers and via private promotional investments by brand owners as well as generic promotions by wine regions and nations. Such promotion aims to shift the demand curve to the right and make it steeper (less price-elastic) so as to raise the price received by the producer and make demand less responsive to prices of substitutes.

The fact that there are other players along the value chain between the producer and the final consumer would not be an issue if those players were perfectly competitive, other than that the cost of their services would be built into the retail price. But where any player such as the wholesaler, exporter, foreign importer/distributor or retailer has some monopoly power, they can reduce the price received by the producer and, if that difference is not passed on to the final consumer, reduce the quantity demanded. The recent concentration of supermarkets in Australia and elsewhere, the oligopolistic nature of distribution in each of America's states, and the monopolistic retailing of wine by the governments of some Nordic countries and Canada, are all examples of such imperfect competition reducing the demand for or at least the producer price of wine, and hence also of winegrapes.

### ***Summary of drivers of industry development***

The above framework suggests that the area planted to winegrapes and the subsequent national production and export of wine will respond positively to the following changes in the three sets of drivers:

#### **(a) On the supply side:**

- A fall in demand for/price of domestic grapes for non-wine uses
- A fall in the price of bulk wine imported for blending with local wine
- More grape and wine R&D investment (or spill-in from R&D abroad)
- A fall in the price and/or an increased allocation of vineyard irrigation water
- A rebate on wine excise taxation
- A devaluations of the exchange rate (prior to the flexible exchange rate regime)
- A fall in the wine stocks-to-sales ratio
- More investor incentives from government (e.g., via income tax concessions; or the opposite if incentives to dis-invest are introduced, such as a vine-pull subsidy)

- A cost-reducing technological improvement such as eradication of a domestic grapevine disease
- A supply- or demand-induced slump in sectors producing other tradable products
- A decrease in import protection for sectors producing other tradable products
- A fall in interest rates and/or a greater willingness of banks to lend to the industry

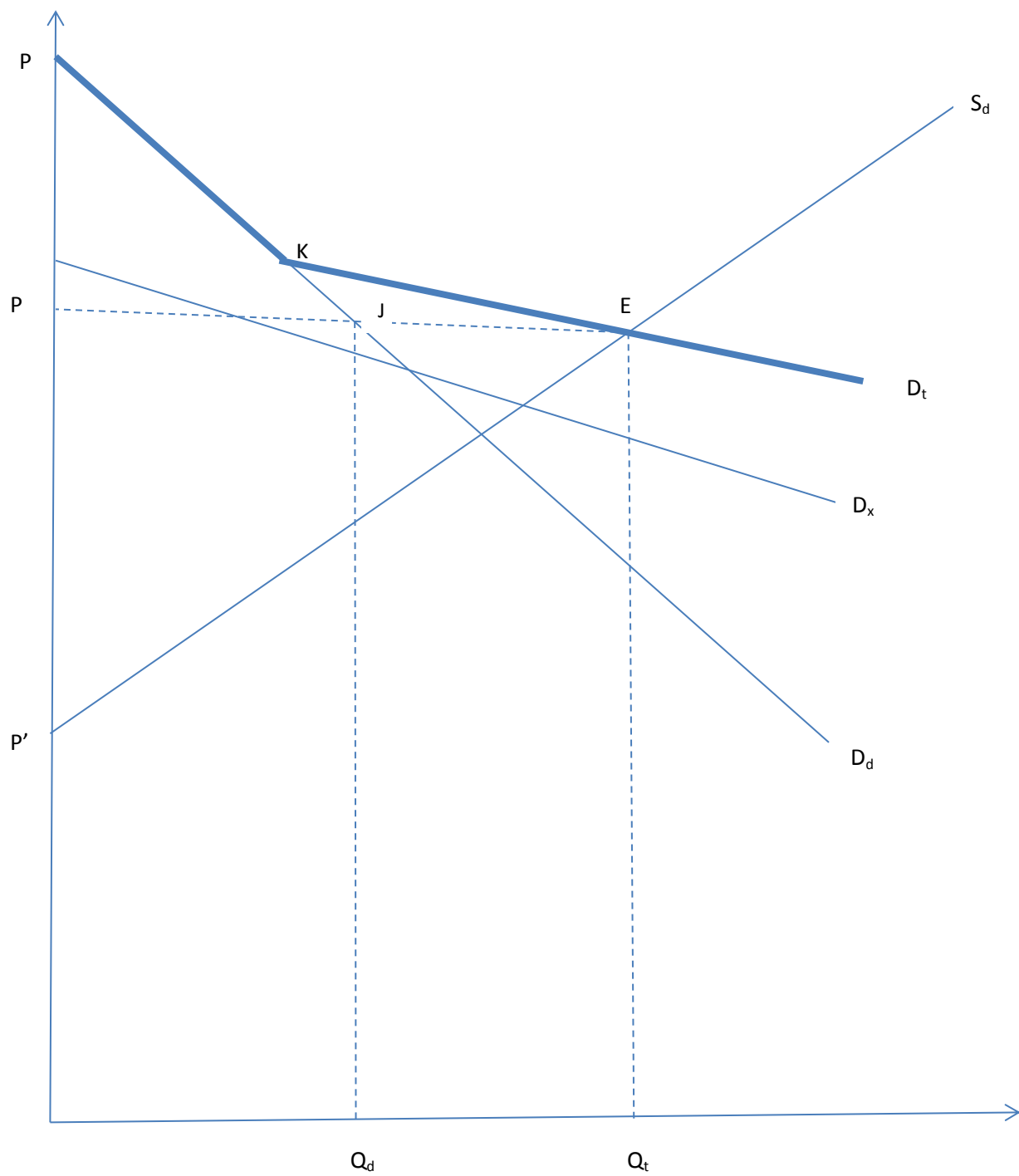
(b) On the domestic demand side:

- A rise in the adult population and its average age
- A change in tastes/preferences toward domestic wine
- A change in tastes/preferences against imported wine
- A rise in per capita income
- A fall in excise taxes on wine
- A rise in excise taxes on alcoholic beverage substitutes for wine
- A rise in competing countries' costs of producing wine imported by Australia
- An increase in generic and/or brand promotion of local wine domestically
- A decrease in generic and/or brand promotion of imported wine
- A relaxation of retail and hospitality regulations inhibiting domestic wine sales
- A rise in wine import barriers
- A fall in the excise tax rebate currently provided to New Zealand wineries

(c) In actual or potential export markets:

- A rise in the adult population and its average age
- A change in tastes/preferences toward wine
- A rise in per capita income
- A fall in excise taxes on wine
- A rise in excise taxes on alcoholic beverage substitutes for wine
- An increase in generic and/or brand promotion of Australian wine
- A decrease in generic and/or brand promotion of non-Australian wine
- A relaxation of retail and hospitality regulations inhibiting wine sales
- A fall in wine import barriers (including any preferential access for Australian wine over its competitors)
- An increase in any Australian export bounties/subsidies
- A fall in ocean transport and intercontinental communication costs (including relative to competitors) and a rise in speed and quality of transport services
- A fall in stevedoring and other costs of getting from the winery to the ship
- A real depreciation of the AUD against the importing country's currency
- A real appreciation of the currency of competing exporters against the importing country's currency
- An increase in production costs, or a decrease in investments in grape and wine R&D, in the importing country or competing exporting countries
- Diseases or bad-weather events in the importing country or in competing exporting countries
- An increase in interest rates and/or a lesser willingness of banks to lend to the industry in the importing country or in competing exporting countries
- A decrease in subsidies to production, distillation or exports in competitor countries
- A reduction of costs associated with Australian exporters meeting labelling laws and technical standards in importing countries

Figure A1: Market for a nation's domestically produced wine



# Chapter 2:

## Regional developments from the late 20<sup>th</sup> century

### 2.1 Introduction

The Australian wine industry's export-led growth and quality upgrading since the 1980s has added remarkable wealth and vitality to many rural regions of Australia. It has also altered the characteristics of grape and wine production in those various regions. This Chapter summarizes the more-easily measured of the industry's regional economic contributions. Other contributions multiply those regional benefits, including to the complementary restaurant, accommodation and other tourist-related industries, and to input-supplying industries such as bottle producers, designers and printers of labels, and transport firms.<sup>38</sup>

This Chapter also summarizes some key characteristics of the industry at the regional level. In doing so it reveals the increasing distinctiveness of the various wine regions as they seek to add value by differentiating themselves from each other and from producers abroad.

One reason for compiling regional data is because regions are investing increasingly in their own promotional efforts, as a supplement to national generic promotion through the Australian Grape and Wine Authority and its predecessors. Pressures to move in that direction have intensified in recent years as the Australian dollar strengthened as a result of a boom in mineral and energy raw material exports, and as competition from other New World suppliers intensified.

Another reason to focus on regional differences within the industry is to assist producers in each region to develop strategies to adapt to climate change and associated developments in water markets. Changes such as rising mean temperatures, a greater frequency and intensity of extreme weather events, changing precipitation patterns, and widening fluctuations in irrigation water prices and availability are altering over time the optimal methods of production and possibly even the optimal regional location for producing particular varieties of winegrapes (see, e.g., Webb 2006 and other references cited in Anderson et al. 2008). For that reason we highlight climate zones in addition to geographic regions: each region is classified, according to the region's average January and February

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<sup>38</sup> In this chapter we resist the temptation to use input-output multiplier analysis, since it necessarily exaggerates an industry's contribution. In a report to New Zealand Winegrowers by Ballingall and Schilling (2009), for example, it is claimed that every extra dollar of value added by the wine industry creates an extra \$2.34 of national GDP (and every new wine industry job creates also 1.79 new non-wine jobs) via other industries. But if every industry did such partial analysis and the direct and indirect contributions of all industries were summed, the total would be several times national GDP and employment, which clearly makes no sense. It is conceivable that, as O'Mahony et al. (2006) find, wine cellar door visits boost the quantity and average price of customers' future wine purchases, but such contributions will be captured in the value of future wine sales and so it would be double counting to include them in any estimate of current contributions.

temperatures and growing degree days (Webb 2006, pp. 239-40), as belonging to one of three viticultural climate zones as defined at the bottom of Table 45 and detailed in Table 46: hot, warm or cool.<sup>39</sup>

Economic modeling of the Australian economy also can benefit from more disaggregated data by sector and region. Recent software developments and the rise in computer memory allow economy-wide models to be targeted for analysis of particular industries however small, and to focus specifically on their regions of production (Horridge and Wittwer 2008). The prime limitation these days for model analysis of small industries is therefore not computer software or hardware but rather the availability of disaggregated data of sufficient quality. A side benefit of this Chapter is that it provides insights into the quality of data currently available for regional modeling of Australia's wine industry (a prototype analysis being Anderson, Valenzuela and Wittwer 2011).

After discussing the sources of data in the next section, the following sections first examine the regional contributions of the Australian wine industry before moving on to explore the regional diversity of the industry. As in the previous chapter, numerous charts and tables are referred to in the text to support the findings. They are followed by a series of tables which provides one page of statistics for each of the 27 major wine regions plus a summary one for each State and for each of the three climate zones identified: hot, warm and cool (see Tables 78 to 121).

## 2.2 Sources of regional data

Wine industry data at the regional level have been available from various sources, but the coverage has been sporadic and the regional definitions have varied widely across the different sources and over time. Basic vine area, production and yield data are available by State back to the 1974 (Table 7) and by broad regions back to 1979 (Table 52), but more-detailed regional data begin in 2001 (Table 53). The most reliable employment data come from the Australian Bureau of Statistics (ABS) censuses, which are conducted every five years with the most recent ones being for the 2005-06 and 2010-11 financial years (and so covering the 2006 and 2011 vintages). The ABS also conducts annual industry surveys and reports those data the following year in industry and other publications. More-detailed data are made available on-line, including for various levels of regional disaggregation. States are divided into Statistical Divisions, Statistical Sub-Divisions (SSDs), and Statistical Local Areas (SLAs, of which there are just over 1400 nationally). SLA data on vineyards and other agricultural activities as of 2005-06 are available in ABS (2009), for example.

For present purposes we focus initially on 27 Statistical Sub-Divisions (SSDs) as defined by the ABS for ABS data, plus some more-disaggregated regions for AGWA data. The 27 SSDs are home to around half of the wine industry's Geographical Indications (GIs), which comprise 65 homogeneous areas legally defined for marketing purposes by AGWA's Geographical Indications Committee (see the map showing all GIs, Chart 56).<sup>40</sup> Each of our

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<sup>39</sup> The beneficial effect of a large diurnal temperature range also was considered, but it did not cause any change to the above classification of regions into hot, warm or cool. A finer classification could identify 'very cool' regions, but to date they comprise only a very small share of Australian winegrape production.

<sup>40</sup> For a description of the main wine regions prior to GIs, see, for example, Halliday (1998) and Beeston (1999).

selected 27 SSDs correspond closely to one or more GIs, and the 34 GIs thereby covered (see Table 45) account for all but one-tenth of the nation's vineyard area.<sup>41</sup> Those SSDs account for one-ninth of national GDP and population. As well, services associated with the wine industry are important in urban areas, for example in shipping activities at the major ports of Adelaide, Melbourne, Perth and Sydney as well as in the head offices of major wine companies in those cities.

The 2006 ABS census data are incorporated in the database of a regional multi-sectoral model of the Australian economy known as TERM and developed by Victoria University's Centre of Policy Studies (Horridge and Wittwer 2008).<sup>42</sup> That database is the source of comparative information reported below on the industry's contribution to regional employment, gross value of production and value added (GDP). Vine area, grape and wine production quantities, and number of establishments in the grape and wine business are from the latest annual survey data reported in ABS Catalogue No. 1329.0.

The ABS does not publish comprehensive price data, but since 1999 the industry itself has been conducting a series of State-based annual winegrape price and utilization surveys. The average price data and crush volumes from those surveys, and the dispersion of winegrape prices around mean levels in each region, are now made freely available online, in a PDF report and an Excel file, at [www.agwa.net.au/winefacts](http://www.agwa.net.au/winefacts) (see AGWA 2014a). In addition, AGWA reports online the distribution of prices for wine exports.

## **2.3 Regional differences and their contributions**

Changes since 2003 in the major regions' shares of the national vine area are shown in Chart 58. Some areas have increased their share a lot (Coonawarra, Adelaide Hills, Riverina) while others have seen their share fall (most notably the Murray Darling region of Victoria).

The previous chapter provided production details for the various States of Australia, but it does not give precise indications of the climatic differences across Australia's wine-growing regions. Just under one-third of South Australia's winegrape vineyards are in the hot Riverland region. In both NSW and Victoria three-fifths of their areas were in that hot zone (Riverina and Murray Darling/Swan Hill) in 2006 and the combined share had risen to two-thirds by 2012. The increase was mostly in the Riverina region of NSW, making possible the huge expansion in sales to the United States and elsewhere of Casella Wines under the Yellowtail label, while in Victoria the hot region area shrunk from 60% to 46%. Together with a small area in southern Queensland and the Swan District near Perth, those hot zones accounted for 48% of the country's winegrape area in 2001, 46% in 2006, and 42% in 2012. Another 42% of the area comprises warm zones. The cool regions, such as the Adelaide Hills, Tasmania, Mornington Peninsula and Yarra Valley, accounted for 12% of the bearing area in

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<sup>41</sup> Further disaggregation proved to be not sensible for ABS data because the concordance between the other smaller GI regions and one or more SSDs or SLAs is very poor, thanks to overlapping boundaries. Even for the chosen GIs the concordance is not always great. For example, the McLaren Vale GI is a small part of the Southern Adelaide SSD which includes a large and rapidly increasing amount of urban activity.

<sup>42</sup> This is a bottom-up regional model. A top-down regional model has also been developed for wine industry analysis, based on the ORANI-G model (Horridge 2000).

2006, but those regions expanded their plantings by two-fifths over the first decade of this century and comprised 15% of the national area by 2012 (Tables 45 and 50).

Tasmania is the coolest region, and its share of the national winegrape area was less than 0.2% in 1990, but it rose to 0.5% in 2001 and 0.8% by 2012. With less than 1% of Tasmania's crop area devoted to vineyards, it still has enormous potential to expand, should climate change encourage more growers to move to higher latitudes. There is also the option of moving to higher altitudes such as in the Adelaide Hills: by 2008, 30% of that region's crop land was under vines, from virtually zero in the early 1970s. The cool regions' share of winegrape production has grown less rapidly – and been more volatile – than its share of vine area though (Table 54 and Chart 57). This is because yields per hectare typically are lower and more variable in cooler regions: during 2001-12 they averaged 6.9 t/ha (and just 6.0 in Tasmania), compared with 7.3 t/ha in warm regions and 14.8 t/ha in hot regions (Table 55). Higher prices compensate more or less for the lower yields, with Tasmania's average ranging between \$2400/t and \$2600/T between 2005 and 2013 (Table 57). The average grape price for all cool regions in 2008 was one-quarter above that for warm regions and almost three times above that for hot regions (Table 74).<sup>43</sup>

Regions vary hugely in the vine intensity of their cropping, defined as the share of vines in the region's total crop area relative to that share nationally. Nationally, vineyards account for just 0.7% of the total crop area at its peak around 2006 and was down to 0.46% by 2012; but in most wine regions the share is at least several percentage points. For the majority of the 27 wine regions it is more than six times the national share (Table 58), and more than 40 times for four regions (McLaren Vale, Yarra Valley, Margaret River and Adelaide Hills). By contrast, the Clare Valley and the Canberra District are even less vine intensive than Tasmania (Chart 599). By State, South Australia has been the most vine intensive since the early 20<sup>th</sup> century, although Tasmania surpassed it during 2007-10 (Table 5) and may again very soon.<sup>44</sup>

Regions also vary hugely in their yields per hectare, with some less than 5 tonnes while others are more than 15 tonnes. In 2012 most regions had lower yields than in 2001 even though the national average yields were almost the same in those two vintages (10.7 and 10.9 tonnes, respectively). That was because a few of the large hot regions had much higher yields per hectare in 2012 than in 2001 (Chart 60).

Those higher yields have gone at least some way toward offsetting the opposite trend in winegrape prices. Prices were lower in 2013 than a decade earlier in virtually all but the premium cool-climate regions, and the proportional fall was especially large in the four large hot regions (right-hand side of Chart 61). In 2008, the mid-point of that period, two-thirds of all winegrapes were sold in the \$400 to \$650 per tonne range, but by 2014 most were sold at less than \$450. In both years, only 2% of sales were above \$1550 per tonne (Chart 62). The average price in 2014 was \$441, halfway between the averages for red and white winegrape varieties (\$540 for reds, \$340 for whites).

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<sup>43</sup> The cool regions' share of the national value of grape and wine production was just under one-tenth in 2006, compared with just under one-quarter for the hot regions and two-thirds for the warm regions (Table 69). The hot regions' share would be slightly less if grapes used for non-wine purposes were excluded, since almost all of them are grown there (Tables 75 and 76) and yields are higher for non-wine grapes than for winegrapes (compare Tables 55 and 77).

<sup>44</sup> A change in definition of crop area in 2011 led to its measured increase in all states but more so in Tasmania than other states (see Table A3).

Despite their low prices, the massive volumes of production in the hot regions are enough to ensure that they comprise four of the top five regions in terms of gross value of winegrape production. The Barossa Valley is ranked 3<sup>rd</sup> by that criterion, while McLaren Vale and Margaret River take 6<sup>th</sup> and 7<sup>th</sup> place (Chart 63).

A similar ranking applies with respect to the contribution of the industry to regional and national employment (Chart 64). The numbers of grapegrowing establishments in each region is shown in Table 62. For almost all regions the industry's share of regional employment is more than twice the national average, and for nearly half of them it is more than ten times (Tables 63 and 67). The share is much higher for employment than for the number of establishments in some regions (Barossa, McLaren Vale, and the region near Mildura in Victoria), where some large wine companies dominate. By contrast, in South Australia's Riverland the industry's regional employment share is much smaller than the establishment shares, reflecting the fact that large vineyards using labour-saving mechanical pruning and harvesting predominate and much of the processing of Riverland grapes is done in the Barossa. These differences in employment and establishment shares also reflect the fact that there is a very uneven distribution of wineries across Australia in terms of tonnes of grapes crushed: in 2012, 70% of wineries crushed less than 25 tonnes each, and only 4% crushed more than 100 tonnes (Table 66 and Chart 43). The same is true of the national share of vine area (Table 65).

The other resource whose employment varies greatly across regions is irrigated water use. Unfortunately comprehensive data are not yet available at the wine region level, but even at the state level the differences are large. In 2006 vineyards accounted for almost one-quarter of agricultural water use in South Australia but for only 6% nationally and less than 1% in Tasmania and Queensland. When differences in wine production are taken into account, Victoria is a much heavier user than South Australia per litre of wine produced, but perhaps that is because some of the grapes around Mildura are processed in South Australia. When expressed per dollar of gross value of agricultural production, Victoria and South Australia are close to the national average whereas New South Wales is 50% higher while Western Australia and Tasmania are only a small fraction of the national average. Compared with other farm enterprises, water use per litre of production value for grapes is greater than for other fruits or for vegetables but it is much less than for sugar, cotton, rice or dairying. And in aggregate terms, grapegrowers use less than all those enterprises except vegetable growing. New South Wales is the only state still a significant user of flood irrigation to water vines (Table 68).

Turning to output contributions of the industry, in 2006 and 2011 grapes accounted for around 1.5% of the gross value of all agricultural value added (GDP), but in wine regions their shares are more than three times larger on average – although much less so in 2011 (a very cool and damp summer and hence a poor vintage) than in 2006 (Table 70 and Chart 65).

Regions also vary in the extent to which their wineries are export focused. Since 1870 South Australian wineries have always been the most export-focused (Table 14). In recent decades that State has accounted for the processing of around 70% of the country's total export volume, although New South Wales and then Victoria have increased their shares a little since 2000 (Chart 27). Some of South Australia's exported wine is based on grapes grown across the border, however, particularly in the Sunraysia region around Mildura.



Data are available on the distribution of winegrape prices within each region (AGWA 2014a). Those price and quantity data, when multiplied, provide value data too. They are summarized in Tables 72 to 74 by dividing the spectrum of prices in the 2008 vintage into three categories. The non-premium category is defined as grapes purchased at less than \$550/tonne, super-premium as grapes purchased at \$1200/tonne or more, and commercial premium at between \$550 and \$1199/tonne. The majority of regions supply grapes into all three categories, but a few do not supply any of either non-premium (Margaret River, Mornington, Tasmania) or super-premium (Murray Darling, Riverland, Riverina, Swan Hill and Mudgee/Cowra). Evidently, the distribution of prices tends to be further to the right the warmer the climate.

To capture the differences in quality across regions, at least as reflected in prices, a Regional Quality Index has been defined as the average winegrape price in a region across all varieties as a proportion of that average price nationally. The average prices themselves are shown in Tables 56 and 57, and the Regional Quality Indexes are reported in Table 61. The distribution of the share of winegrape production at any one RQI point is shown in Chart 66 for 2001 and 2012. That pair of graphs suggests that over that period the average price dispersion increased substantially, with the right side of that distribution's tail now stretching more. The unweighted mean value of that index rose by one-eighth, from 1.48 to 1.67.

This shift is reflected also in the increase in the coefficient of variation of the RQI across regions, from 0.31 to 0.50 over the 2001 to 2012 period. It is also reflected in the fact that of the 50% of regions whose RQI rose over that 12-year period, two-thirds of them had an index value of greater than 1.6 in 2001 and greater than 2 in 2012. None of them were hot irrigated regions (Murray Darling, Riverland, Riverina and Swan Hill, which comprise nearly three-fifths of the national crush volume). Hence the RQI for hot regions as a group has fallen slightly since the turn of the century, and that of cool climate regions has risen slightly (Chart 68). By 2013 the national average price was one-tenth lower again and price dispersion was even wider, ranging from \$320-360 in the hot-climate regions to more than seven times that (almost \$2500) in cool Tasmania and Mornington Peninsula (Chart 67(a)). The dispersion is almost as wide even for just Shiraz winegrapes (Chart 67(b)), suggesting that for versatile varieties it is regional rather than varietal characteristics that determine their quality and price.

A final indicator of the extent to which regions differentiate themselves can be found by focusing on each region's mix of winegrape varieties in their vineyards differs from the global average mix. A so-called Varietal Similarity Index (VSI), to be defined in the next chapter (together with appropriate vine bearing area data), provides such an indicator. The degree of similarity of each region's varietal mix with the global varietal mix is shown in the VSI numbers for 2001 and 2010 reported in Table 169. According to that indicator, there has been a considerable decrease in the diversity of Australia's regions in terms of their vineyards' varietal mix, relative to the global average. This is evident from Chart 69, showing all regions to have a higher VSI in 2010 than in 2001. It is also evident from the slightly narrower range and rightward-shifted distribution of those VSI numbers in 2010 as compared with 2001, depicted in Chart 70.

## **2.4 Are regional differences being recognized in the market?**

Clearly there is a great deal of wine regional diversity in Australia in terms of climate and other aspects of terroir and hence in terms of the quality mixes of the winegrapes produced, even if the varietal mix has become less diverse since the turn of the century. That also means regions are affected differently from external shocks, as shown, for example, in a quantitative analysis of the regional impacts of a fall in wine export demand and prospective wine tax changes (Anderson, Valenzuela and Wittwer 2011). This increasing diversity is what one would expect as vignerons become more familiar with the growing characteristics and potential of each region and indeed of each vineyard.

But are consumers recognizing this in terms of being willing to pay higher prices from regions that are promoted as being of higher quality? Some years ago an econometric study was undertaken to address this question (Schamel and Anderson 2003). Many consumers, especially when they are new to or inexperienced with wine, seek guidance before purchasing, for example from published ratings of wine experts. So how have expert ratings affected what consumers are willing to pay for such things as the reputation of the producing region as distinct from corporate brand reputation, or grape variety reputation, or the published ratings of wine writers/judges/critics?

The Schamel and Anderson (2003) study uses a hedonic pricing model to estimate price functions for premium wine from Australia (and New Zealand), differentiating implicit prices for sensory quality ratings, wine varieties, and regional as well as winery brand reputations over the vintages 1992 to 2000. The results show regional reputations became increasingly differentiated through time (although less so for New Zealand). In particular, during that decade cool-climate regions became increasingly preferred over other regions in Australia. The results are therefore consistent with the view that price premia can be generated through regional promotion, which suggests that the European tradition of emphasizing region in addition to nation of origin was gradually taking hold in Australia as it headed into the new millennium.

## **2.5 Which regions have adjusted most since the latest downturn?**

Australia's winegrape bearing area peaked in 2008 before shrinking gradually under the adverse economic conditions since then. Between 2001 and 2008 the cool and warm regions had the highest rates of vine area expansion (Chart 71). Cool-climate regions of other countries also expanded in the first decade of this century: in the US, the vine area increased 55% in Sonoma County of California, 108% in Oregon State, and 158% in Washington State, while New Zealand's area grew 220% (Anderson and Aryal 2013a,b). Presumably a similar force was at work in all three New World countries, namely, an increasing appreciation for finer wines as incomes and familiarity with wine grew.

By 2012, however, when Australia had almost 21,000 fewer hectares than in 2008, every State except Tasmania had seen its area shrink (Table 49). The shrinkage was least in South Australia (a 1% drop to 70,000 ha) and greatest in Victoria (a one-third drop to 24,700 ha, all but 4% of which was its hot irrigated regions). Western Australia had a one-fifth

drop to 10,300 ha, and New South Wales had a one-tenth drop to 38,300 ha. Almost none of falls were in cool climate regions, and the 9% drop in warm regions was only half as large as the 19% drop in hot regions (bottom of Table 49).

Within each of the climatic regions the change was far from uniform though. Eight cool-climate regions shrank, offsetting smaller gains in ten other cool regions (Chart 72(a)). In the hot regions, Riverina and Lower Murray had gains but they only slightly offset the losses, which were largest in the big irrigated regions along the rest of the Murray River (Chart 72(b)). As for the warm regions, the biggest losses in New South Wales were in the Hunter, Mudgee and Cowra with only a slight offset in Orange; in South Australia the adjoining regions of Langhorne Creek and Currency Creek had the largest losses (Chart 72(c)). These adjustments suggest that while climate change may have driven part of that adjustment, some was also the result of having planted in less than optimal places during the immediately preceding boom period. The lack of area reduction in regions near cities also probably reflects the fact that many small producers there are enjoying the lifestyle of being a vigneron and are willing to finance that indulgence with off-farm income or assets acquired elsewhere. The rebate on the Wine Equalization Tax of 29% on the first \$1.7 million of sales each year also has helped small wineries to stay in business.

# Chapter 3:

## Varietal developments since the 1950s

### 3.1 Introduction

Traditionally the Old World has emphasized regional differences and has restricted both the range of varieties grown in each region and the use of varietal labeling on bottles. In Australia and other New World countries, by contrast, differentiation had been mainly through varietal labelling, although gradually more emphasis has been given also to regional labelling. In both parts of the world, though, producers are also well aware of the impact climate changes (higher temperatures, more extreme weather events) are having on their winegrapes. Adaptation strategies include switching to warmer-climate or more-resilient grape varieties, and sourcing more from regions with a higher latitude or altitude to retain the firm's current mix of grape varieties. Especially in recently established regions and sites whose varietal comparative advantages are still unclear, winegrowers are continually searching for attractive and profitable varieties that do well in climates similar to what they expect theirs to become in the future. Where affordable water availability is becoming a more-important issue, the drought tolerance of varieties also is influencing varietal (and rootstock) choices.

These marketing and climate/environment adaptation needs are generating a rapidly growing demand for information on what winegrape varieties are grown where and how those patterns are changing over time. Certainly there are great books available on both the varieties and wine regions of major supplying countries, including the latest seminal ones by Robinson, Harding and Vouillamoz (2012) and Johnson and Robinson (2013). Yet none of those resources provides enough empirical information to get a clear view of the relative importance of the various regions and their winegrape varieties in the global vineyard and their changes over time. To respond to the need for more-comprehensive empirical information, a global database for 2000 and 2010 was recently compiled (Anderson and Aryal 2013a). The database includes more than 640 regions in 48 countries that together cover 99% of global wine production; and it includes more than 2,000 varieties, of which more than 1,500 are 'primes' and the rest are their synonyms (according to Robinson, Harding and Vouillamoz 2012).

This chapter draws on that newly compiled global database plus additional new Australian data to generate several indicators that capture changes over the first decade or so of this century in the varietal mix in Australia and its wine regions vis-a-vis the rest of the world. The indicators reveal that the varietal distinctiveness of Australia vis-à-vis the rest of the world, and the varietal differentiation between regions within the country, are far less than for other countries. This pattern – which has been noted several times since World War II (Hickinbotham 1947, Dry and Smart 1980) – is one that has become even more pronounced since 2000.

### 3.2 Evolution of winegrape varietal mix

As a prelude to putting Australia in that global context, it is helpful to examine the evolution of Australia's winegrape varietal mix. Annual data for the country as a whole are available from 1956.<sup>45</sup> The hectares of bearing area of each variety are compiled in Tables 122 to 126, and Tables 127-131 express them as shares of the national bearing area. Those data reveal the swings away from reds in the latter 1950s, then towards reds from the mid-1960s to the early 1980s, and again from the late 1990s (Chart 73(a)). They also reveal the move from non-premium to premium varieties:<sup>46</sup> the latter were barely 20% of the total bearing area in the 1950s, but since the turn of the century they have accounted for more than 90% (Chart 73(b) and Table 132).

The red and white split is shown in Chart 74 by main variety. Among the reds, the initial dominance of Garnache (Grenache) for port production has been gradually eclipsed first by Syrah and then also Cabernet Sauvignon, plus Merlot from the late 1990s. Among the whites, the varieties of importance for sherries, muscats and tokays dominated in the 1950s and 1960s along with Semillon. The fortified focus (and the use of multi-purpose grapes such as Sultana) was gradually supplemented with Riesling from the 1970s to the early 1990s, while Chardonnay – today's dominant white – began to make its mark only from the 1980s.

This dramatic change in the varietal mix in Australia's vineyards is reflected in the change in the country of origin of the varieties being made into wine. In the 1950s Spanish varieties made up about half of the area and French varieties just one-fifth. Today, by contrast, French varieties account for all but one-tenth of the area and Spanish varieties comprise less than 3% (Chart 75 and Table 133).

Australia was not unfamiliar with the noble varieties in earlier decades though. Prior to the subsidies and preferential tariffs into the British market provided for fortified wines in the inter-war period, the colonies had seen a wide range of traditional French varieties being introduced, first by Macarthur and very importantly in the early 1830s by Busby, and then by others. Kelly (1861) compiled a list of the main ones that were growing as of 1860 (see Table 134).

### 3.3 Emerging varieties in Australia

What about the increased plantings of so-called emerging or alternative varieties that are diversifying Australia's vineyards? Of those varieties not in the world's top 20 list and which have expanded from less than 200 bearing hectares in Australia in 2000, there are ten whose areas have grown significantly since then. But in aggregate those ten raised their share of Australia's total winegrape area between 2001 and 2010 by only 1.7% (Table 135). The eight varieties whose area in Australia expanded most over the first decade of this century are, apart from Viognier, all in the top 20 globally (Chart 76).

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<sup>45</sup> There is a data gap for the years 1967 to 1972, so trend values have been inserted for graphing purposes in the charts that follow).

<sup>46</sup> The listing of varieties in those categories is shown in Table 36.

Since there is a total of less than 50 varieties separately identified in the Australian official data though, that list in columns 1 and 2 of Table 135 excludes many of the small emerging varieties that are hidden in a residual ‘Others’ category. Even so, that ‘Others’ category accounted for just 5% of Australia’s total area in 2000 and for only 1.6% by 2010, which means the main varieties have expanded much more than lesser alternative ones. The share for Syrah alone rose 6 percentage points over that decade, while Chardonnay’s rose 5 points and the shares of Sauvignon Blanc and Pinot Gris each rose 2 points.

Fortunately the Phylloxera and Grape Board of South Australia has a much more-detailed dataset for that state (Phylloxera Board 2013), and it reveals another dozen varieties that have shown some growth between 2006 and 2012. The ABS (2012) also has provided some more varieties in its release of 2012 data. These data, shown on the right-hand side of Table 135, refer to planted area rather than bearing area, and so provide a better indicator of recent changes since newly planted vines take three years to bear. But even these data reveal that emerging varieties make up only a small fraction of 1% of the national area. The total number of varieties in South Australia with more than 0.5 hectares rose by only 20 between 2006 and 2012, from 91 to 111.<sup>47</sup>

Not surprisingly, however, these emerging varieties are being displayed on wine labels as soon as possible by producers seeking to differentiate themselves in novel ways. Hence seven of the ten varieties listed in the first two columns of Table 135, and four of those listed on the right-hand side of Table 135, are also listed by Winetitles (2014) as among the 35 most-frequently mentioned varieties on Australian bottles sold – even though those 11 varieties in aggregate accounted for only 1.4% of the value of winegrape production in 2012 (Table 136).

Thus, despite this flurry of new varieties appearing on Australian wine labels, the increase in varietal diversity of Australia’s vineyards between 1956 and 1984 had reversed considerably by 2012, as shown in the cumulative graphs in Chart 77. By then there were just 25 varieties that had shares of national area and production greater than 0.2% (Chart 78).

### **3.4 Indicators of varietal mix and quality distinctiveness**

In addition to bearing area data, the volumes of production by variety over the past six decades, and their shares of total winegrape production, are shown for each variety in Tables 137 to 141 and Tables 142-46, respectively, and their yields per hectare are reported in Tables 147 to 151. Price data by variety, available from 1999 to 2013, are reported in Tables 152 and 153, from which their value of national production is calculated (Tables 154 and 155). Those five variables by variety also are available for each Australian region, but that mega table is too large for this book and so has been made freely available online at [www.adelaide.edu.au/wine-econ/databases](http://www.adelaide.edu.au/wine-econ/databases). Also compiled are the area, production volume and yield per hectare of each of the main varieties produced in the cool, warm and hot regions (Tables 156 to 164).

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<sup>47</sup> For more on these and other emerging varieties in Australia, and on which firms have planted them, see Higgs (2010) and his updates at [www.vinodiversity.com](http://www.vinodiversity.com). Winetitles (2014) also maintains a list of the varieties included on Australian wine labels, which in 2013 amounted to 144 varieties.

It is helpful to summarize these data through calculating various indexes. In addition to regional and varietal shares, a varietal intensity index and a varietal similarity index, suggested by Anderson (2010a, 2013), are defined here. Also defined is a varietal quality index, using winegrape price as a proxy for quality.

### **3.4.1 Varietal Intensity Index (VII)**

The Varietal Intensity Index is defined as a variety's share of a region's winegrape area divided by that variety's share of the global winegrape bearing area. The Varietal Intensity Index is thus a complement to share information in that it indicates the importance of a variety in a region not relative to other varieties in that region but rather relative to that variety in the world.

Specifically, define  $f_{im}$  as the proportion of bearing area of grape variety  $m$  in the total winegrape bearing area in region or country  $i$  such that the proportions fall between zero and one and sum to one (i.e., there is a total of  $M$  different grape varieties across the world, and  $0 \leq f_{im} \leq 1$  and  $\sum_m f_{im} = 1$ ). For the world as a whole,  $f_m$  is the bearing area of grape variety  $m$  as a proportion of the total global winegrape area, and  $0 \leq f_m \leq 1$  and  $\sum_m f_m = 1$ . Then the Varietal Intensity Index,  $V_{im}$  for variety  $m$  in region  $i$ , is:

$$(1) \quad V_{im} = f_{im} / f_m$$

### **3.4.2 Varietal Similarity Index (VSI)**

An Index of Varietal Similarity has been defined by Anderson (2010a) to measure the extent to which the varietal mix of one region or country matches that of another region or country or the world. It can also be used to compare the varietal mix of a region or country over time.

The mix of grape varieties is a form of revealed preference or judgement by vignerons about what is best to grow in their region. That judgement is affected by not only terroir but also past and present economic considerations, including current expectations about future price trends plus the sunk cost that would be involved in grafting new varieties onto existing rootstocks or grubbing out and replacing existing varieties.

The index, defined in the Technical Notes on page xxiii, will be zero for pairs of regions with no overlap in their grape varietal mix, and one for pairs of regions with an identical varietal mix. For cases in between those two extremes, the index will be between zero and one. It is conceptually similar to a correlation coefficient. Like a correlation coefficient, it is completely symmetric. Thus the results can be summarized in a symmetric matrix with values of 1 on the diagonal, plus a vector that reports the index for each region relative to the global varietal mix.

The VSI, and the VII, could have been based on production rather than area data, but their comparisons over time would have been less reliable because of year-to-year variations in yield per hectare. In any case production data by variety are less-commonly available than data on bearing area.

### **3.4.3 Varietal Quality Index (VQI)**

To capture differences in the quality of the grapes delivered, which reflect consumers' and thus winemakers' willingness to pay as well as growers' willingness to accept, we generate a price-based index on the assumption that prices indicate quality. The simplest index of quality of different varieties is the ratio of the national average price for variety  $m$  to the national average price of all winegrape varieties. That has been called the Varietal Quality Index,  $VQI_m$ , where

$$(3) \quad VQI_m = (P_m/P).$$

## **3.5 The global data**

To calculate the Varietal Intensity and Similarity Indexes, data on bearing area of winegrapes are needed for the world. Such data were compiled recently by Anderson and Aryal (2013a). In the case of the European Union countries, plantings in several member countries are available from one source (Eurostat 2013), while for other countries they are typically available online from a national wine industry body or national statistical agency. The United States and Canada are key exceptions, where data are collected at the state/provincial level and only for those with significant wine production. The years included in Anderson and Aryal (2013a) correspond to the most-recent decadal agricultural census periods of the European Union, which were 1999 or 2000 and 2009 or 2010. For the non-EU countries data have been sought for the earlier year in the Northern Hemisphere and the latter year in the Southern Hemisphere. Inevitably not all other countries or regions had data for exactly those vintages, but in most cases the data refer to vintages that were only 6 months apart.

Using those raw data, the Varietal Intensity and Similarity Indexes have been assembled in comprehensive tables and figures in Anderson (2013). With the supplementary data for Australia on production volume and average price by variety and region, we are also able to calculate the Varietal Quality Index.

## **3.6 Australia's varietal distinctiveness globally**

It is possible to draw distinctions in terms of the varietal distinctiveness of Australia's vineyard bearing area vis-à-vis the rest of the world's, and the varietal differences between regions within the country and their changing varietal intensities.

### **3.6.1 National varietal distinctiveness**

The Varietal Similarity Index or VSI between Australia and the world, was 0.45 in 2000 but it rose to 0.62 by 2010 (Table 165), indicating a substantial drift in Australia's varietal mix toward the world aggregate mix over that decade. Meanwhile, the average of the VSIs for all other countries in the sample is much lower and hardly changed, at 0.35. In other words, Australia was much less distinct than the average country in its varietal mix in 2000, and its



distinctiveness became even less so by 2010.<sup>48</sup> Since France is the country whose varietal mix is most similar to the world mix, this means in effect that Australia has become more like France: the two countries had a VSI of 0.47 in 2000 and 0.58 in 2010.

A key reason for Australia's varietal mix becoming more like the global mix has to do with Shiraz, or Syrah as it is called in most other parts of the world. The popularity which Australia brought to Syrah in the 1990s has led to many other countries expanding their plantings of this variety. In 1990 there were barely 35,000 bearing hectares, making it 35<sup>th</sup> in the area ranking of all winegrape varieties globally. But by 2000 there were 102,000 hectares, and by 2010 that had risen to 186,000, bringing Syrah to the 6<sup>th</sup> position on that global ladder and less than one-third below the areas of the two now-most-widespread varieties, namely Cabernet Sauvignon and Merlot. Over the decade to 2010, the Syrah area grew more than either Cabernet or Merlot – in fact only Tempranillo expanded faster globally (Chart 80). Certainly Australia contributed to that expanding area of Syrah, but expansion was even greater in France and Spain. There were also large plantings in other key New World wine countries, and in Italy and Portugal (Chart 81). As a result, Australia is no longer as globally dominant in this variety: its share of the global Syrah area has dropped from 29% in 2000 to 23% in 2010 – even though Syrah has increased its share of Australia's own vineyards over that decade, from 22% to 28% (the next-nearest countries being South Africa and France, with 10% and 8% of their vineyards under Syrah, respectively).

A further reason Australia's varietal mix has become more like the world's has to do with the large declines in some of the main varieties traditionally used for producing non-premium wines in the Old World (Airen, Grasevina, Mazuelo), the first two of which are not grown in Australia and Mazuelo (locally known as Carignan Noir) has had only a tiny presence. Three other low-valued traditional varieties that have declined globally, Garnacha Tinta, Sultaniye and Trebbiano, have declined in Australia also, again contributing to Australia's lack of distinctiveness vis-à-vis the rest of the world.<sup>49</sup>

In 2000 Australia had a higher share of its winegrapes under varieties of French origin than any country other than New Zealand and South Africa (74%), and in 2010 its share was even higher at 88%, just below China, Chile and New Zealand. (Between 2000 and 2010 the winegrape area devoted to varieties of French origin rose from 26% to 36% globally: from 20% to 27% in the Old World and from 53% to 67% in the New World's vineyards – see Anderson (2013, Tables 21 and 22).)

This is not to say that Australia is not highly ranked in terms of the global bearing area of certain varieties. On the contrary, in addition to some unique varieties developed in this country such as Tarrango, Table 166 reveals that among the varieties whose share of winegrape area in Australia exceeds that of the world (i.e., they have a VII > 1) there are ten in which Australia ranks 2<sup>nd</sup>, five in which it ranks 3<sup>rd</sup>, and three in which it ranks 4<sup>th</sup> globally. Australia also ranks in the top five for a further eight varieties whose VII is less than one.<sup>50</sup> But other key wine-producing countries also rank highly for handfuls of varieties, so Australia is not unusual in this respect either. Details of the VII for each region are presented in Table 167 based on area and Table 168 based on production volume.

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<sup>48</sup> New Zealand, by contrast, had a VSI with the world of 0.34 in 2000, which fell to 0.30 by 2010.

<sup>49</sup> Two-thirds of what has disappeared as a winegrape in Australia since 2000 is Sultaniye (Sultana), whose area globally fell by three-quarters over the 2000-10 period.

<sup>50</sup> Dolcetto (2<sup>nd</sup>), Nebbiolo and Monastrell (3<sup>rd</sup>), Touriga Nacional and Tribidrag (4<sup>th</sup>), and Chenin Blanc, Cot and Tempranillo (5<sup>th</sup>).

### ***3.6.2 Regional differences in the varietal mix within Australia***

Varietal differences between regions within Australia are more muted than is the case within other countries – notwithstanding the very large differences in growing conditions across Australia. Bear in mind that it is possible for the VSI for a country vis-à-vis the world to be high but the VSI of each region in that country vis-à-vis the world to be low. In France for example, where each region is required by law to grow only a small number of varieties that have been designated as most suitable for that region, the average of its regional VSIs of 0.29 is well below France's national VSI in 2010 of 0.72 vis-a-vis the world's varietal mix (which is the highest in the world, because so many other countries have adopted varieties from France's various diverse regions). In Australia, however, the average of its regional VSIs in 2010 of 0.53 is not much below Australia's national VSI of 0.62 (Table 169), and it is almost double the average regional VSI of other countries in the sample (including New Zealand's, which is 0.37). Moreover, in 2010, of the 3 most-similar regions in the world to each of Australia's 94 regions according to the VSI, less than 7% were non-Australian regions (Table 170). In New Zealand, by contrast, more than two-thirds of the 3 most-similar regions to each of its ten regions were in other countries.

It is true that some regions in Australia have managed to pull away from the pack and so are more differentiated from the national mix now than in 2000. However, a little over one-fifth of Australia's 74 regions in the global database, comprising 40% of the national winegrape area in 2010, changed their varietal mix hardly at all (the VSI of their mix in 2010 vis-à-vis 2000 was 0.97 or higher). For another one-fifth of Australia's regions, accounting for 22% of the national area, their VSI was 0.95 or 0.96; and for yet another one-fifth (18% of the area) their VSI was between 0.91 and 0.94. Thus it was for just Australia's remaining regions (slightly less than one-fifth of the total number and the national area) that the VSI between their varietal mix in 2000 and 2010 was less than 0.91.

The Varietal Intensity Index or VII provides another way to check on the altered varietal distinctiveness of regions. That index is the ratio of the regional to global shares of the area under a particular variety. Charts 82 and 83 show, for each of three red and three white varieties, the five Australian regions with the highest VIIs. In the case of red varieties, for example, the five most-intense regions all have VIIs above 3 but they are all lower in 2010 than in 2000. In the case of whites there are a few regions where the VII has risen, but certainly not a majority. For Australia as a whole, for all the varieties that had a VII above one in 2010, as many as two-thirds of them had a higher VII in 2000 (Table 171).

### **3.7 Varietal Quality Differences within Australia**

Given that different varieties grow better in some regions than others, and that consumer tastes differ across varieties and over time, it is not surprising that there is also considerable dispersion in the national average prices by variety. In 2001 the difference between the lowest and highest varietal prices was more than six-fold, and it shrunk very little by 2010 despite the two-fifths fall in the nominal average price for all varieties. The ranking from lowest- to highest-priced varieties changes a lot over that decade though (Tables 172 to 174). This reflects the fact that the mixes of varieties in all three climate zones in Australia have

altered considerably. Chart 84 shows that the range in 2013 from lowest-priced to highest-priced, even for just the main varieties, was four-fold, but it is six-fold if minor varieties such as Pinot Meunier are included. Moreover, for each variety there is a wide spectrum of prices across and even within regions. As Chart 67 reveals, the cross-regional range for Shiraz prices is almost as large as that for the all-variety average regional prices, even though data are not available for including some of the highest-priced cool regions with emerging Shiraz vineyards. Over the past 15 years there has been a move away from producing the lowest-quality wines though. That has caused the shift away from the left in varietal price dispersion between 1999 and 2012, which is clearly visible in the histograms for the Varietal Quality Index in Chart 85.

### **3.8 Varietal prices and January temperatures**

In the Northern Hemisphere it is common to observe an inverted U-shape relationship between the price of winegrapes and the summer temperature (Jones et al. 2005, 2012). Across Australia's regions, by contrast, that relationship tends to be only negative for observed temperatures (Chart 86). As the number of cool-climate regions expands that relationship in future years may become a little more like Europe's, but that tendency may be offset by the fact that Australia's climate continues to warm and January mean temperatures are becoming higher and bringing forward the harvest date (Webb 2006, Anderson et al. 2008). The current pattern of prices being lower in warmer regions is likely to mean that climate change will lower Australia's average winegrape price, unless vignerons switch to Southern European varieties more suited to our relatively warm climate. Indeed more than six decades ago Hickinbotham (1947) believed that Australia's hot regions were too narrowly focused on varieties from France rather than from warmer parts of Europe. Dry and Smart (1980) suggested that if acid addition had been outlawed in Australia, the hot regions would have been forced to at least add 'improver' varieties to their varietal mix.

# Chapter 4:

## Where to from here?

### 4.1 Market prospects

The Australian wine industry is not alone in feeling challenged during the past few years. Common contributors include the following:

- economic recessions on both sides of the North Atlantic,
- a chronic oversupply of winegrapes and wine in the European Union,
- retail concentration of supermarkets in many high- and middle-income countries, with the largest developing their own labels by buying bulk wine,
- tight regulatory environments for wine distribution in such settings as Ontario, many of the US states and Scandinavia,
- expanding supplies in emerging markets such as China,
- consumer health and environmental concerns,
- anti-alcohol campaigns by health and road safety lobbyists, and
- great uncertainties resulting from climate change and associated policy responses.

On top of those common challenges, Australian producers have had to deal also with such things as:

- a high-valued currency (thanks to the boom in industrial raw material and agricultural exports to China) that has made Australian wines less competitive abroad as well as at home in competition with imports,
- large stocks of unsold wine (thanks to the rapidity of the latest boom's vineyard acreage expansion coupled with a slowdown in global demand),
- a fashion swing against Australian wines in the UK and US,
- a fashion swing toward New Zealand's Sauvignon Blanc, and
- major reforms to irrigation water institutions and policies.

Symptoms of those difficulties for the Australian industry include large declines in winery profits, the cut in winegrape prices particularly in the hot irrigation areas, more than 15% of domestic sales being supplied by imports (compared with just 3% at the start of the millennium), and almost three-fifths of Australia's wine exports in 2014 being in bulk containers (compared with 15% in 1996-2003).

Climate change also is likely to be a bigger challenge for Australia than for many other wine-producing countries. The majority of Australia's winegrapes are produced in the hot irrigated regions around the Murray and Murrumbidgee Rivers (see Chapter 2). Those regions, like most of southern Australia, are becoming warmer and drier, and have seen a slowdown in river flows. There is also an increasing demand from the community for a larger

share of those reduced river volumes to be saved for environmental flows and urban uses, so there will be less scope in the future for irrigation to compensate for reduced precipitation. The quality of the main international winegrape varieties currently grown in that region deteriorates as the growing temperature rises (Webb, Whetton and Barlow 2008, Anderson et al. 2008), so producers are having to go to the expense of searching for and planting or grafting alternative varieties that will be more suitable. By contrast, in much of temperate Europe global warming will improve the quality of winegrapes. Ashenfelter and Storchmann (2010a,b) estimate that in the Mosel region of Germany, for example, an increase of 3°C would improve winegrape quality so much as to double the value of vineyards there.

Daunting though the above lists of challenges looks, some of those adverse developments are only short term. Also, there are several positive signs already emerging. One is the cautious optimism of economic recovery that is showing up in the United States and parts of the recessed economies of Europe.

A second encouraging sign was the substantial take-up of the European Union's offer to pay winegrape growers to grub up vines during 2009-11. There has also been some grubbing out of unprofitable vineyards in the hot irrigated areas of California in recent years, as well as in Australia.

Thirdly, a recent assessment of the impact of expected demographic changes in the United States over the next two decades suggests wine consumption there will grow considerably faster than overall population: as the age and ethnic profiles alter, Lapsley (2010) concludes that wine sales could rise from 280 million cases in 2009 to around 400 million by 2030.

Fourthly, the Asian market is promising to grow steadily. Its population is expected to rise by about 750 million people by 2030, and its share of global income (ignoring Japan) is expected to double, to around 23%. Already the middle classes in those emerging economies are importing popular and fine wines – and with China producing more wine locally, often by firms partly owned by producers in the Old or New World with best-practice technical and marketing knowledge, that is adding to their consumers' interest in the product.

Not only are Asian incomes growing very rapidly and their preferences becoming more westernized, but also they are seeking relatively high-priced imported wines. In China, for example, wine from grapes in recent years has accounted for just 2% of the volume of alcohol consumption but for 8% of the value of alcohol sales.

The Asian region shows great promise for Australian wineries in particular: the market is relatively close and in the same time zone, Australia already has a strong trade and investment presence there in other product areas, and the number of alumni returning there from Australian educational institutions is growing rapidly. The region accounted for barely 4-5% of Australia's wine exports in the early 2000s, but since then its share has more than doubled (Table 16(i)). Australia is a close second to France in supplying imported wines to China, which is now Australia's 3<sup>rd</sup> biggest market in value terms, ahead of Canada and New Zealand. Moreover, those exports are not just bulk wine used for blending with Chinese juice. Indeed their unit value was more than twice the average for all Australian wine exports in 2012-14. Australia's exports to other Asian countries enjoy substantial premia too, earning almost three times Australia's average export price in 2012-14. Five of the East Asian countries shown in Table 16(j) are now among the top dozen destinations for Australian

wine, having grown far faster than sales to the rest of the world. With per capita consumption still very low in Asia, the potential for steady long-term growth in demand and in returns from marketing investments there, even if not instantaneous, is very considerable. This is clear in the high average unit value of wine exports to all East Asian countries from Australia: during 2011-14 it averaged \$6.40 per litre, compared with less than \$2.20 to all other destinations, and for exports to China (by far the biggest Asian wine market) the average price was more than \$5.70 (Chart 55). In fact 90% of Australia's exports of wines priced at over \$50/litre went to Asia in 2014, at the same time as Australia grew its \$2.50-\$5.00 per litre sales to China. The recent completion of bilateral preferential trade agreements with Korea, Japan and most recently China will help to rebuild market share Australia lost to Chile and others who signed earlier agreement in Asia.

A recent global economic modelling study by Anderson and Wittwer (2013a,c, 2014a,b) projected impacts of market changes on domestic wine production, consumption and trade in key wine-producing and -consuming countries by 2018 under various growth and real exchange rate (RER) assumptions. If RERs in 2018 were to be the same as in 2011, Australia's non-premium grape and wine prices would be even lower than in 2011 while super-premium and iconic still wine prices would be more than 40% higher.<sup>51</sup> If, on the other hand, RERs were to return half-way toward what they were in 2009 – which is what had happened by the end of 2014 – and China's imports continued to grow rapidly, real producer prices in Australia would be above 2011 levels for most grape and wine types, especially for super-premium+ wines. The extent of those rises would be somewhat but not substantially less if China's import growth were to be slower.<sup>52</sup>

With that reversal in RER trends, Australia is projected to expand its output by 2018 for all wine types except non-premium, with commercial-premium and super-premium increases of one-eighth and one-sixth, respectively. The projected upgrading of qualities demanded in most markets means that China accounts for only about one-third of the projected growth (by about one-sixth) in the value of global imports.

Australia's export prospects depend very much on the exchange rate scenario though. If RERs were the same in 2018 as in 2011, Australia's exports to all destinations other than Asia are projected to decline, and in aggregate volume would be no more than in 2011. By contrast, if exchange rates settled at half-way back to those of 2009 – as has since happened – Australian total annual export volumes are projected to increase to become as much as one-eighth more than in 2011 (or somewhat less under slower import growth by China). Within that growth, however, Australian exports of non-premium wines are projected to fall.

Finally on market prospects, it needs to be kept in mind that Australia's per capita income growth is slowing and may even decline as the latest mining investment boom comes to an end, depending on how well the government is able to deal with the political difficulties of balancing the federal budget (Garnaut 2013). This will slow the growth in domestic

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<sup>51</sup> Commercial-premium still wines are defined to be those between USD2.50 and 7.50 per litre pre-tax at a country's border or wholesale. Non-premium wines are defined as those below USD2.50 per litre and super-premium wines are defined as those greater than 7.50 per litre. The sparkling wine category in the model covers all price points.

<sup>52</sup> The lower Chinese import growth scenario assumes the growth in disposable incomes in China is one-quarter less than in the high-growth scenario, its RER ceases to appreciate, and capital investments in domestic grape and wine production grow twice as fast as in the base scenario.

demand. How much it slows the growth in Australian wine sales at home will also depend on the impact of RER changes on competition in the domestic market from imports.

#### **4.2 What about the varietal mix across regions?**

The data reviewed in Chapter 3 reveal three things about Australia's vineyard. First, Australia's mix of winegrape varieties is not very different from the rest of the world's and, since 2000, it has become even less differentiated. One reason is that even though Australia's signature variety, Shiraz, has expanded its share of the national vineyard, the importance of that variety has expanded even faster in numerous other countries. Australia's mix is now closer to that of France, since France is the closest to the global mix. Whether that is a good thing commercially is unclear, especially for Australia's hottest regions. Do Australian producers benefit enough by emulating France's varietal mix to offset any economic downsides, for example from being less differentiated from the world mix, or from growing varieties that may be less than ideal for the terroir of Australia's various regions?

Second, even though there are very large differences in growing conditions and especially climates across Australia, cross-regional varietal differences within Australia are much less than is the case within other countries. Perhaps this is a consequence of producers finding it easier to market well known 'international' (mostly French) varieties than trying to differentiate their offering and region with less-familiar varieties. But it does suggest there is plenty of scope to explore alternative varieties in the various regions of Australia – which is something grapegrowers are doing in any case as they consider ways to adapt to climate changes.

And third, Australia's various regions to date have made only a little headway in diversifying their vineyards – despite much discussion of alternative or emerging varieties in the media and at conferences.

This leaves open the question of *why* particular varieties have been produced at various times in Australia's various regions. To what extent is the varietal mix driven by what grows best in each location (the terroir explanation)? Gergaud and Ginsburgh (2008) argue that terroir has not been the main explanation even in Bordeaux. Is the increasing concentration on major 'international' varieties partly a result of producers in newly expanding wine-producing regions finding it easier to market them because of France's strong reputation with those varieties? Might part of the explanation also be that those key varieties do well in a wide range of growing environments, or have been found to be desirable for blending with other varieties that grow well in the same regions?

These and other centripetal forces during the first decade of this century apparently have dominated possible centrifugal forces such as intensifying competition from abroad and consumer demand for novel offerings. It remains to be seen as to whether the latter are strong enough to dominate the former over the coming years so as to differentiate Australia's regions more and thereby reverse the trend of the this century's first decade.

### 4.3. Policy and institutional implications

How might Australia strengthen its competitive edge over the next decade or so? Looking beyond the immediate difficulties, there are reasons to be cautiously optimistic about the Australian wine industry's future. Recovery won't be easy, and may not be as quick as the resurgence from its mid-1980s slump. Certainly major adjustments will be required for many participants. However, to the extent there is a willingness to continue to invest for the long term (rather than just focusing on quarterly returns to shareholders), and if the earlier spirit of collaboration within the industry can be re-invigorated, a return to at least normal levels of profitability should be possible before long.

One adjustment already under way is in marketing. The earlier emphasis in generic marketing by the Australian Wine and Brandy Corporation on Brand Australia, of providing sunshine in a bottle, has switched to a marketing strategy that places far more emphasis on regional characteristics and higher quality wines. Wine Australia also initiated a website allowing individual producers of fine wines to tell a story about their wines ([www.australiaplus.com](http://www.australiaplus.com)).

That idea was taken further with the creation in 2009, by a dozen long-established, mid-sized, quality-driven, high-profile, family-owned Australian wineries, of the First Families of Wine: together they represent 16 Australian regions across four states, and between them they have more than 1200 years of winemaking experience ([www.australiasfirstfamiliesofwine.com.au](http://www.australiasfirstfamiliesofwine.com.au)).

Following the merger of Wine Australia and GWRDC on 1 July 2014 to form the Australia Grape and Wine Authority, the industry is now developing its next 5-year strategic plan. Its Discussion Paper (AGWA 2014b) reveals that there will be a stronger focus on building and promoting the country's fine wine offering. The aim is to go beyond offering good value wine to making the world aware Australia also has great wine, and indeed has the potential to be one of the greatest wine-producing nations in the world, given its wide range of climates and terroir.<sup>53</sup> Getting that message across in not only Australia's traditional markets but also in Asia will require a larger budget than AGWA's predecessor organizations have had in the past though, especially given the commitment by the European Union to more than double its generic promotion expenditure over the next five years (European Court of Auditors 2014).

In terms of private-sector promotion by individual large wine companies, they already have well-recognized labels, including five of the top dozen wine brands globally plus Penfolds (Table 27). The first four represent rather low bottle prices though (Hardy's at number 4, Yellowtail at 6, Jacob's Creek at 9 and Lindemans at 10), while Wolf Blass is ranked 12. Most of those labels have been selling wine in the key UK supermarkets at less than £4 a bottle over recent years, which is almost certainly not sustainable in the long run. Since competition from Argentina, Chile and South Africa at that non-premium commodity end of the wine quality spectrum is strengthening, improved profit margins require graduation to higher quality, more differentiated wines of place. One step in that direction

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<sup>53</sup> That Australia can produce the equivalent of Bordeaux first-growth wines is beyond dispute, even if they have yet to reach the same stratospheric prices. And the characteristics of what it takes to produce them are also reasonably well known. In the case of weather variables, they have virtually the same influence on Australian iconic wines as those in Bordeaux (Wood and Anderson 2006).



was the decision a few years ago by Treasury Wine Estates to abandon cask (bag-in-box) wine and thus to not renew contracts with growers of non-premium fruit. Another example is the greater emphasis being given by Pernod Ricard Australia to their Regional Reserve range of Jacob's Creek wines. Other examples are the purchase in late 2014 of Peter Lehmann Wines by Casella and Grant Burge Wines by Accolade (see Tables 22 and 23). Also helpful is the embracing of environmental stewardship by an ever-larger number of Australian producers, in the expectation that retailers and their consumers will be increasingly looking for evidence at all stages of production of sustainable use of natural resources. Numerous high-end wineries also have embraced organic and biodynamic methods in their vineyards, believing that it results in better wines that will attract higher prices even when those methods are not advertised on the bottle label (Allen 2010).

As for the R&D portfolio of AGWA and private firms, the returns from such investments have been shown to be very high in the past. Returns in the next two decades are likely to be even higher, bearing in mind marketplace changes and long-term uncertainties such as climate change, water and other environmental policy reforms, and prospective alcohol tax changes at home and abroad. Transgenic biotechnology offers much promise for accelerating the research discovery process (Pretorius and Hoj 2005), and consumer resistance to genetic engineering is likely to gradually fade over time and thus reduce its constraint on exploiting that opportunity. The scope for collaboration across scientific disciplines could be exploited more, as could the scope for collaboration between scientists at the basic and applied ends of the spectrum, and between scientists in various countries.

As with generic promotion though, the returns to the various players along the value chain and to different types of producers and different regions from R&D investments will not be equal of course. And they will vary across the adoption time period as well, rewarding most those producers able to adopt a new technology fastest before it is mainstreamed by others nearby and abroad (Zhao, Anderson and Wittwer 2003). Ex ante economic analysis of the likely effects is one way for AGWA to anticipate the possible distributional impacts of its various strategic choices. Ideally such analysis would be undertaken with a model of global markets and not just the national market, taking into account the efforts also being considered in other key countries, for example recent innovative efforts in Chile (Dutz, O'Connell and Troncoso 2014) and proposals under consideration in Europe (Cogea 2014).

Policy reforms could contribute to the transition to higher-quality wine production. The gradual creation of better property rights for water and the increasing opportunities for them to be tradable is allowing irrigation water to be attracted to its most-profitable uses. Within agriculture, vineyards have been among the more profitable crops to irrigate, so when prices for water rise in drier years vignerons will be able to out-compete other users for the available allocations.

On domestic wine taxation, if Australia were to switch from an ad valorem to a volumetric tax, as recommended by the Henry Review of Taxation (Henry 2009) and as used in most other countries, that would encourage the transition to finer wines (and it would weaken the case by anti-alcohol lobbies for a higher *rate* of taxation of wine). In particular, it would make it easier for smaller fine-wine producers to sell all their product on the domestic market, thereby avoiding the high fixed costs of breaking into new export markets (bearing in mind that successful exporting firms typically are larger and more productive – see Bernard

et al. 2007, 2012).<sup>54</sup> There is the risk that any change to the method of taxing wine consumers will be accompanied by a hike in the extent of taxation to bring it up to at least the beer rate if not the higher spirits rate. Argumentation to that effect would need to be robustly countered by the argument that moderate wine consumption can have net positive health and social externalities rather than negative externalities on society associated with excessive alcohol consumption and especially binge drinking. According to that argument the volumetric tax on wine should be lower than that for other alcohols and potentially zero (Anderson 2010b), as it is in the major wine-producing countries of the world (Charts 45 and 46).

Advocacy by the industry on wine tax policy and myriad other issues is likely to be more successful, the more the industry can speak with a united voice. That is no small task for an industry that is even more widely spread geographically and more diverse in terms of firm size and product quality than it was at the start of the present cycle a generation ago. The industry has managed recently to join its generic promotion and R&D bodies, but it still has two advocacy groups (the Winemakers' Federation of Australia, [www.wfa.org.au](http://www.wfa.org.au), and Wine Grape Growers Australia, [www.wgga.com.au](http://www.wgga.com.au)). Independent grapegrowers and winemakers inevitably find it more difficult to see eye to eye on every issue when profits are low or negative, but that is also when the stakes in advocacy may be highest. It remains to be seen whether the strength of industry leadership that was so abundant in the 1990s can be garnered again for this second and more-challenging half of the present cycle.

#### 4.4 Some lessons from history

What lessons can be learnt from the past that are pertinent to the industry's current and prospective opportunities and challenges? For brevity's sake, these are laid out as dot-point responses to a series of questions that have arisen in the course of the present study.

*Why did the Australian wine industry not take off in the latter half of the 19<sup>th</sup> century when Europe's wine industry was being ravaged by phylloxera and mildew?*

- It had no large firms at that time, and the overall scale of industry was too small;
- Spain was on France's doorstep and far more capable of rapidly expanding its exports to its neighbour.
- Algeria was a close-by territory so that, as soon as French producers became established there, competitors were cut off by discriminatory import restrictions, including against Spain (Pinilla and Ayuda 2002; Pinilla and Serrano 2008; Meloni and Swinnen 2014).

*Why did the industry grow so slowly during most of 20<sup>th</sup> century?*

- The creation of the Australian Federation led to the removal of inter-colonial trade barriers which assisted the South Australian wine industry greatly, but at the expense of wine producers in other mainland states.
- However, from Federation to the 1970s Australia adopted a highly interventionist, protective set of trade and industry policies that protected producers from

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<sup>54</sup> However, a move to a volumetric tax on wine consumption – like climate change – would harm hot winegrape regions more than those in the higher latitudes and altitudes, and more so the higher is that volumetric tax rate (Anderson, Valenzuela and Wittwer 2011).

international competition and slowed innovation and hence productivity and income growth.

- The grape industry was one of the first agricultural industries to successfully lobby for such assistance, and wine imports also have been subject to tariffs from early last century. That meant both parts of the wine industry were sheltered for most of the century from the cool winds of international competition. It was also an offset to the negative effects on production costs of high protection to other industries.
- In the interwar years the industry was also distorted by policies that assisted exports but in a very discriminating way, favouring only fortified wine exports to Britain.

*How important were macroeconomic conditions to the industry's cycles?*

- Very: Australia suffered three severe economic depressions (in the early 1840s, early 1890s, and early 1930s) which dampened both domestic demand for wine and the availability of finance to help producers weather those downturns.
- Also, the Global Financial Crisis from 2008 and associated changes in exchange rates dampened demand for Australian wine on both sides of the North Atlantic.

*How important were the fortunes of other sectors of the Australian economy to the industry's development?*

- Very: the gold rushes in the 1850s and 1890s had a generally positive effect because they brought permanent immigrants and capital from abroad which grew the domestic demand for wine.
- The ban on iron ore exports from the 1930s to the 1960s delayed the start of a mining boom in response to Japan's industrialization, which benefitted wine and other tradable industries relatively but meant the economy grew less rapidly than it might have in the 1960s and 1960s.
- The latest two mining booms, in the 1970s/early 1980s and especially in the first dozen years of the present century, contrasted with the 19<sup>th</sup> century mining booms in that they attracted few extra permanent residents and were financed mostly by footloose overseas capital. Being export-demand driven, those mining boom involved major real exchange rate appreciations followed by major and faster depreciations. Since the wine industry was far more open to international competition in the past two decades than it had been throughout most of the 20<sup>th</sup> century, those exchange rate gyrations had a major impact on the wine industry's current cycle (contributing positively to the start of its boom, negatively to its end, and potentially positively again if the AUD remains at its current low level for some years to come).

*How have successful investors in the wine industry behaved in past cycles?*

- Cycles are inevitable for perennial crop industries, so canny investors with finance and market outlets have bought assets in slumps, giving them a reasonable return on those low-priced assets and readying them for take-off in the next boom when they can sell those assets at higher prices and lower their capital base to concentrate on brand investment.

*Why was there such a sharp downturn in the present cycle?*

- It was affected by a perfect storm of coincident influences: the biggest and longest demand-driven mining investment boom and hence RER appreciation in Australia's history, the deepest global recession since the early 1930s, coming at the end of one of Australia's longest droughts followed by floods, and at a time of rapid wine export expansion in other New World countries.

## 4.4 Conclusion

What can be done to shorten the current slump and reduce the amplitude of future cycles? Firms have numerous strategies. Those that have been long-established know that cycles are normal and recoveries tend to be slow, so they preserve some earnings from high-profit booms to carry them through the long periods of low returns that tend to follow. In this era of flexible and volatile exchange rates, they also hedge against currency fluctuations. They also use the slump period when asset prices are low to shift new investments from low-return to prospectively higher-return regions and even to other countries so as to also hedge against macroeconomic shocks and improve access to more market and technical knowledge.

The industry as a whole needs to invest more in at least four areas: generic promotion; technical, policy and market research; data on industry developments; and collaborating better on these and other issues including advocacy. Had better and more-timely data been available in the latter 1990s, there may have been fewer inappropriate investments in vineyard expansion. The Australian Bureau of Statistics has been scaling back its collection of data in recent years, and it expects the industry to fully cover the cost of collecting extra data. A new strategy for data collection and its analysis is therefore needed, and its implementation will require more industry resources than have hitherto been made available in this area if the government continues to cut back on public data collecting.

One of the clearest lessons from the past 170 years is that distortionary government policies tend to exacerbate rather than smooth adjustments in the industry as it goes through each cycle. An on-going objective of the industry should be to keep governments out of markets and confine their activities to generating public goods and overcoming market failures such as the free-rider problem of collecting levies for generic promotion and R&D.

It is almost two centuries since John Macarthur and Gregory Blaxland invested in vineyard developments in New South Wales. It is therefore worth recalling the words of the late Baroness Philippine de Rothschild, who liked to tell visitors to her château that “wine making is really quite a simple business, only the first 200 years are difficult.”

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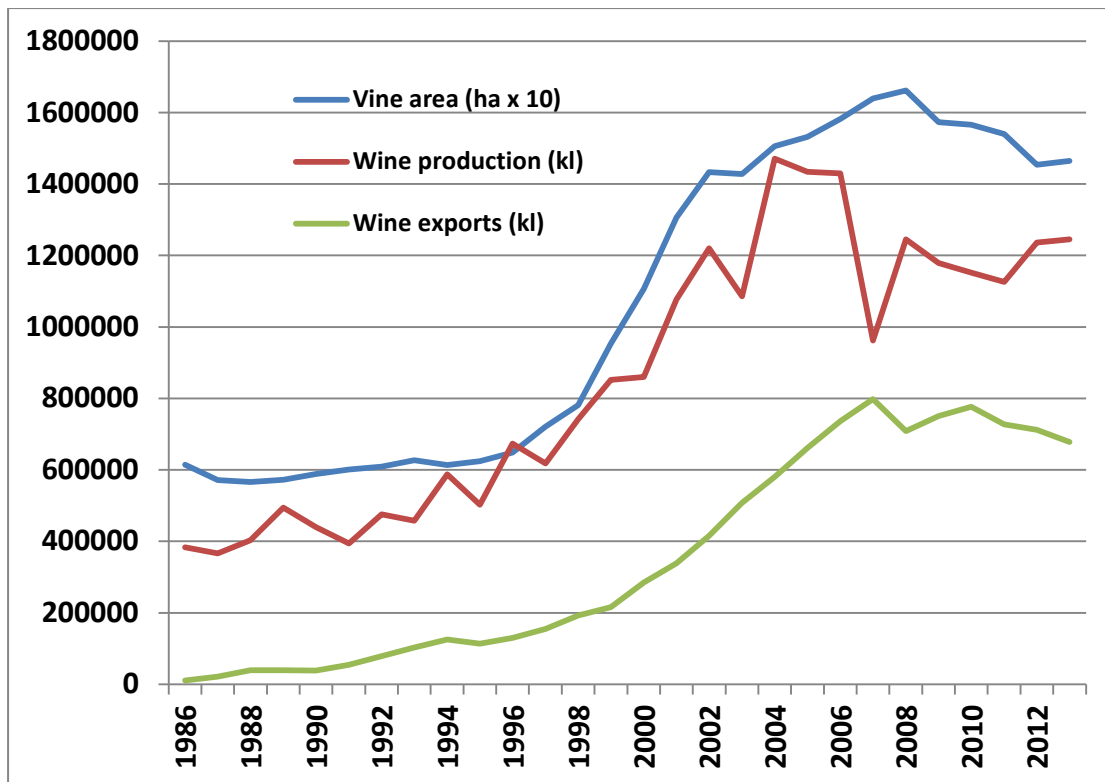
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# **Grape and wine market developments in 86 charts**

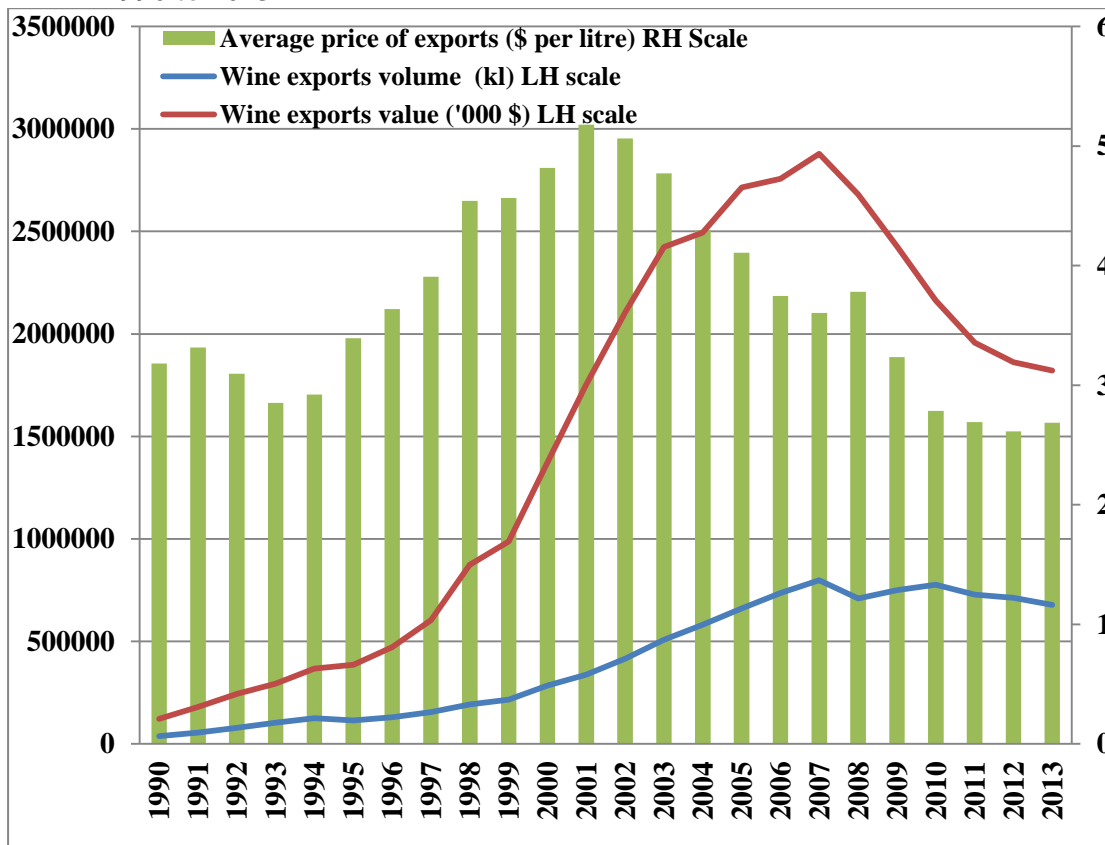
## **Section I: Australian Grape and Wine Production, Consumption and Trade**



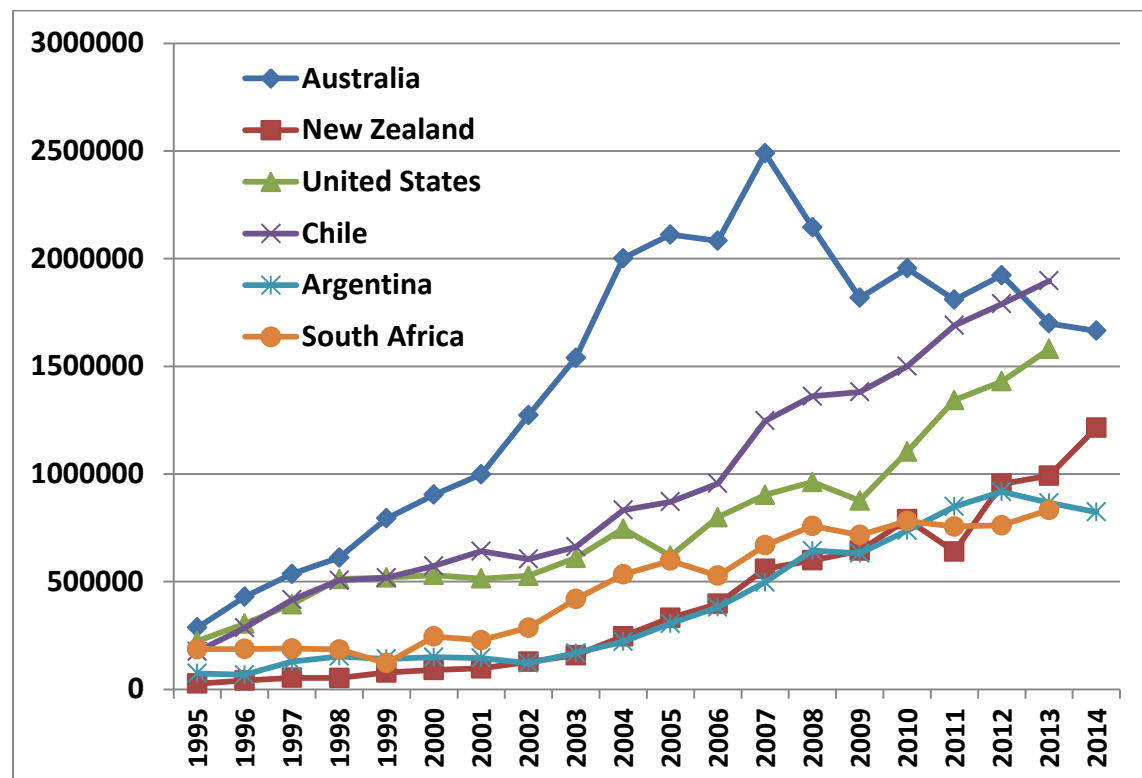
1. Bearing area of vineyards, wine production, and wine exports, 1986 to 2013



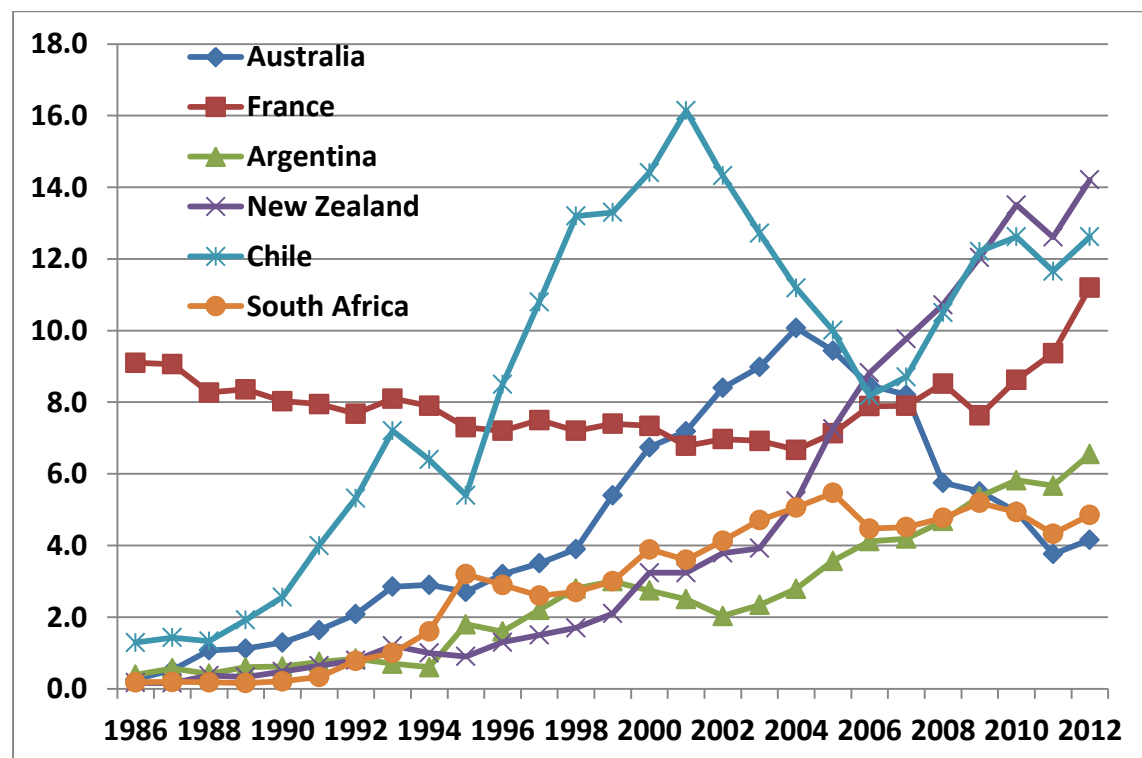
2. Volume, average AUD price and value of export sales of Australian wine, 1990 to 2013



3. Value of wine exports, Australia and other New World countries, 1995 to 2014 (US\$ '000)



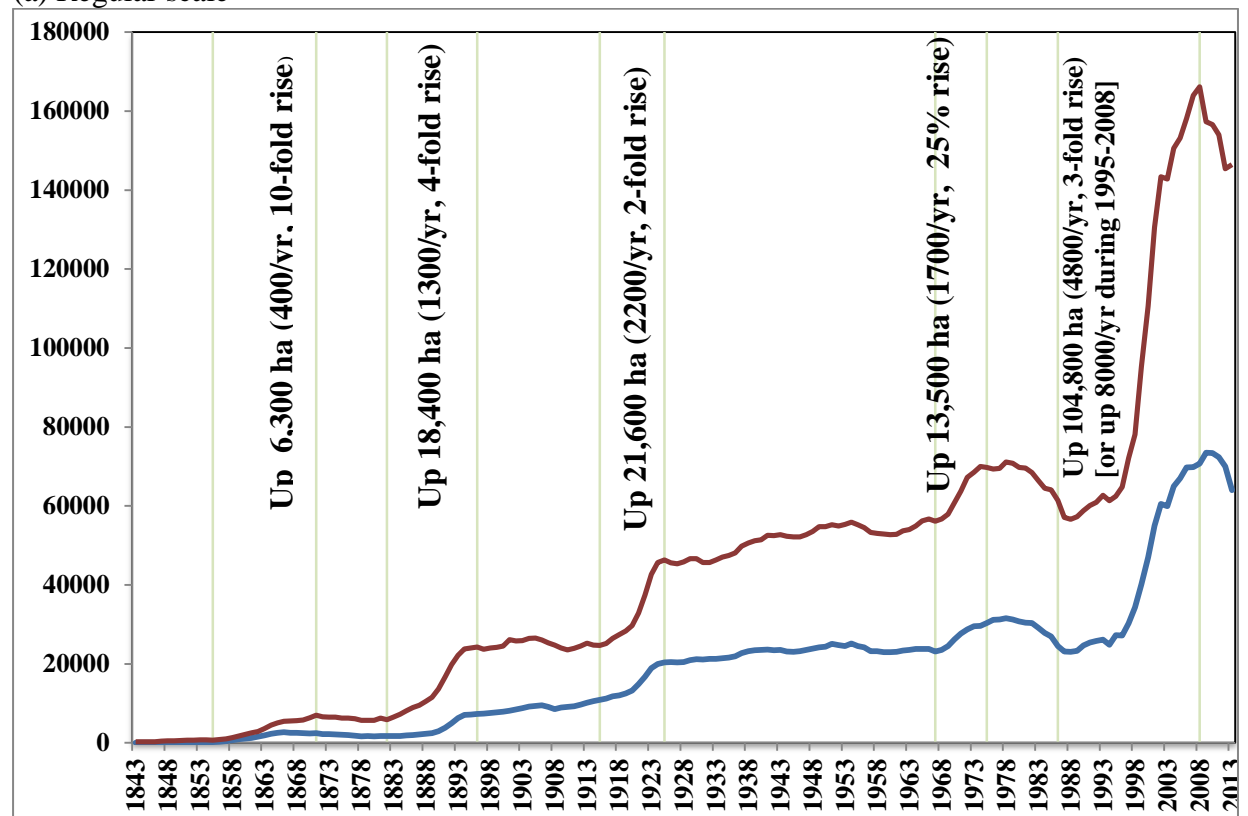
4. Index of revealed comparative advantage in wine, Australia and other key exporters, 1986 to 2012 (1.0 = world)



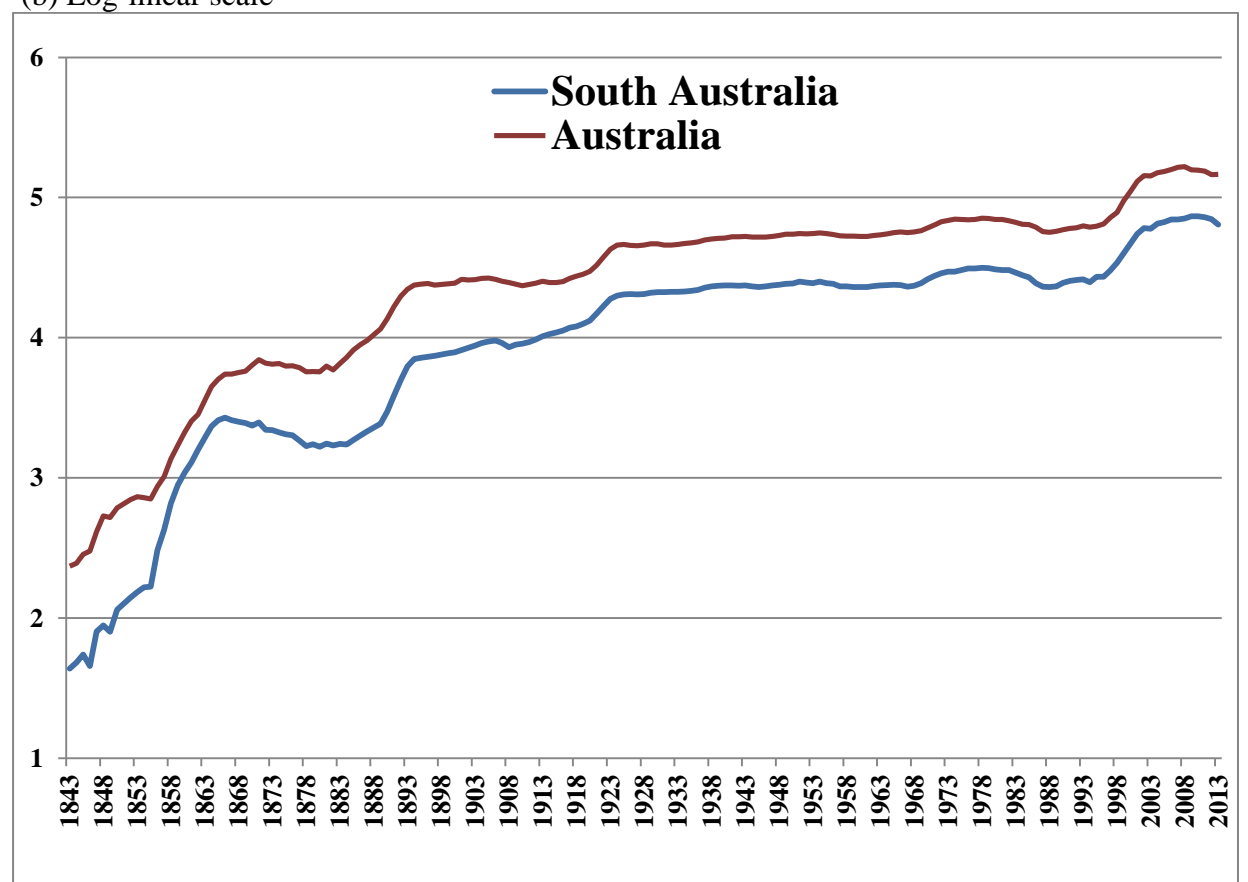
<sup>a</sup> Wine's share of a country's exports divided by wine's share of global exports.

# 5. Bearing area of vineyards, Australia and South Australia, 1843 to 2013 (ha)

(a) Regular scale

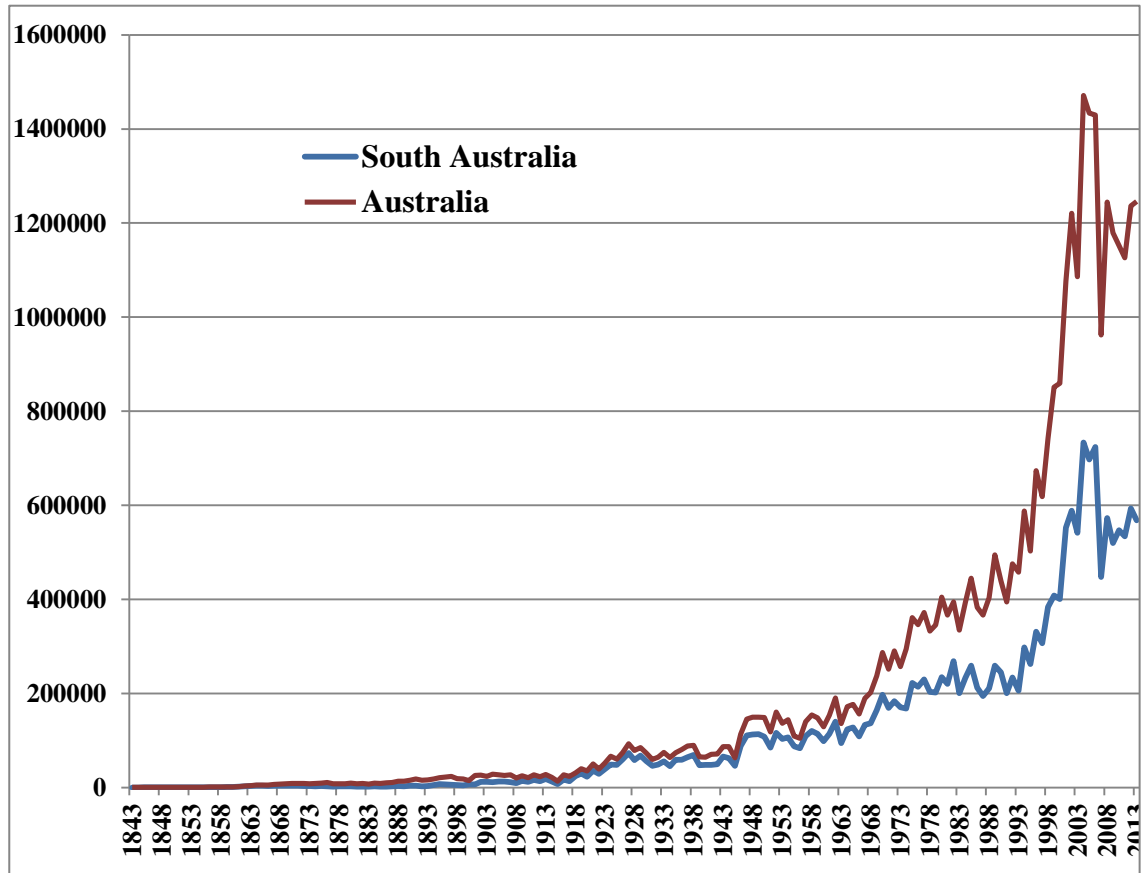


(b) Log-linear scale

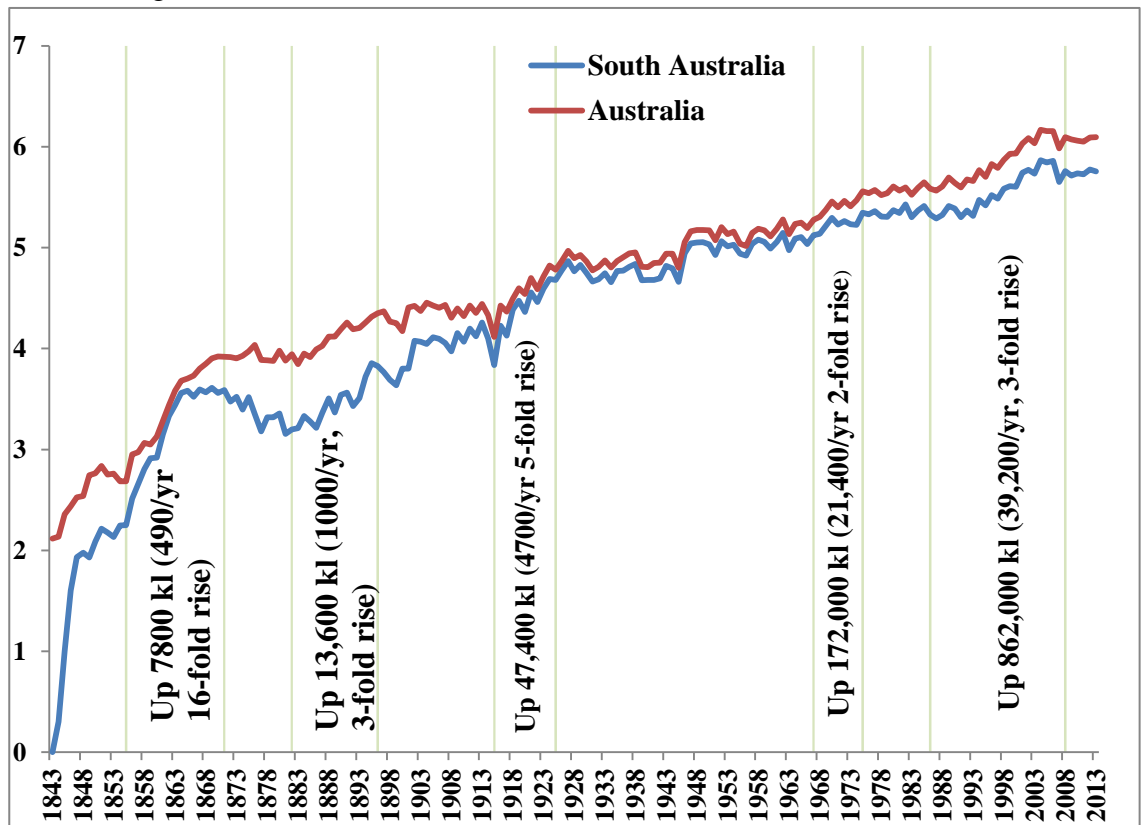


## 6. Wine production, Australia and South Australia, 1843 to 2013 (kl)

(a) Regular scale

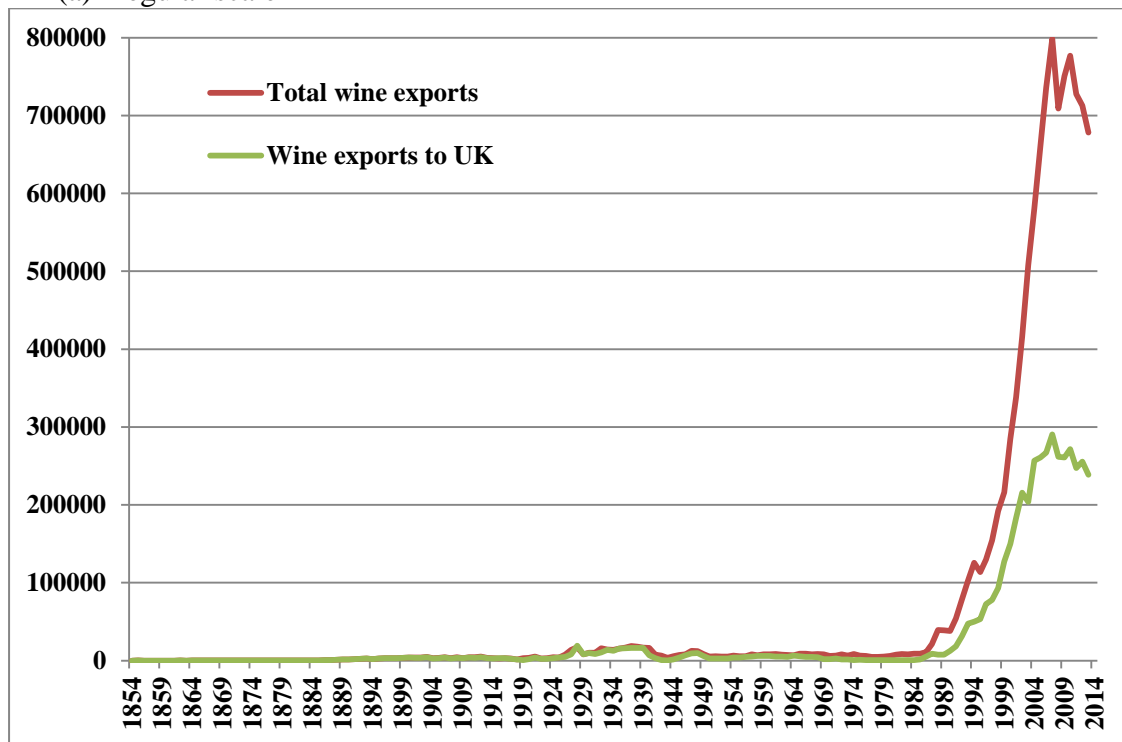


(b) Log-linear scale

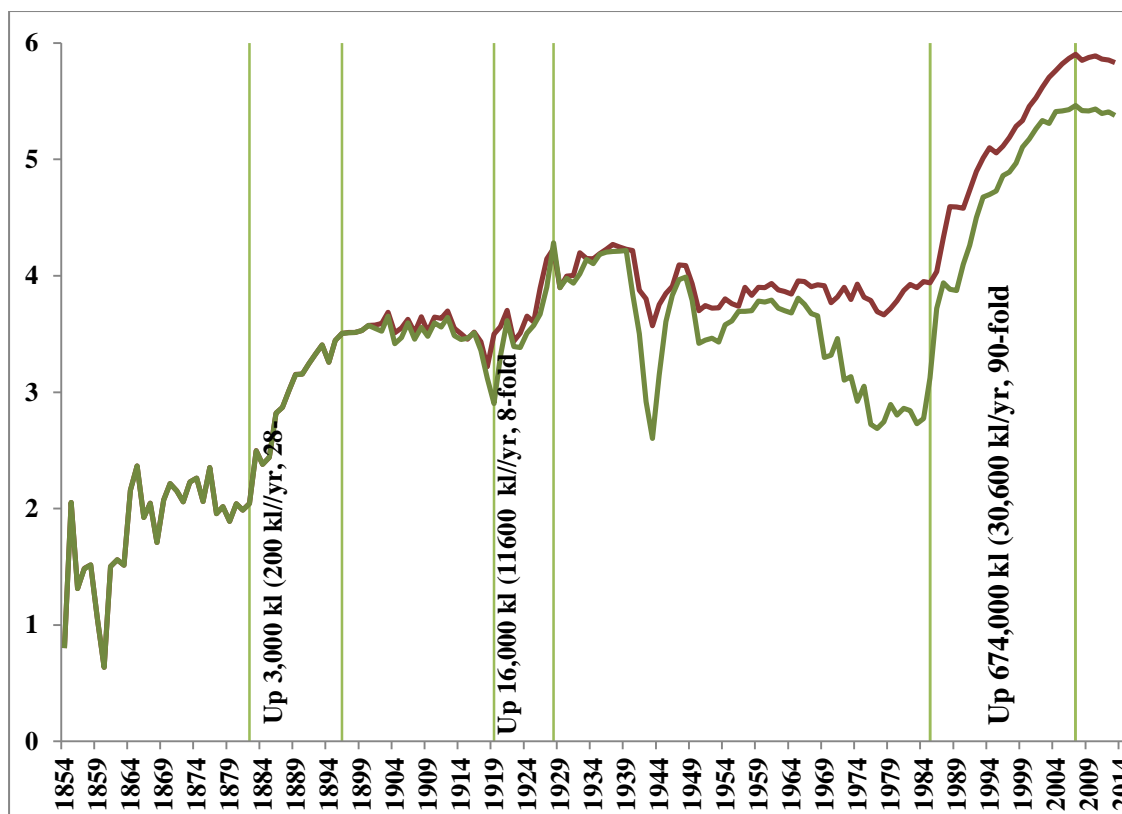


7. Volume of Australian wine exports to United Kingdom and world, 1854 to 2013 (kl)

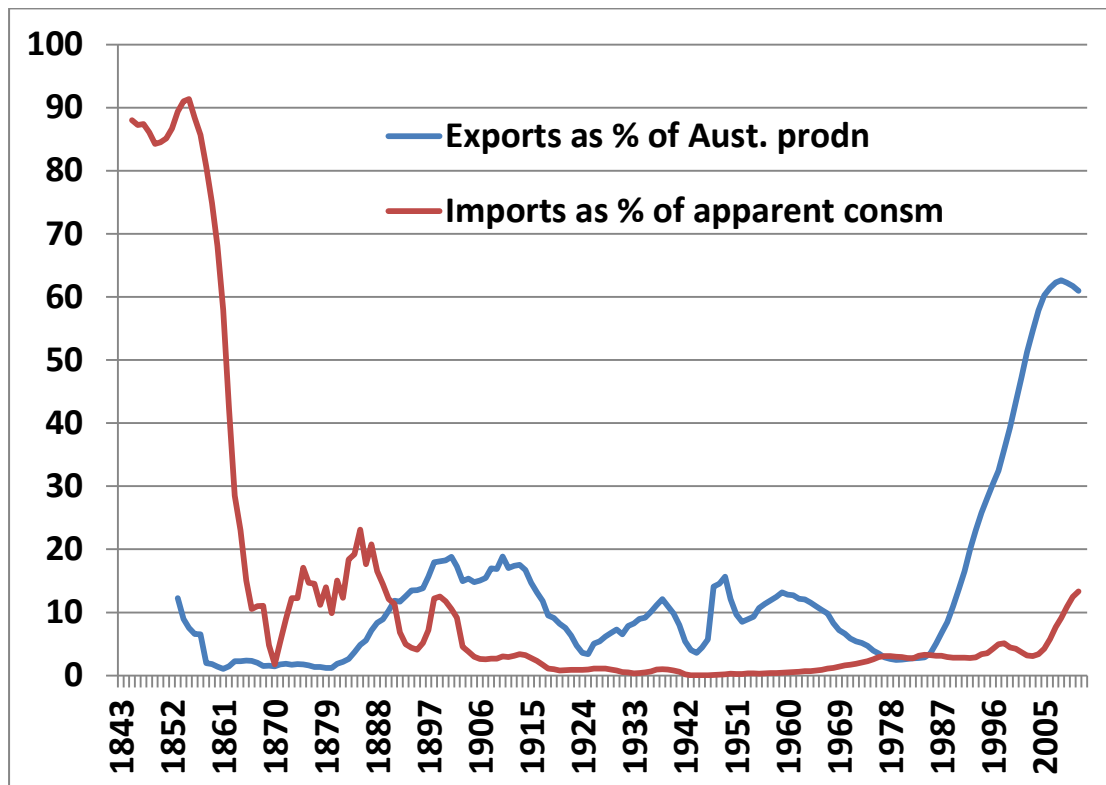
(a) Regular scale



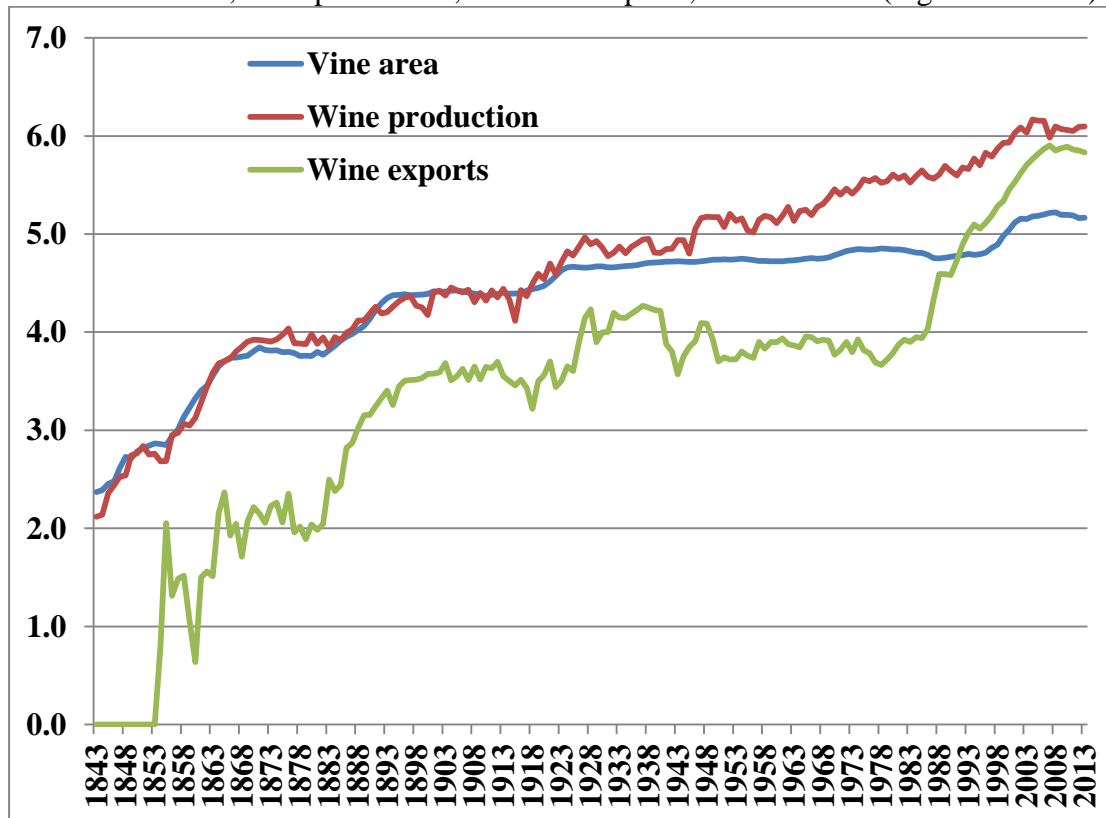
(b) Log-linear scale



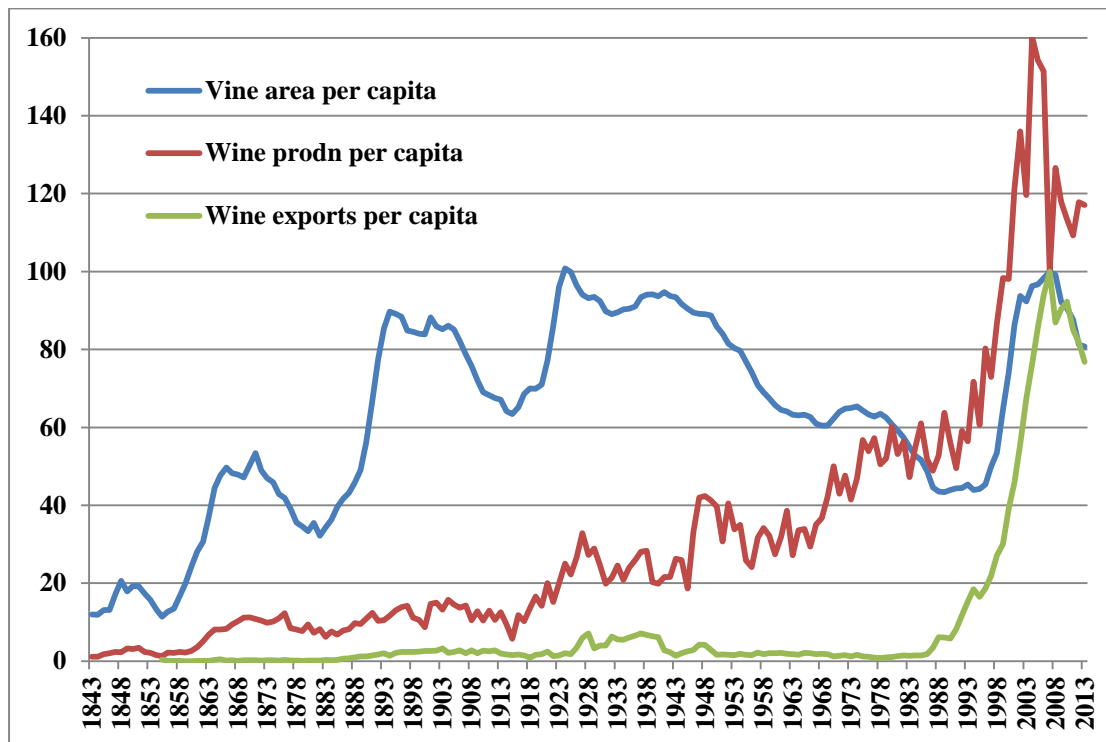
8. Exports as % of wine production and imports as % of apparent wine consumption, 1843 to 2013 (% , 3-year moving average)



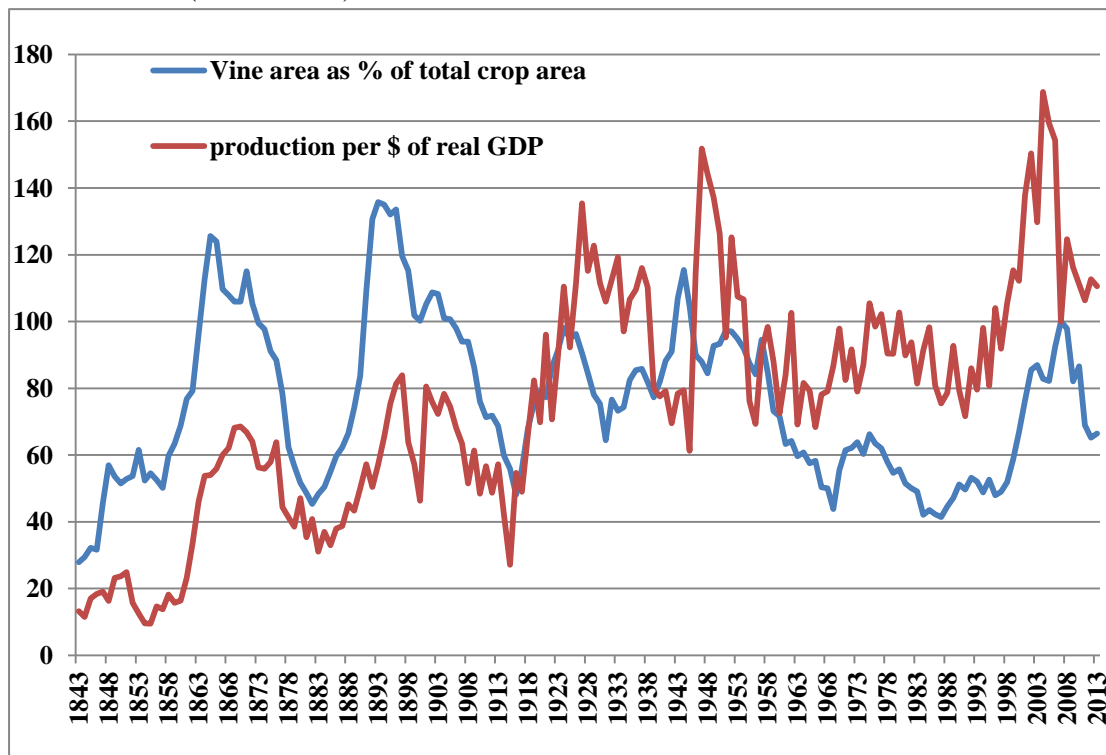
9. Vine area, wine production, and wine exports, 1843 to 2013 (log-linear scale)



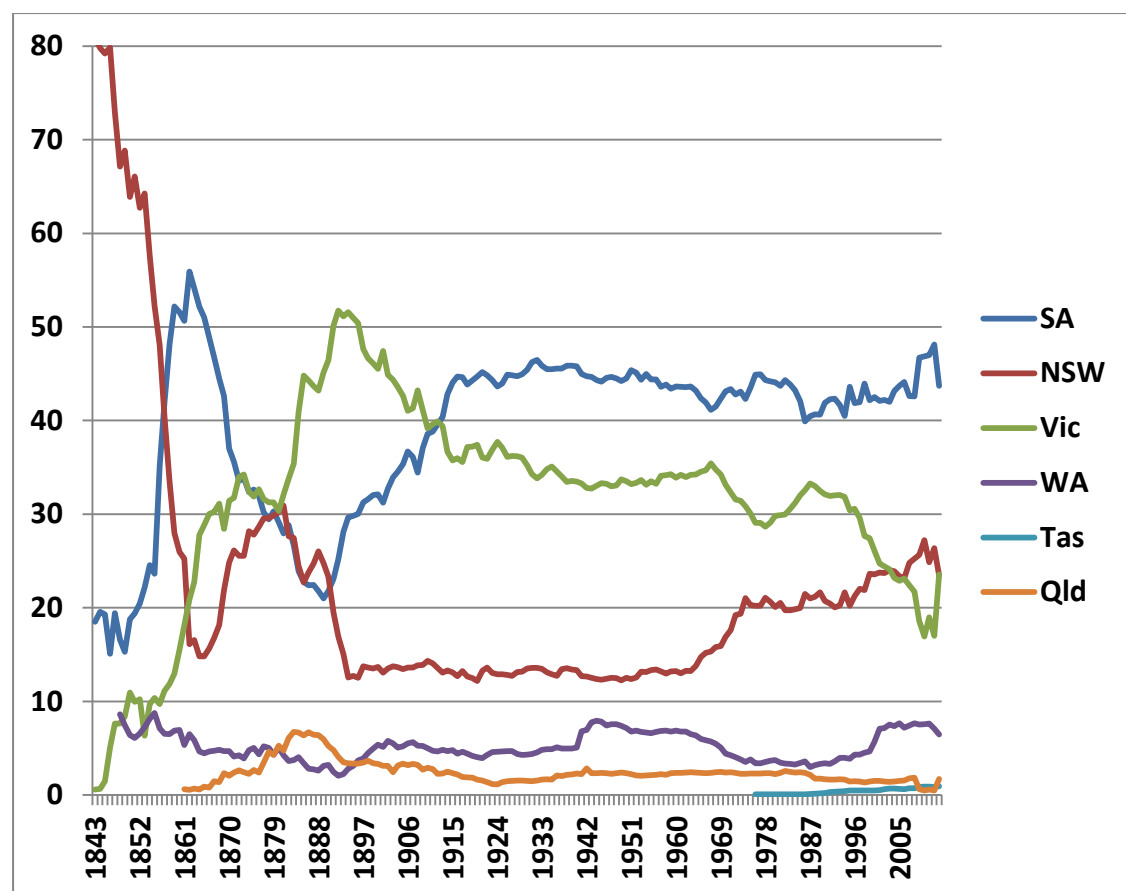
10. Indexes of vine area, wine production, and wine exports, per capita, 1843 to 2013 (2007 = 100)



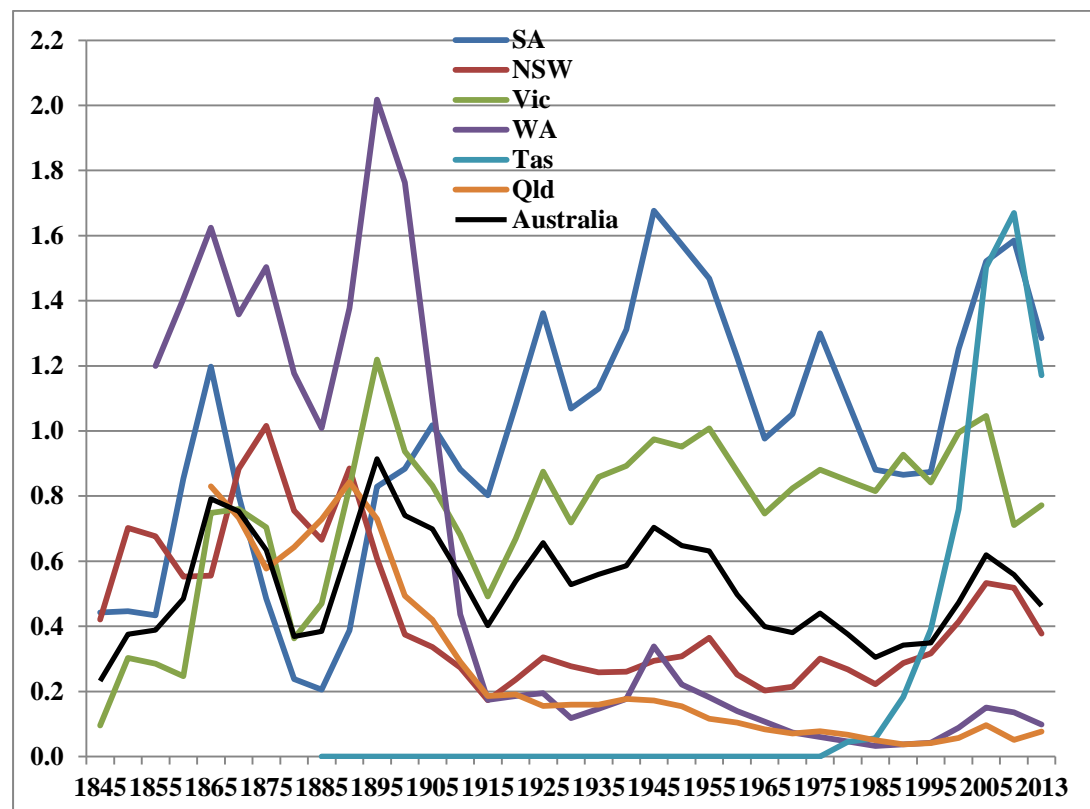
11. Vine area as a percent of total crop area, and wine production per \$ of real GDP, 1843 to 2013 (2007 = 100)



12. States' shares of Australian vine area, 1843 to 2013 (%)



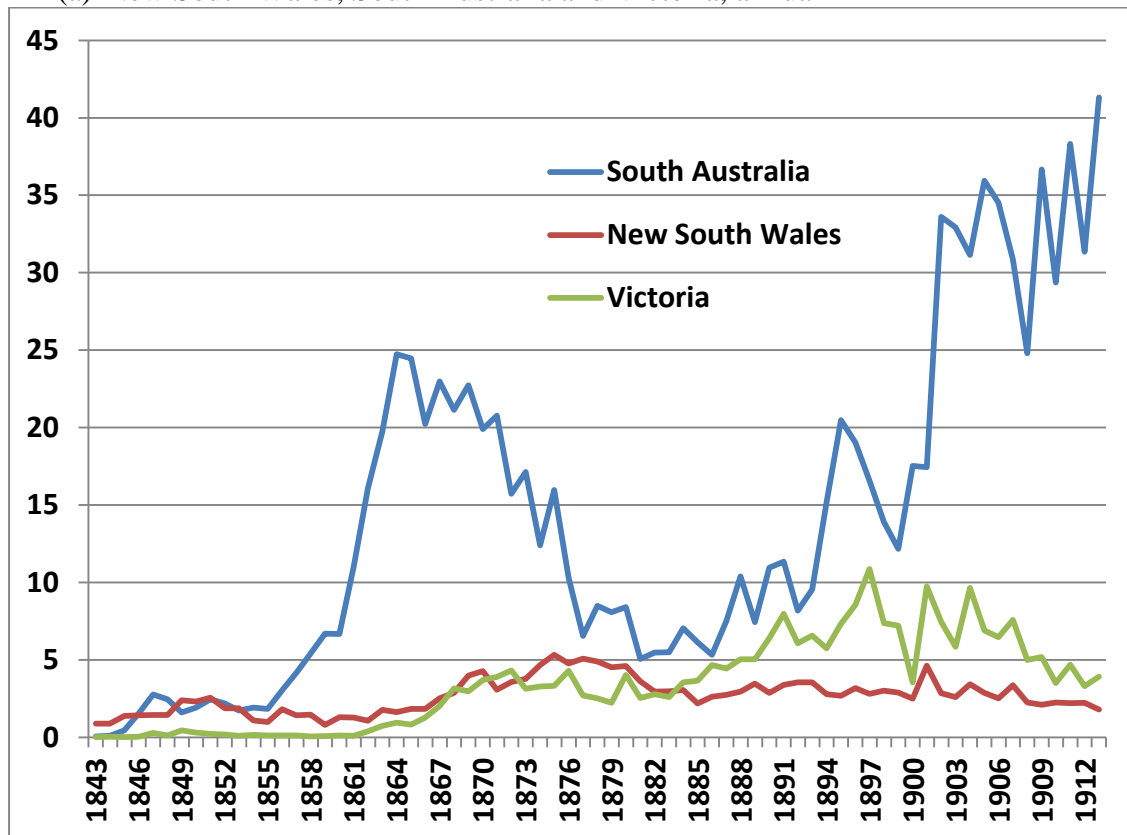
13. Vine's share of total cropped area, by State, 1843 to 2013 (% , 5-year averages)



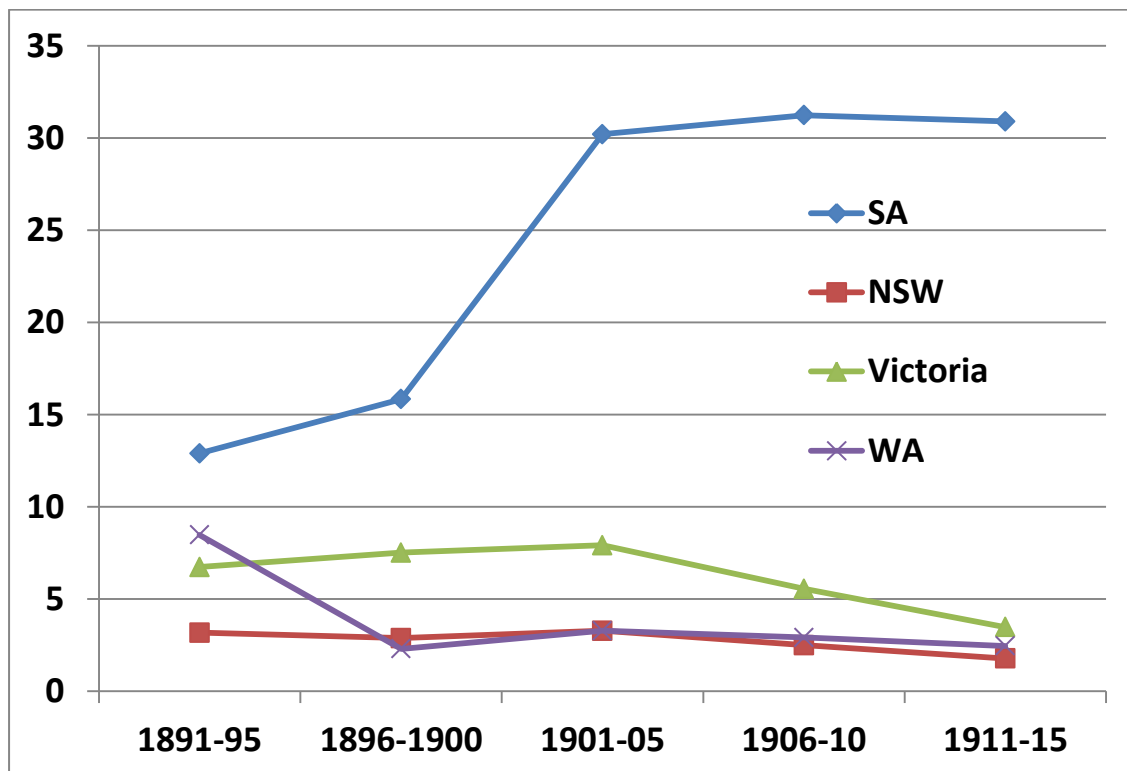


#### 14. Wine production per capita, by State, 1843 to 1913 (litres/year)

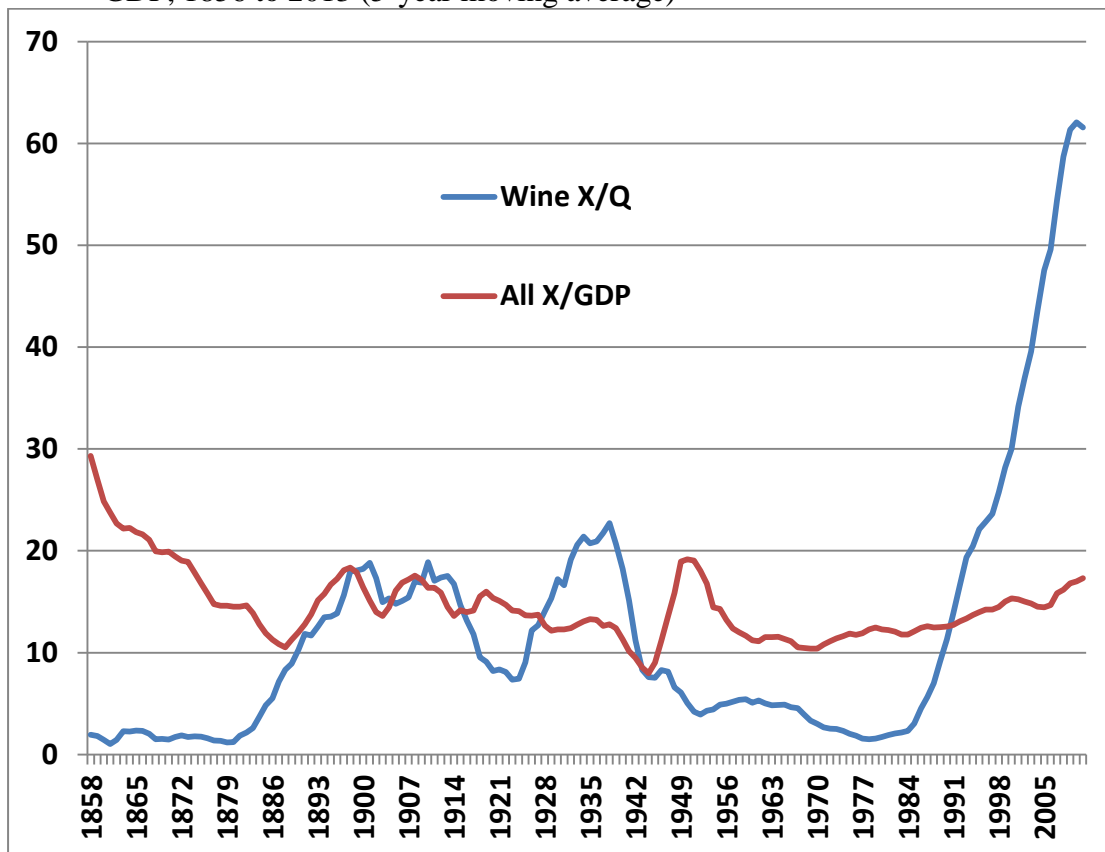
(a) New South Wales, South Australia and Victoria, annual



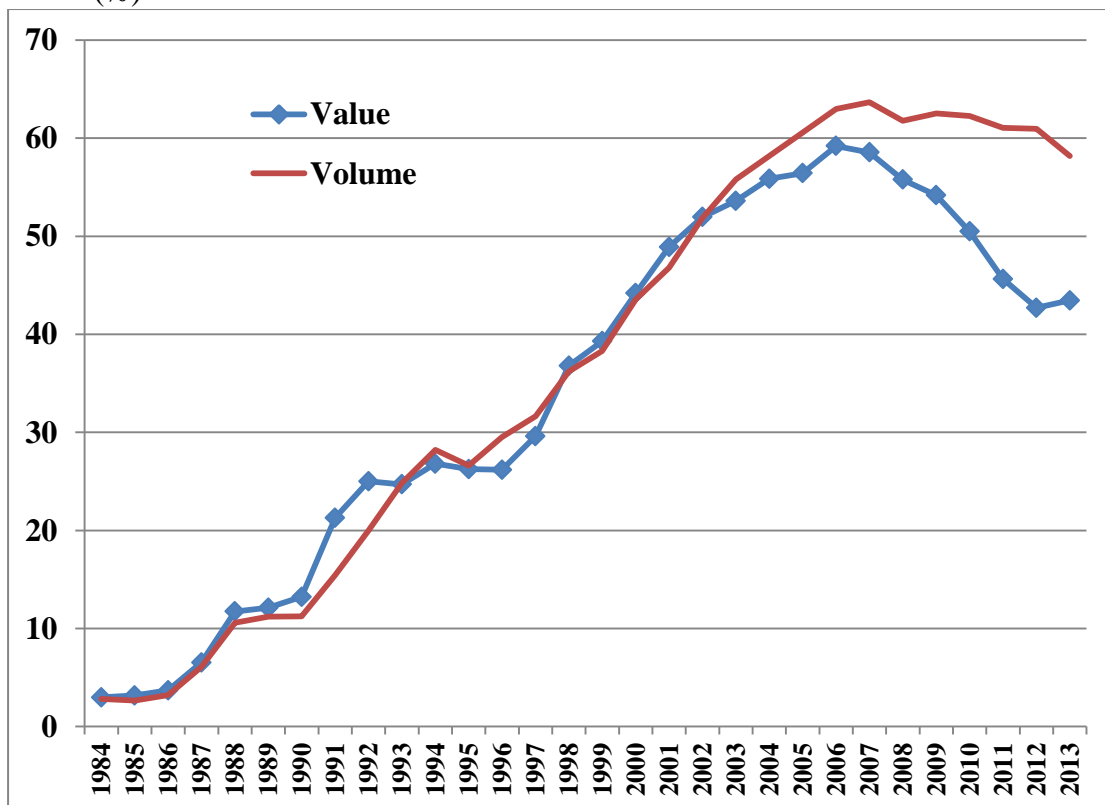
(b) NSW, SA, Vic and WA, 5-year averages



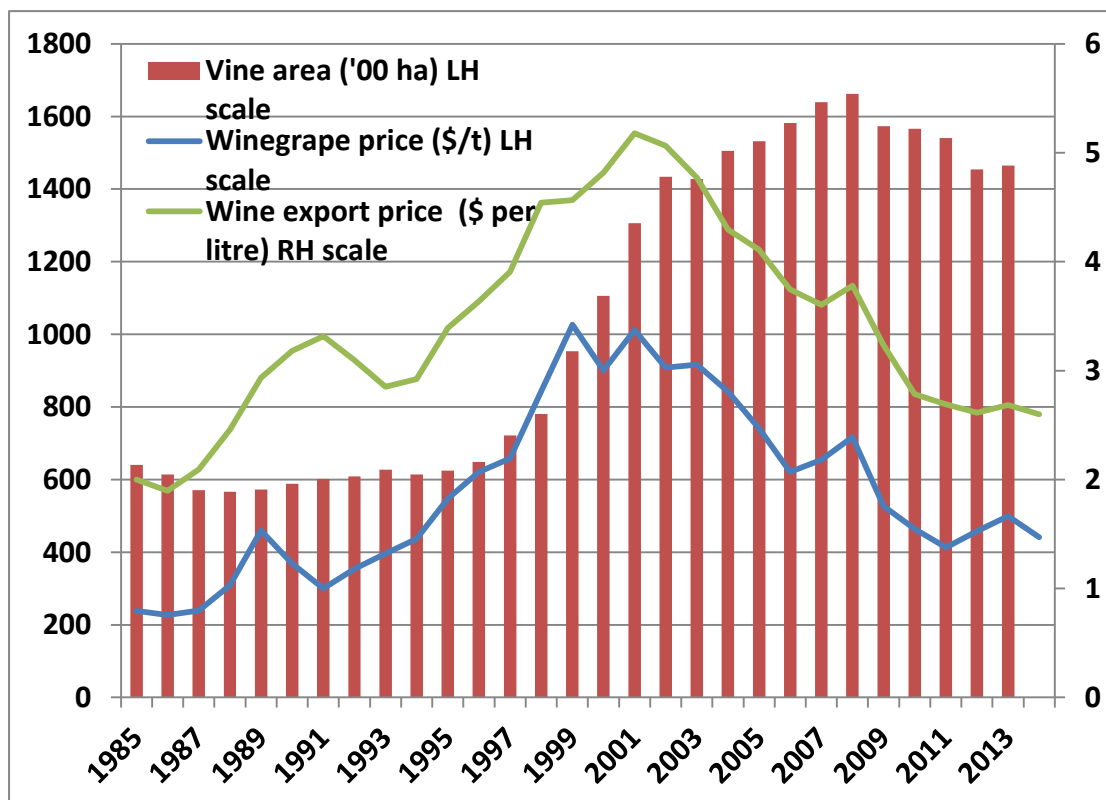
15. Share of wine production exported, and all merchandise exports as a share of GDP, 1856 to 2013 (5-year moving average)



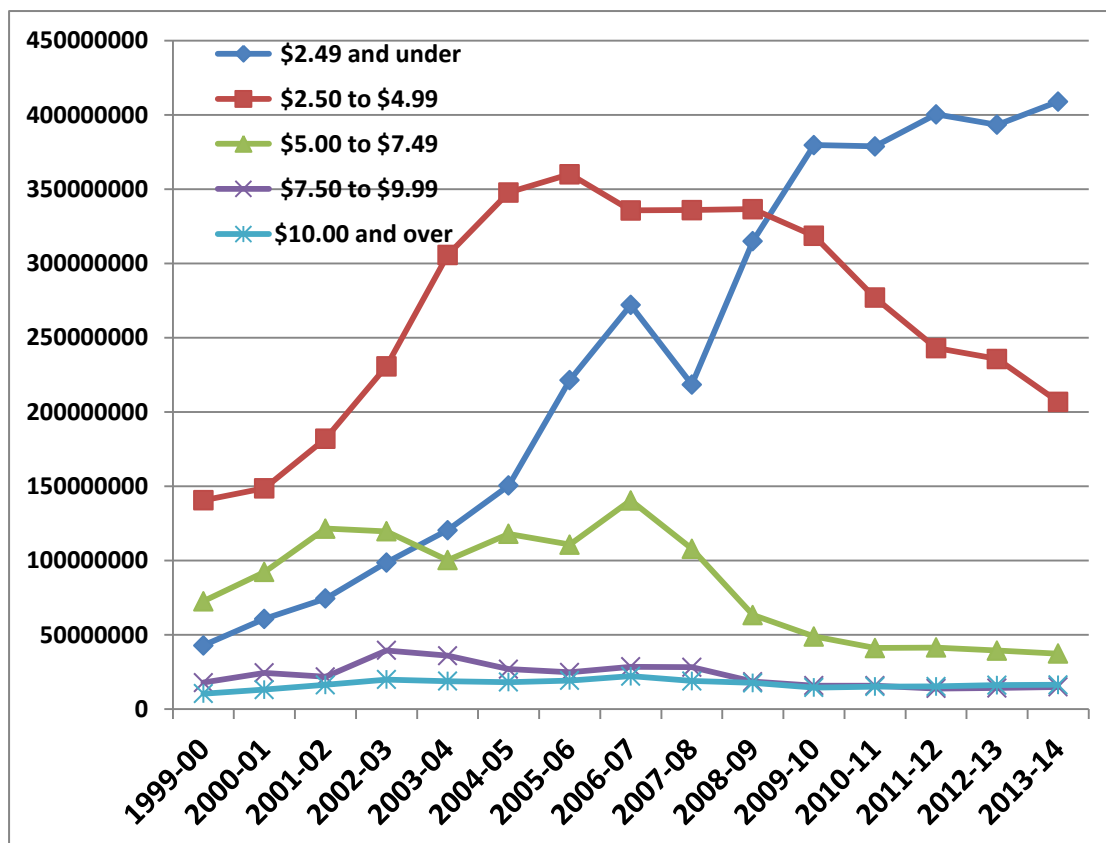
16. Volume and value shares of exports in sales of Australian wine, 1984 to 2013 (%)



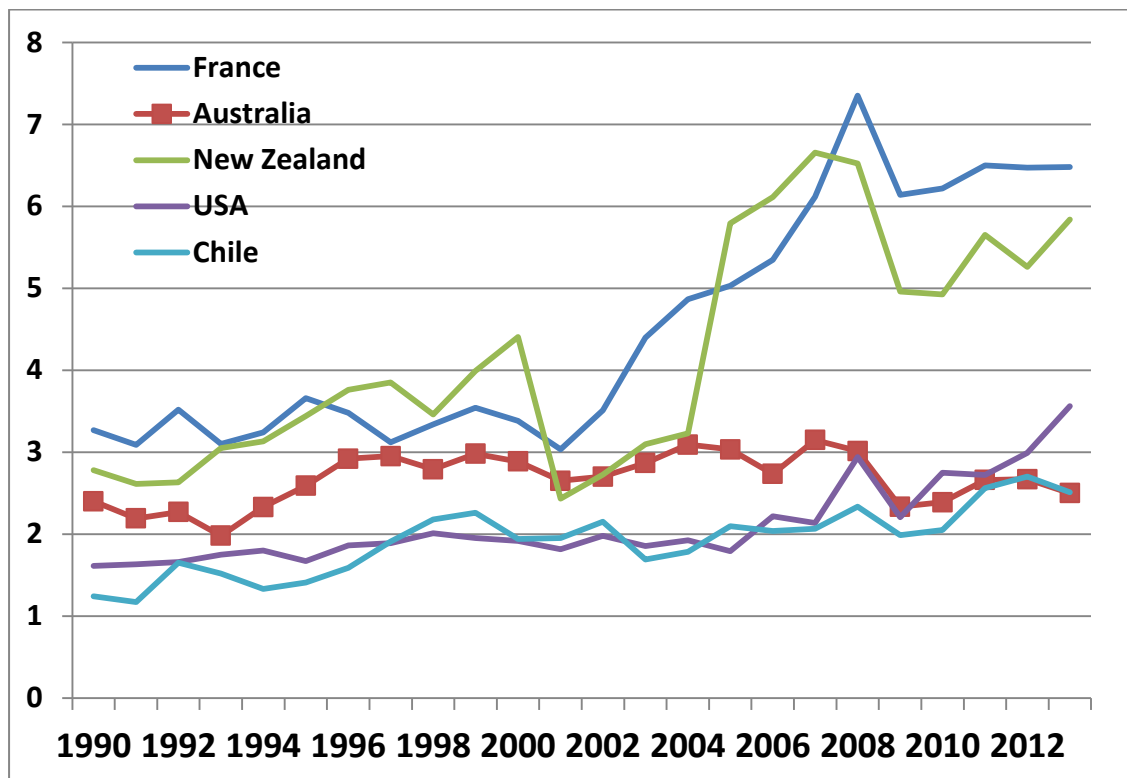
17. Average AUD price of winegrapes and of exports, and vine area, 1986 to 2014



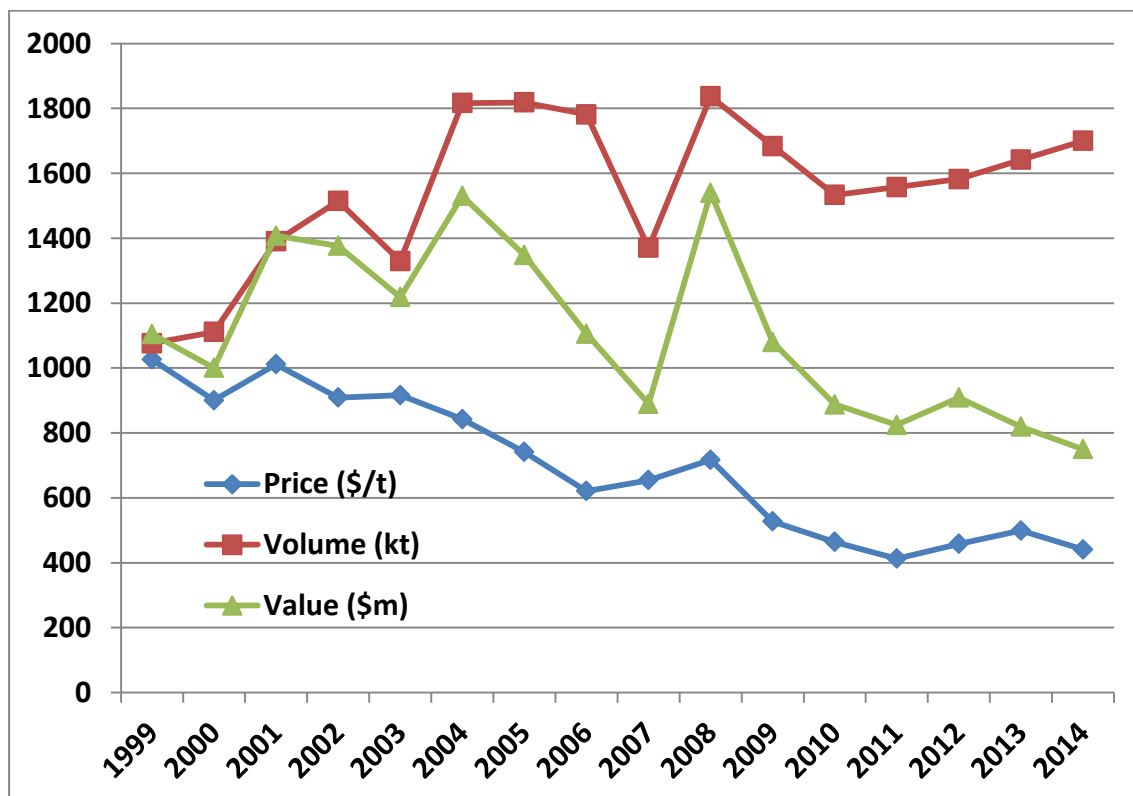
18. Volumes of wine exports by AUD price segment, 2000 to 2014 (litres)



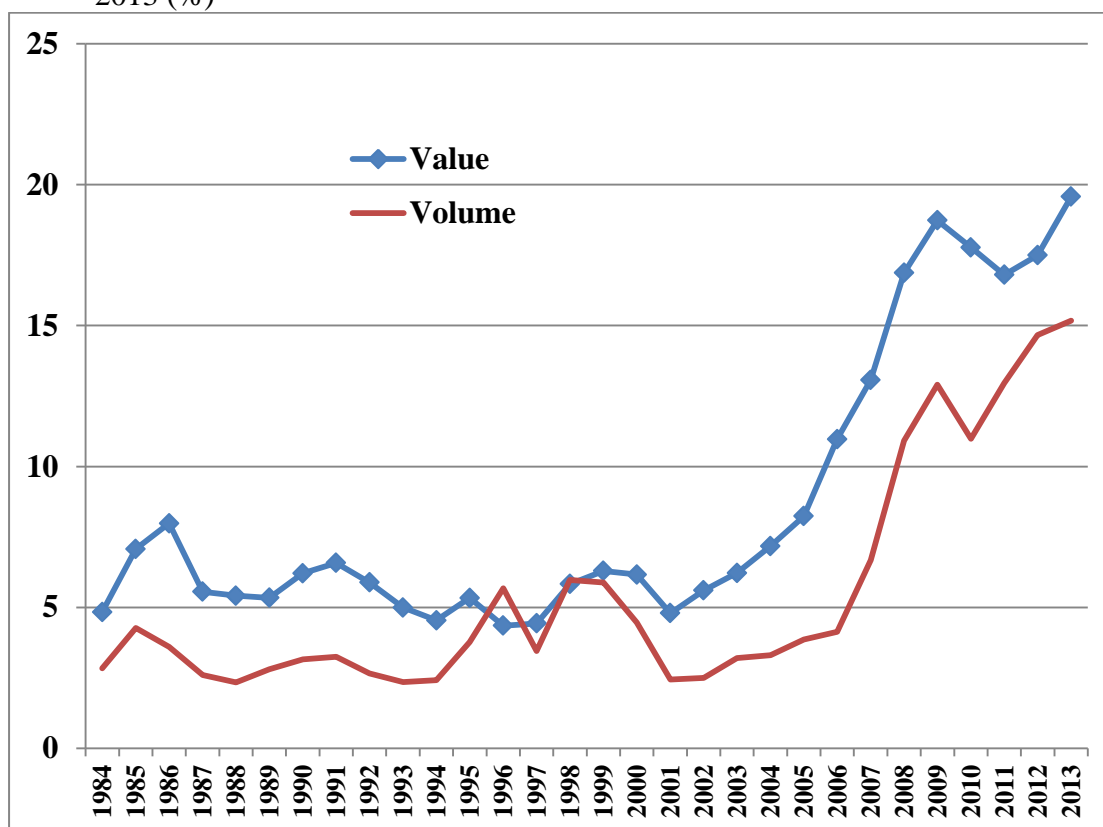
19. Unit value of wine exports, Australia and other New World countries, 1990 to 2013 (US\$/litre)



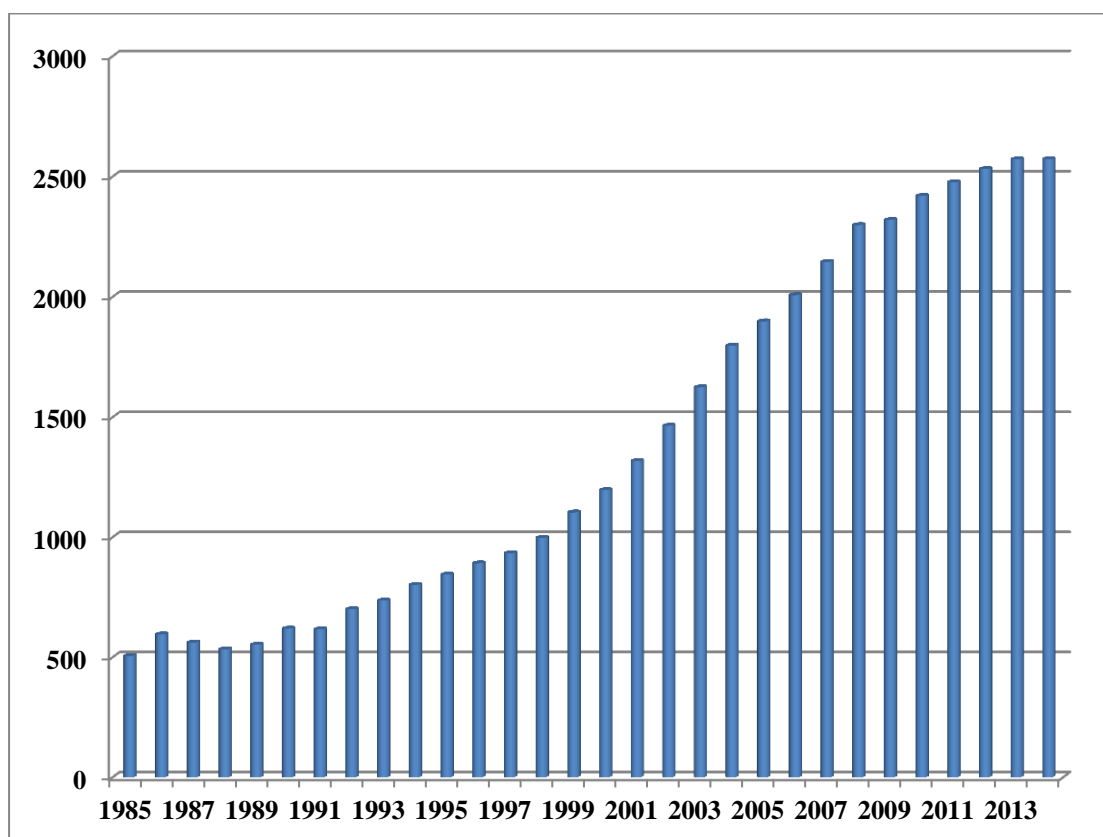
20. Winegrape price, and volume and value of winegrape production, 1999 to 2014



21. Volume and value shares of imports in wine consumption in Australia, 1984 to 2013 (%)

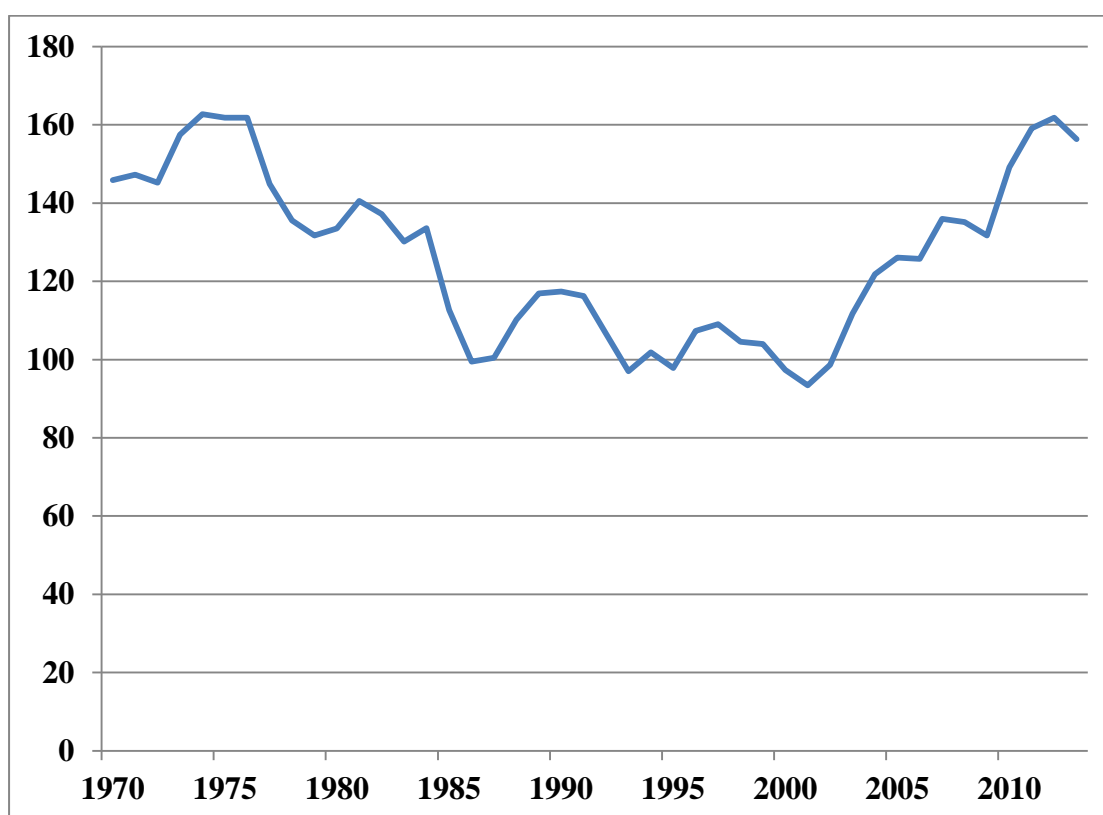


22. Number of wineries in Australia, 1985 to 2013

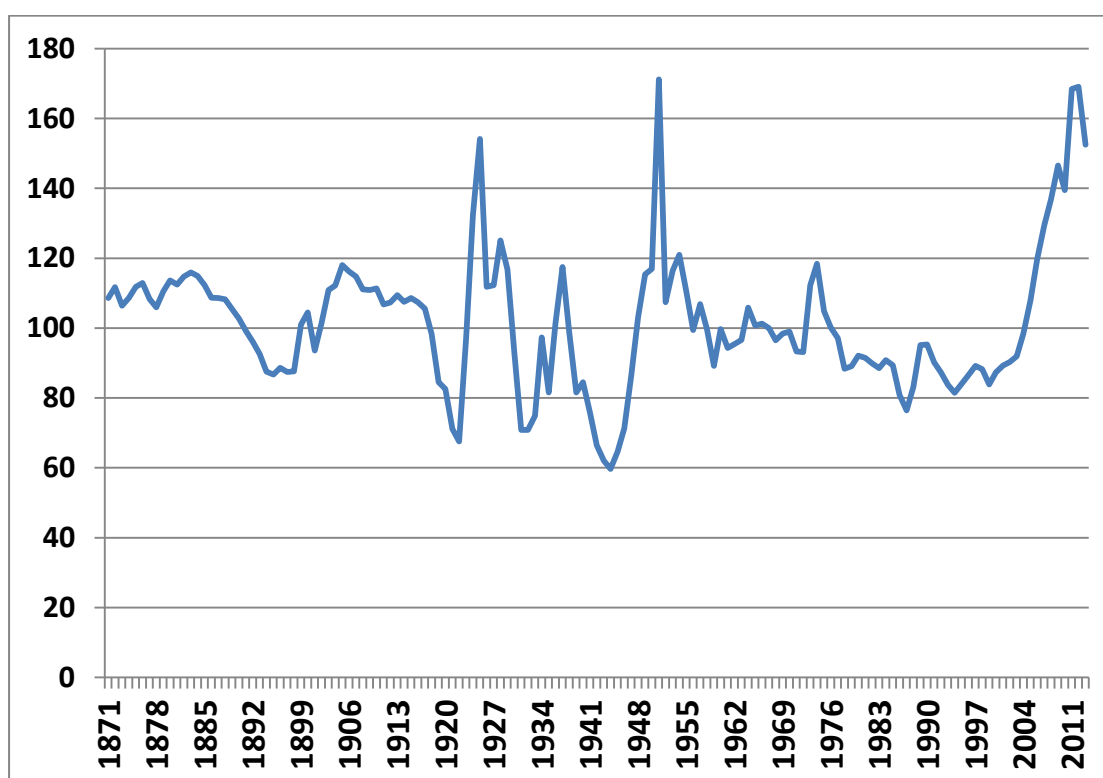


23. Real exchange rate, 1970 to 2013 and international terms of trade, 1871 to 2013

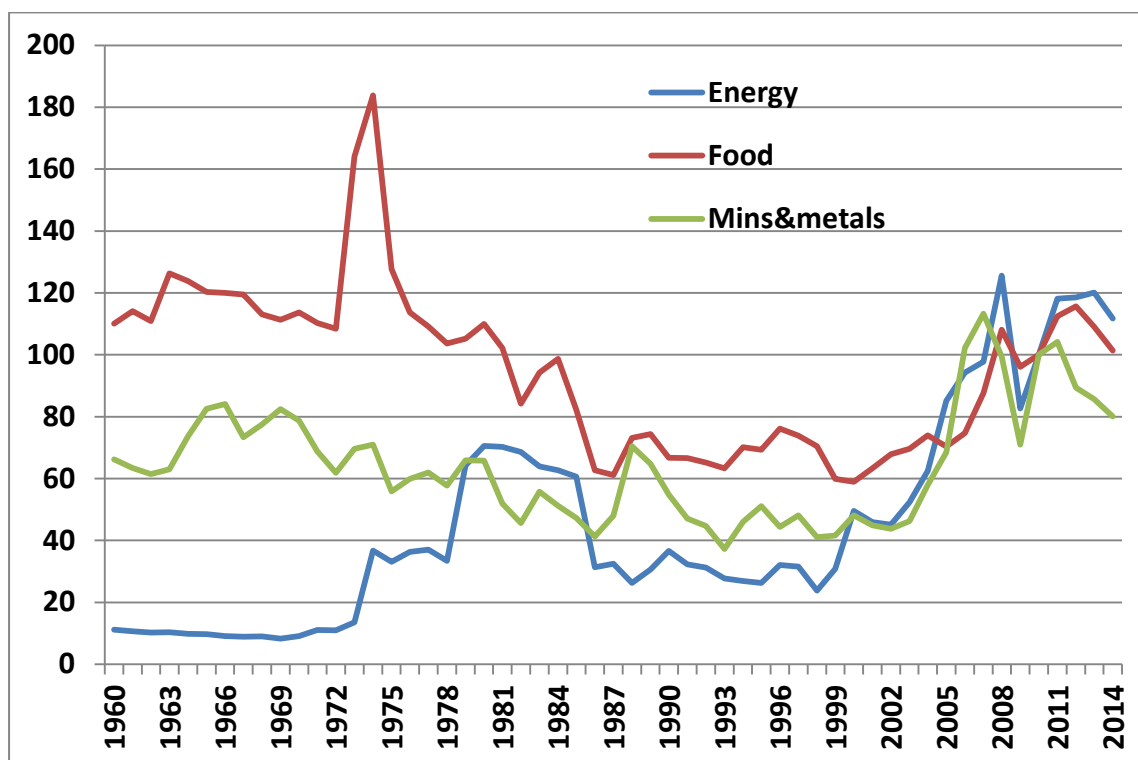
(a) AUD real exchange rate, trade-weighted average



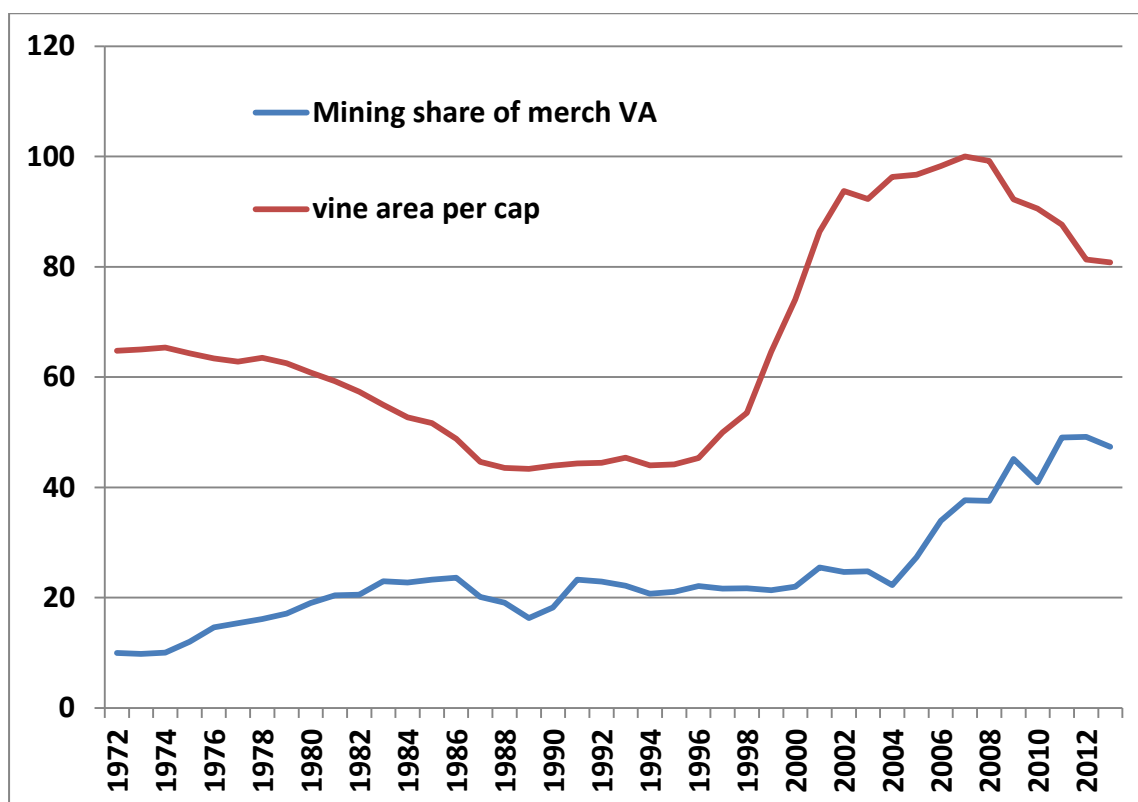
(b) Australia's international terms of trade



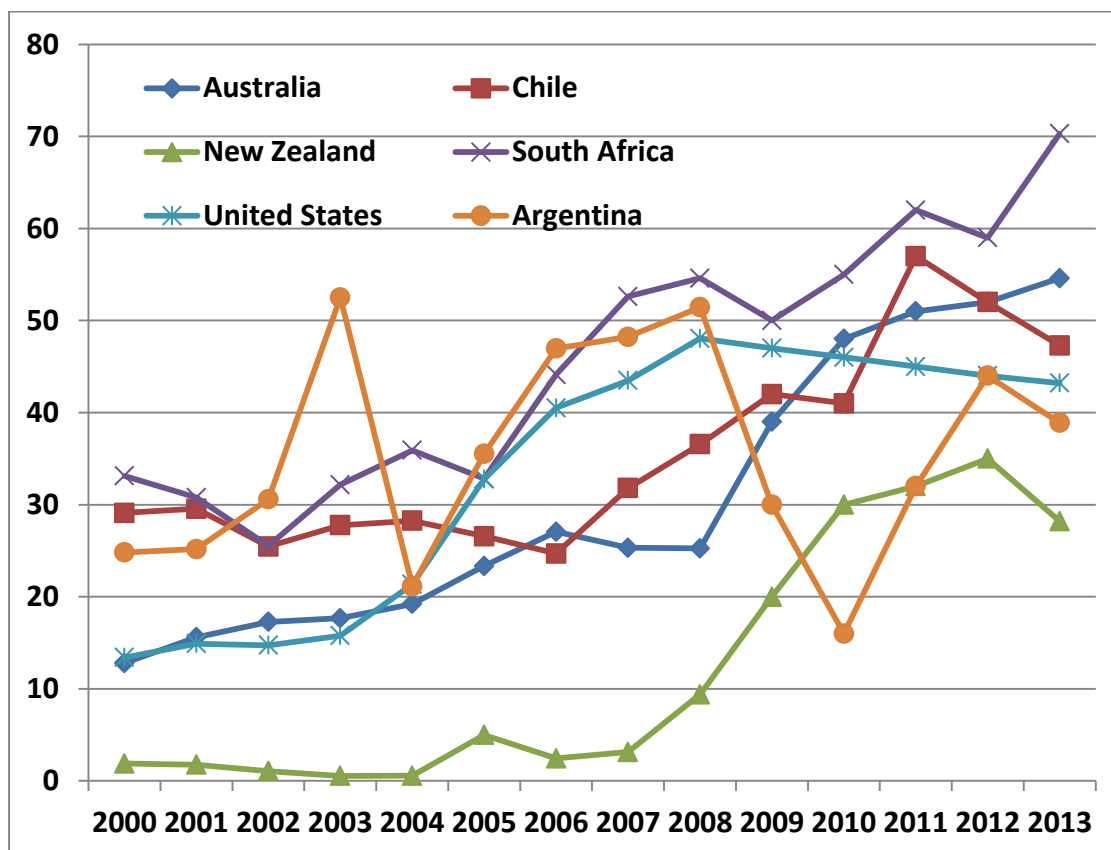
24. Indexes of real international prices of food, energy raw materials and minerals, 1960 to 2014 (US\$, 2005 = 100)



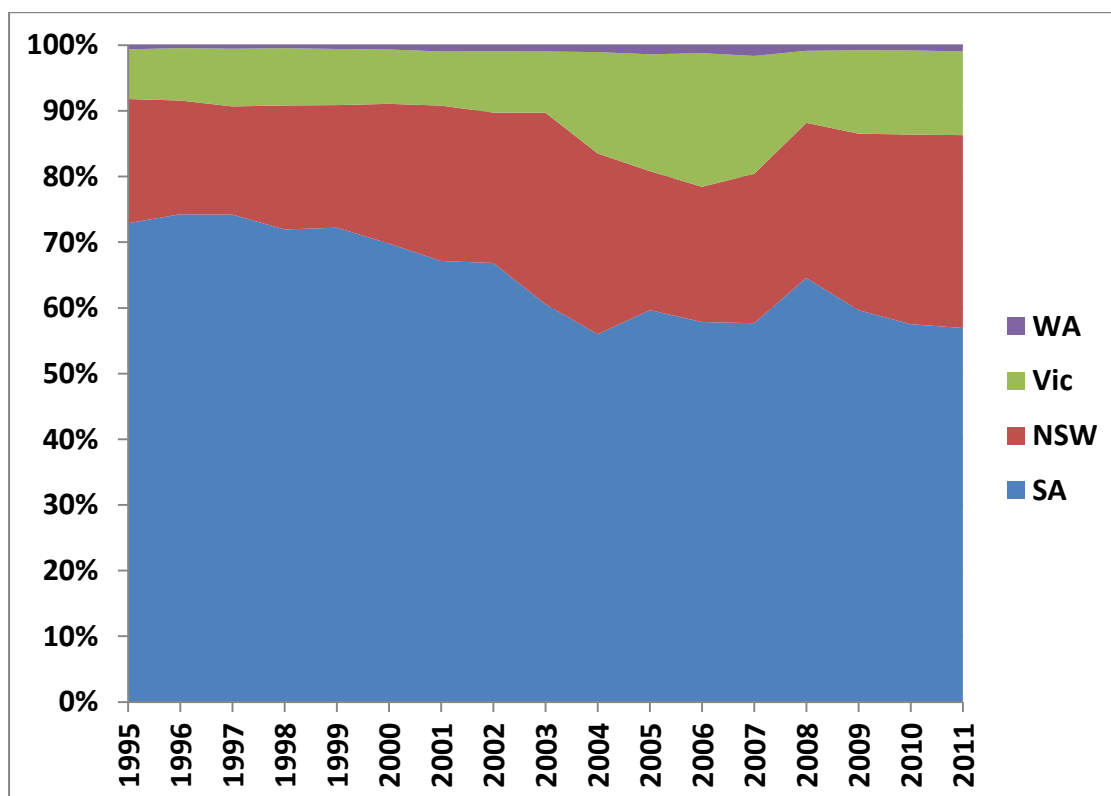
25. Mining share of merchandise value added and vine area per capita, 1972 to 2013 (% of GDP excluding services, and hectares)



26. Share of bulk wine in volume of exports, Australia and other key exporters, 2000 to 2013 (%)

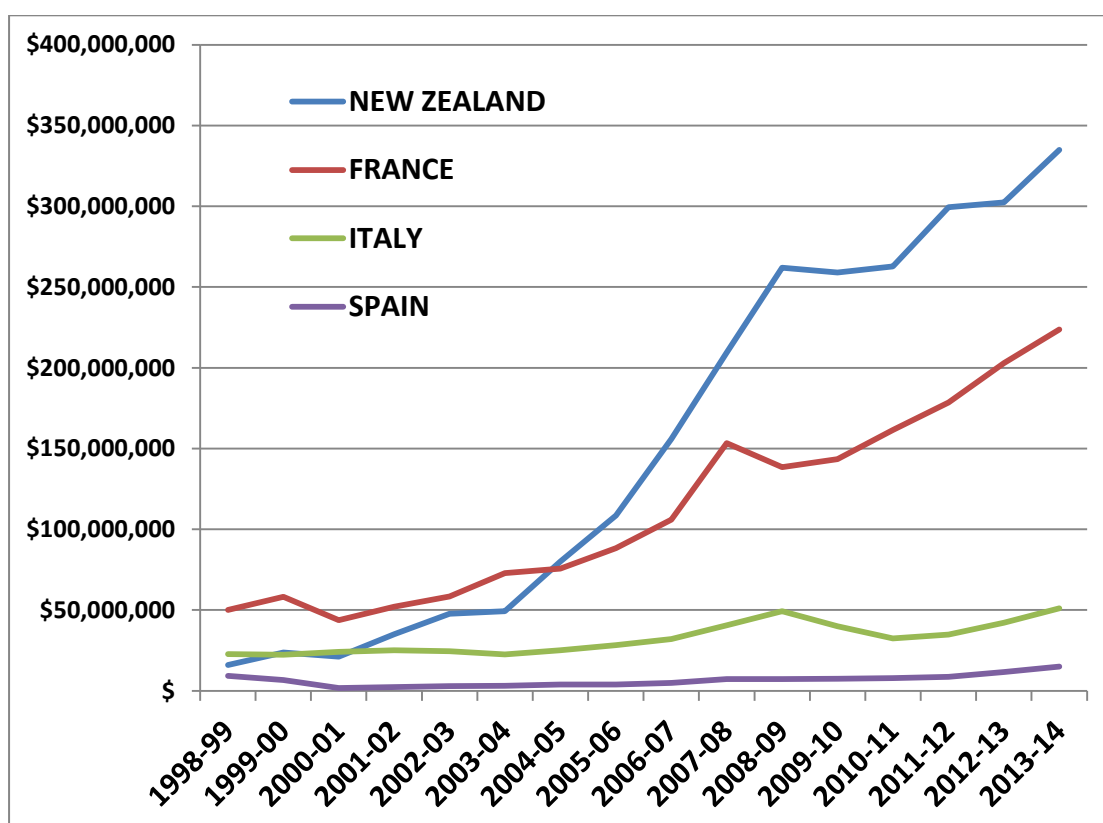


27. Shares of wine exports, by State of processing, 1995 to 2011 (%)

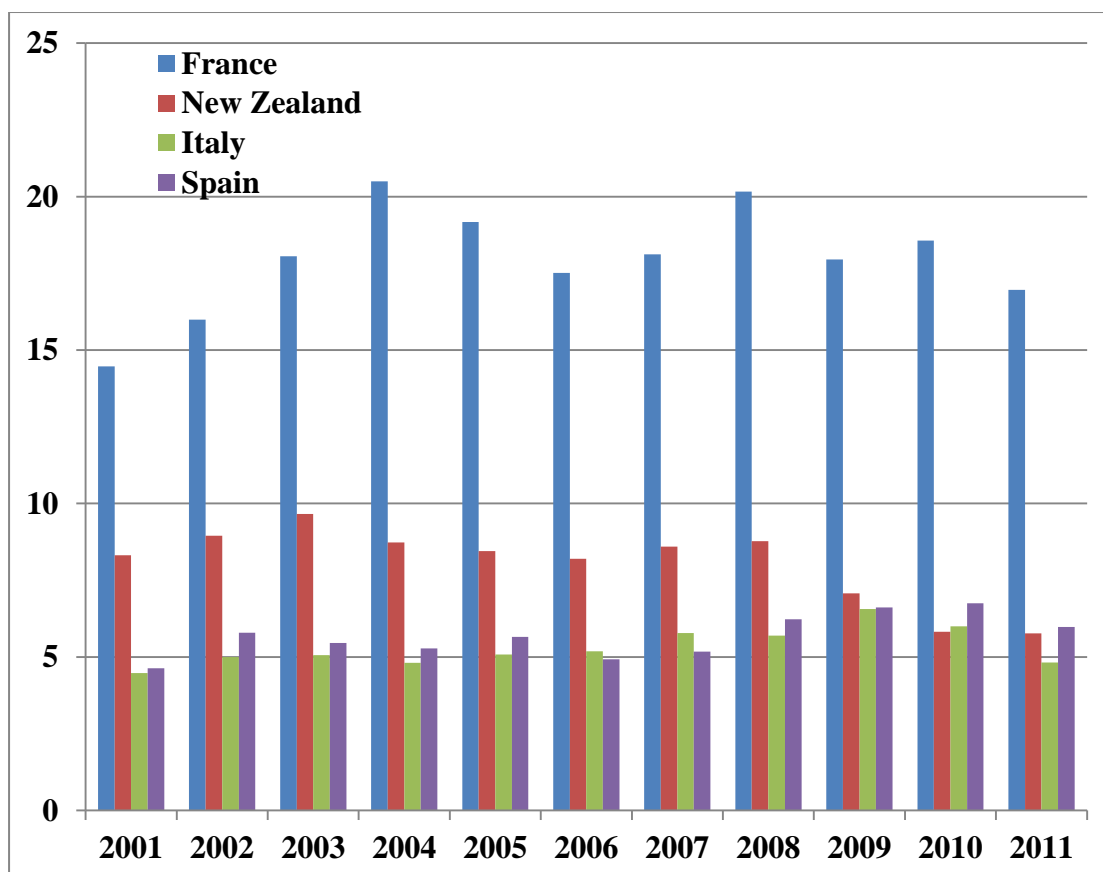




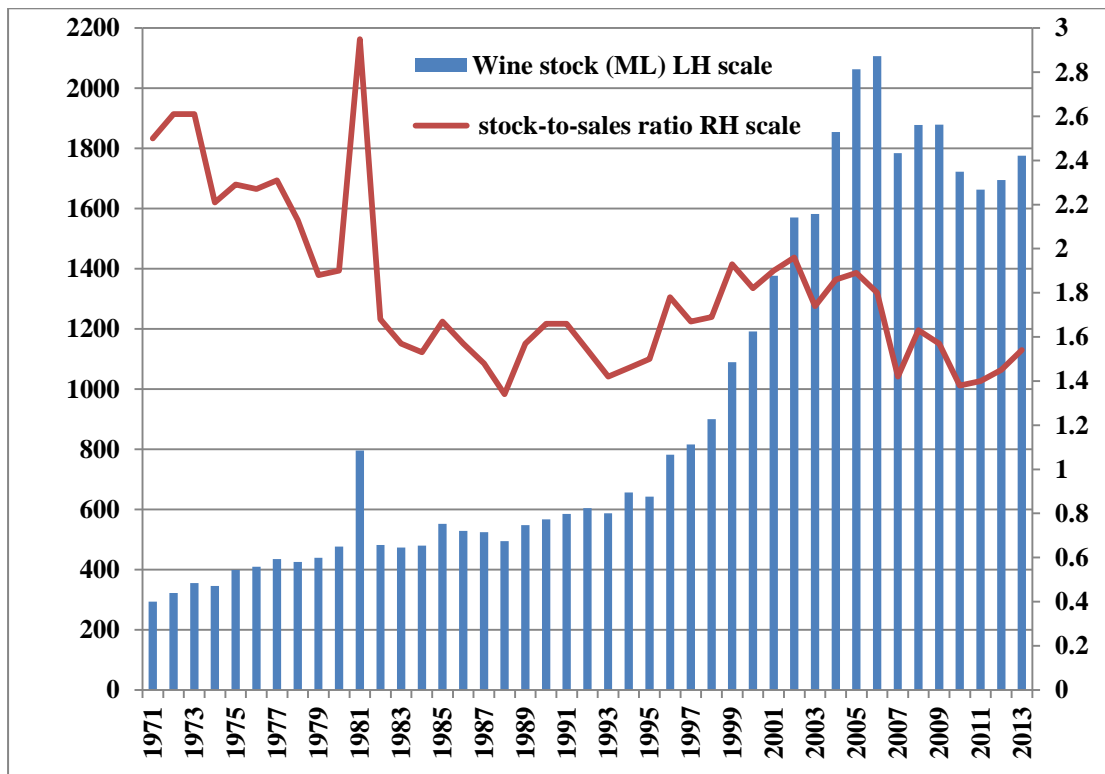
28. Total value of wine imports, by source, 1999 to 2014 (AUD)



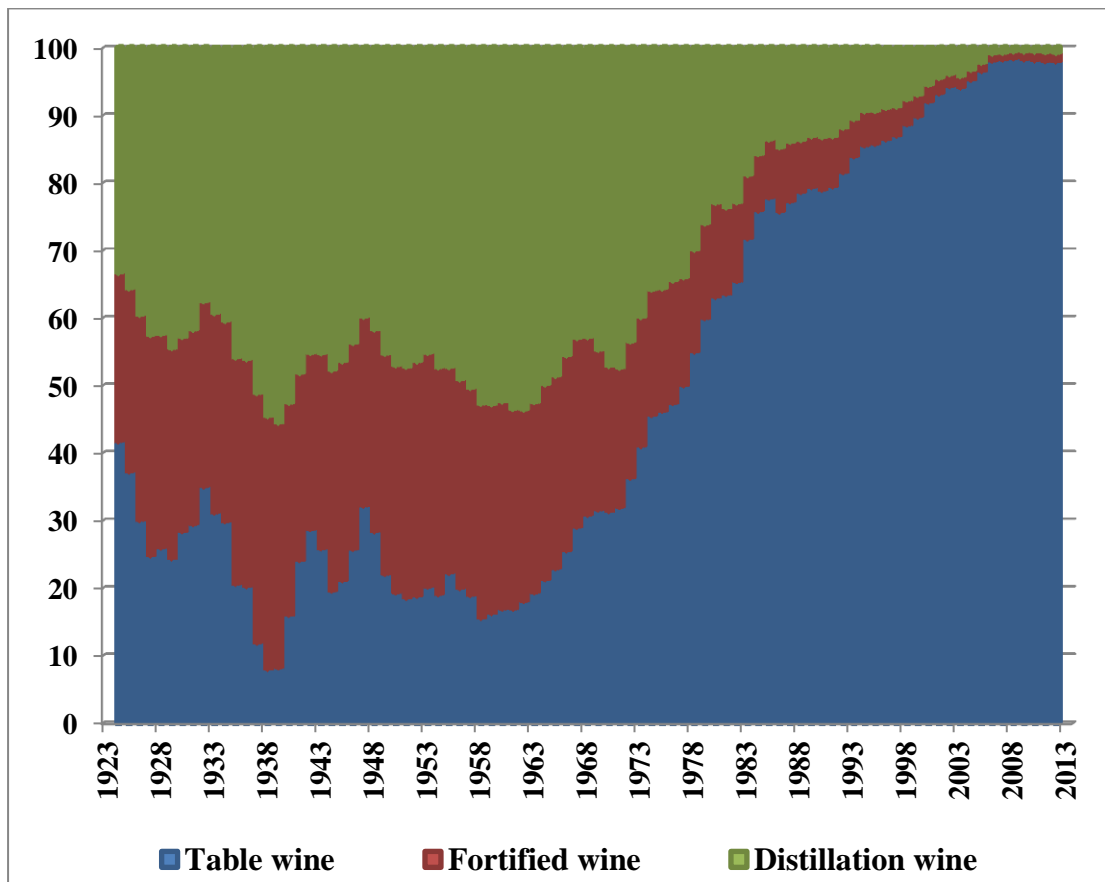
29. Unit value of wine imports, by source, 2001 to 2011 (US\$/litre)



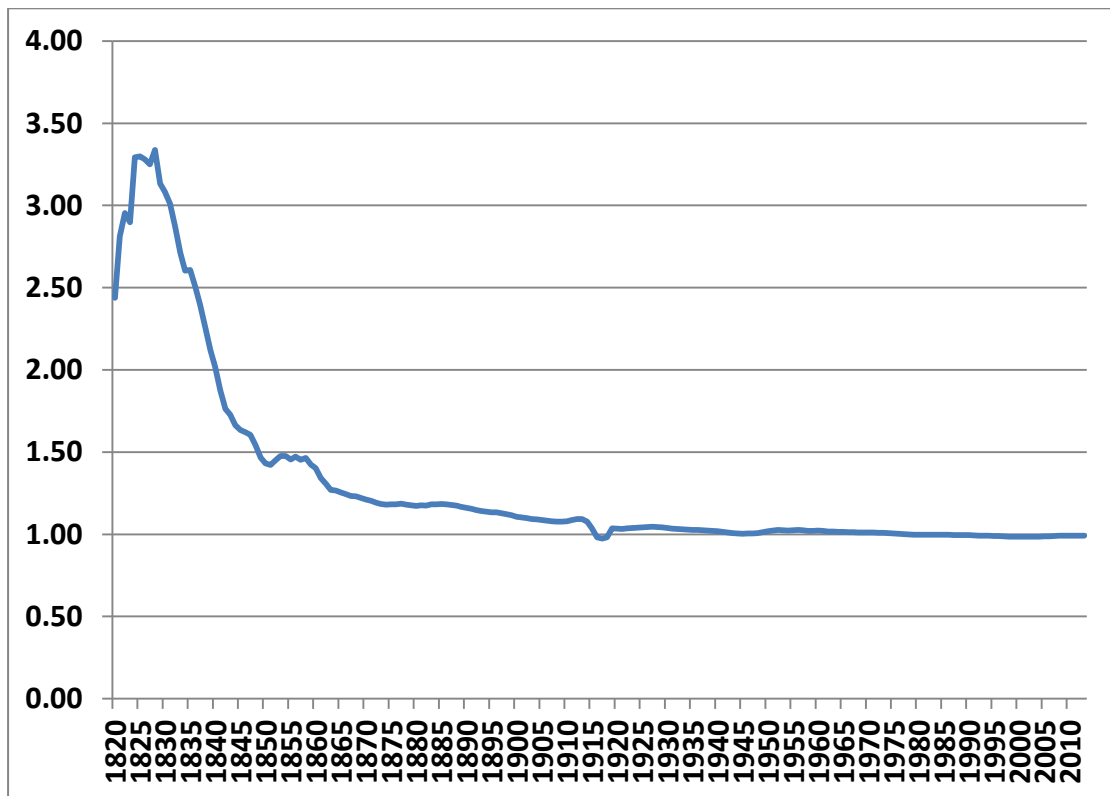
30. Closing stock and stocks-to-sales ratio, 1971 to 2013



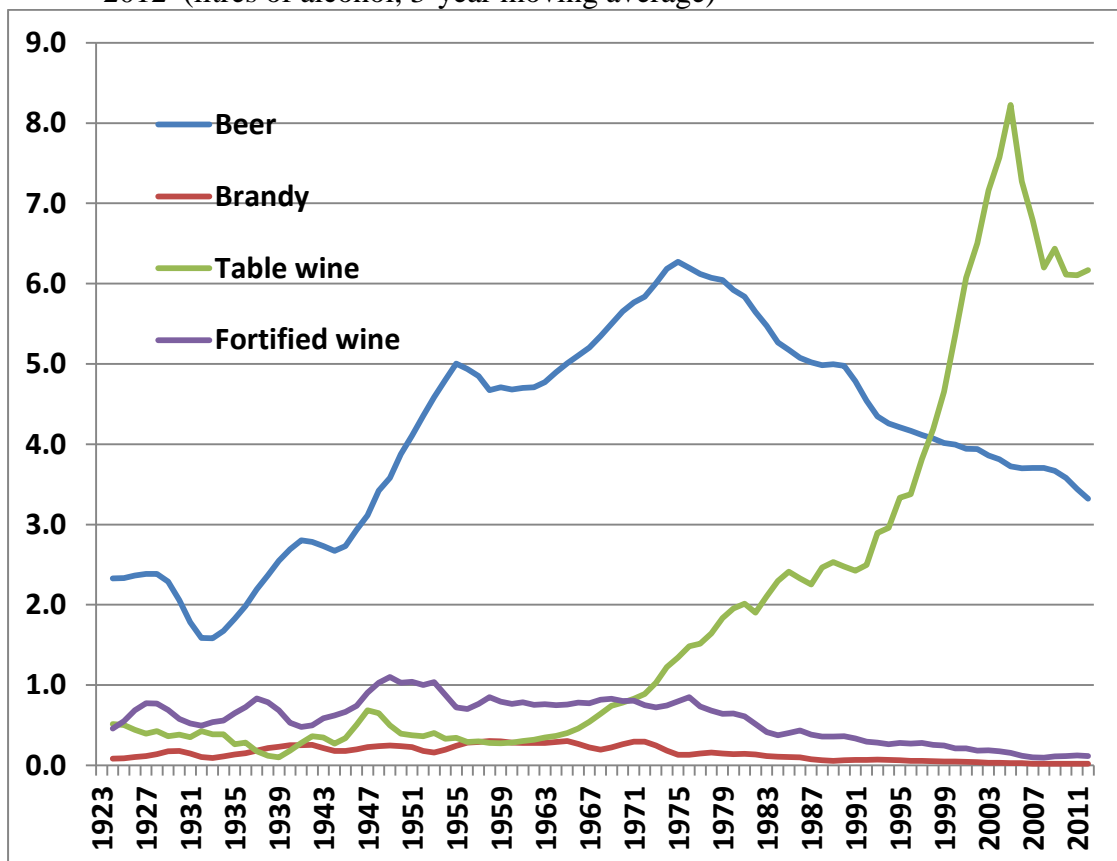
31. Shares of wine production destined for table wine, fortified wine and distillation, 1923 to 2013 (%)



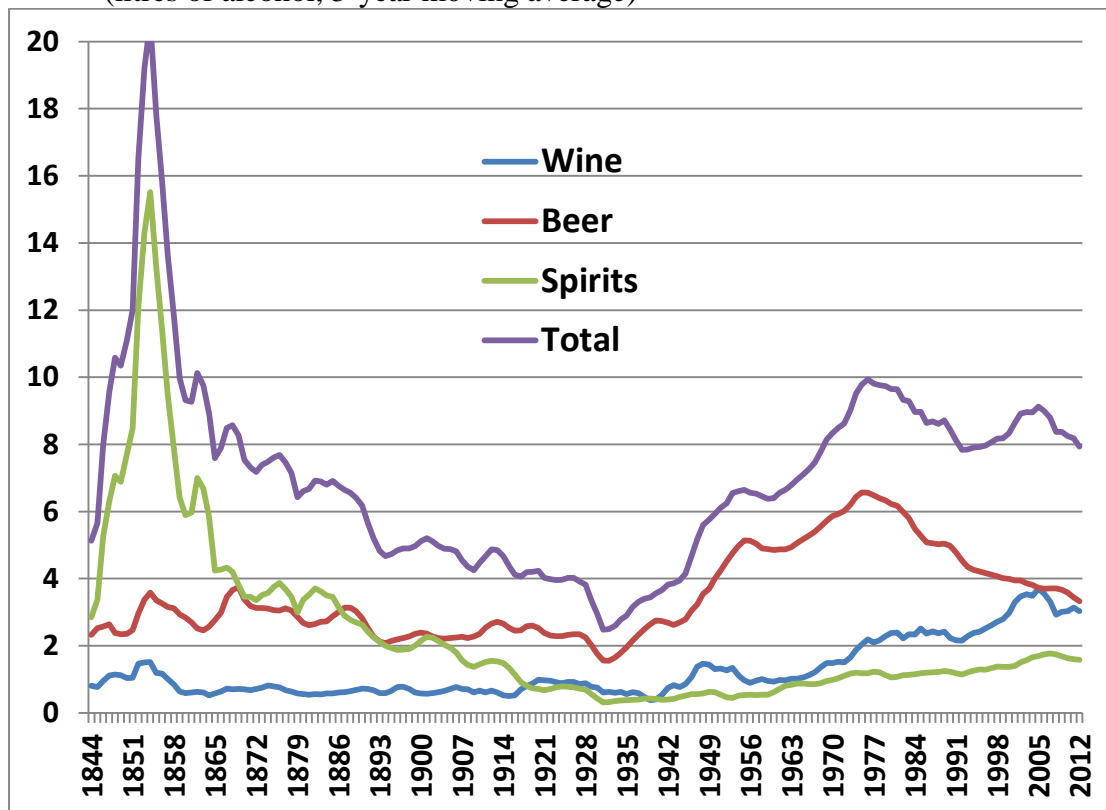
32. Gender ratio, 1820 to 1950 (males per female)



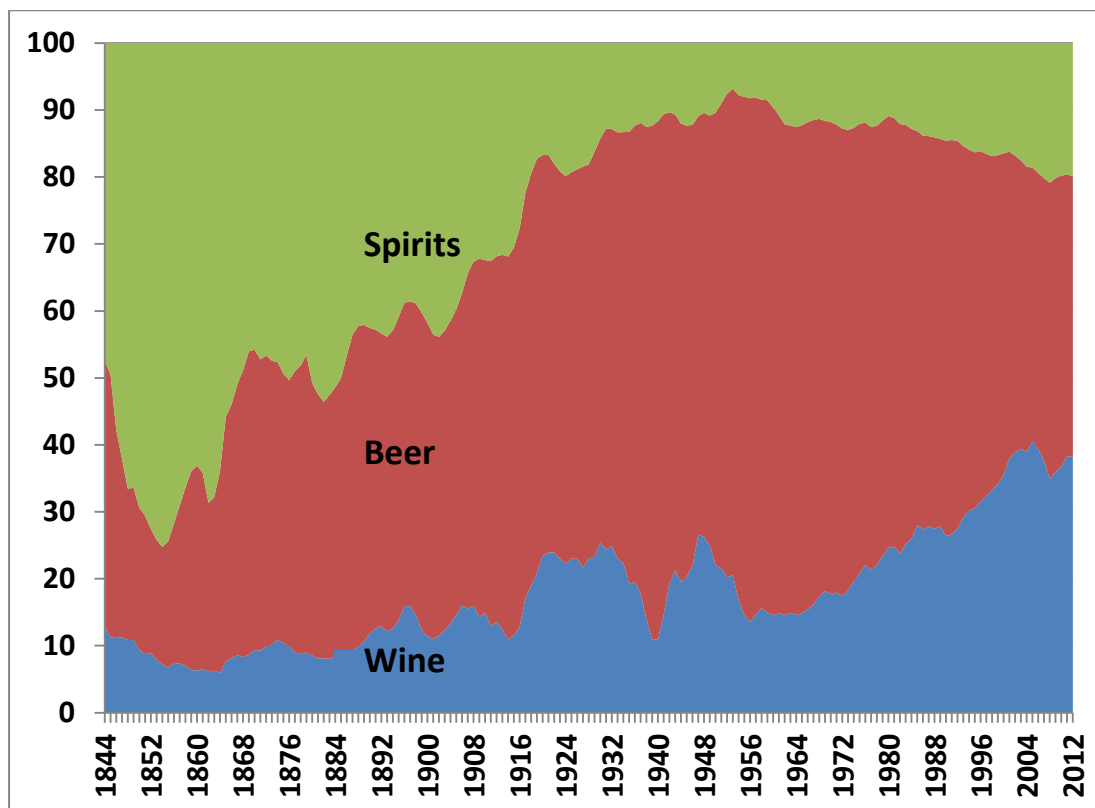
33. Per capita production of beer, table wine, fortified wine, and brandy, 1923 to 2012 (litres of alcohol, 3-year moving average)



34. Per capita consumption of alcohol as wine, beer and spirits, 1843 to 2013  
(litres of alcohol, 3-year moving average)

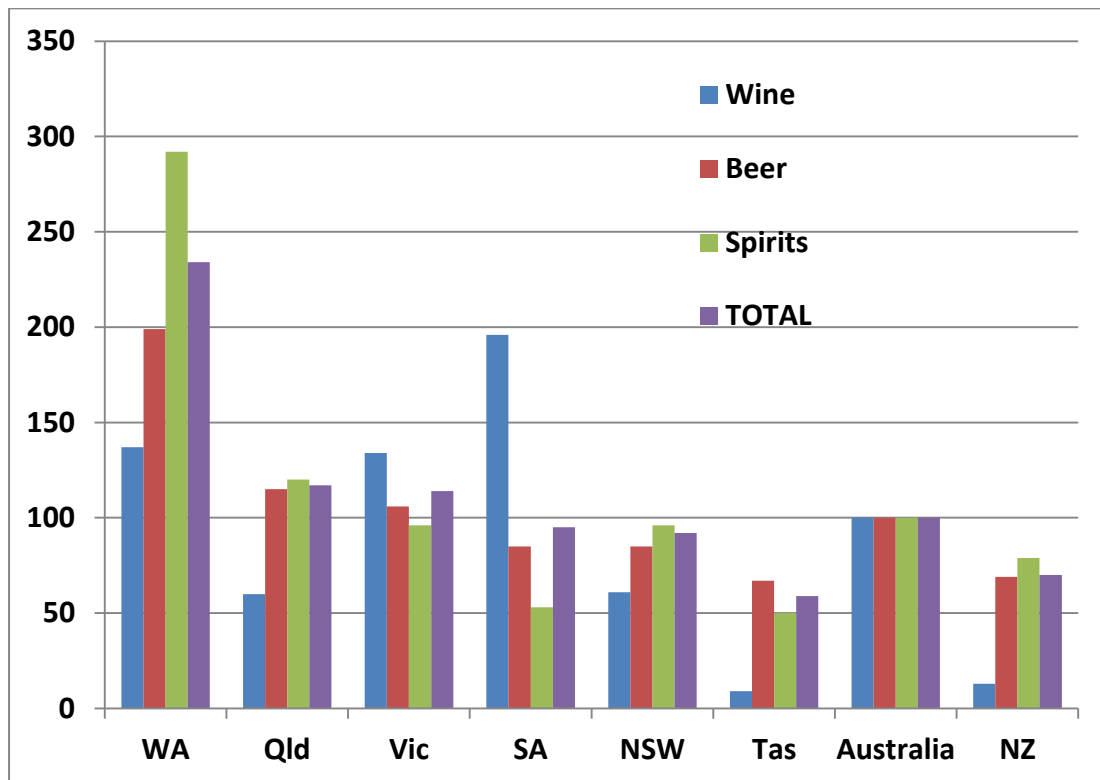


35. Shares of wine, beer and spirits in alcohol consumption, 1843 to 2013 (% alcohol, 3-year moving average)

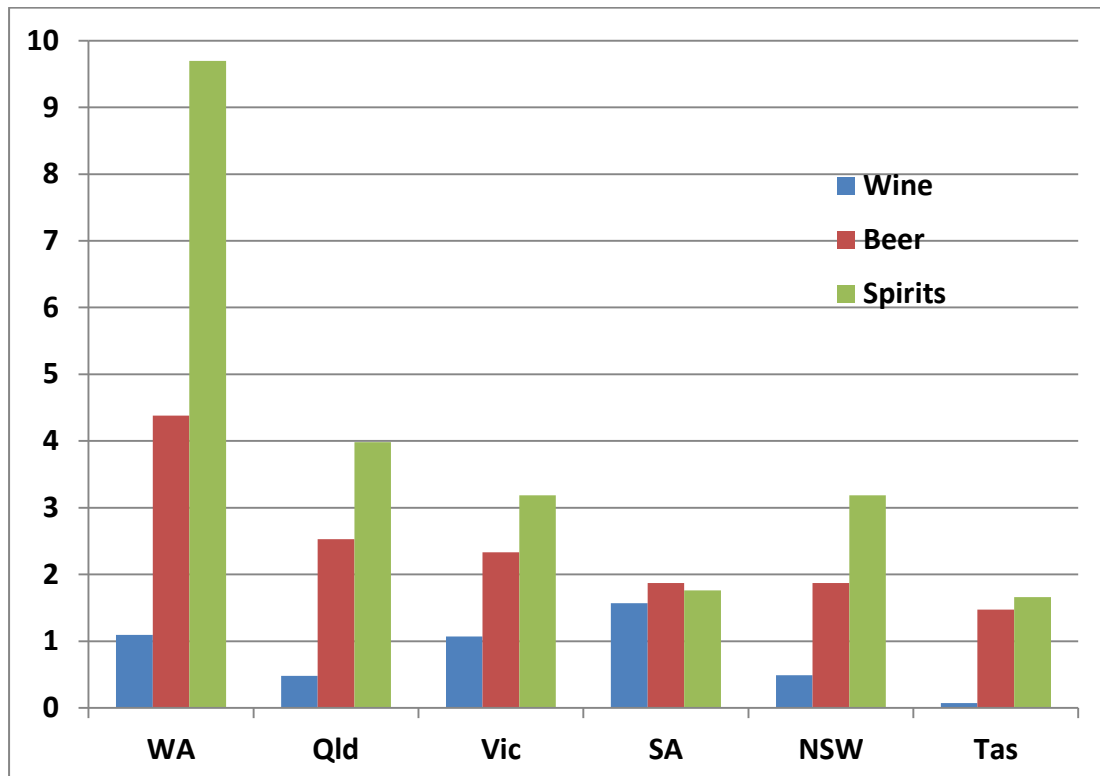


36. Late colonial per capita consumption of wine, beer and spirits, 1896

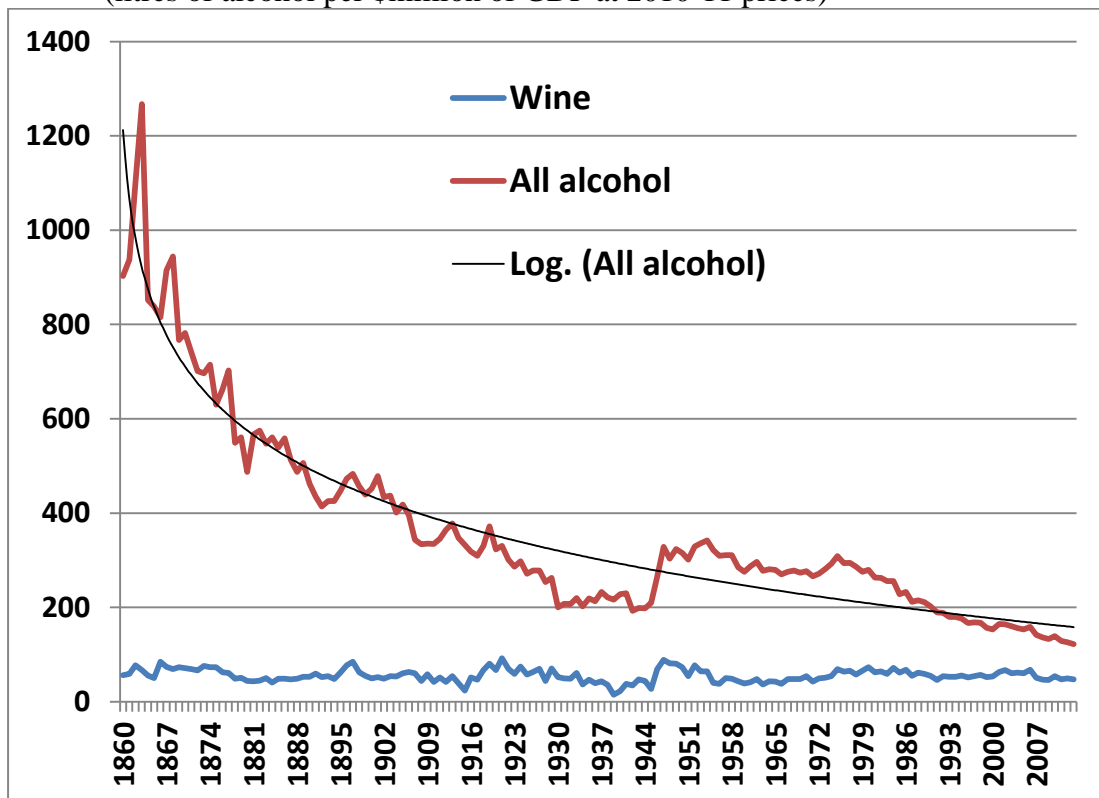
(a) Relative to Australian average (%)



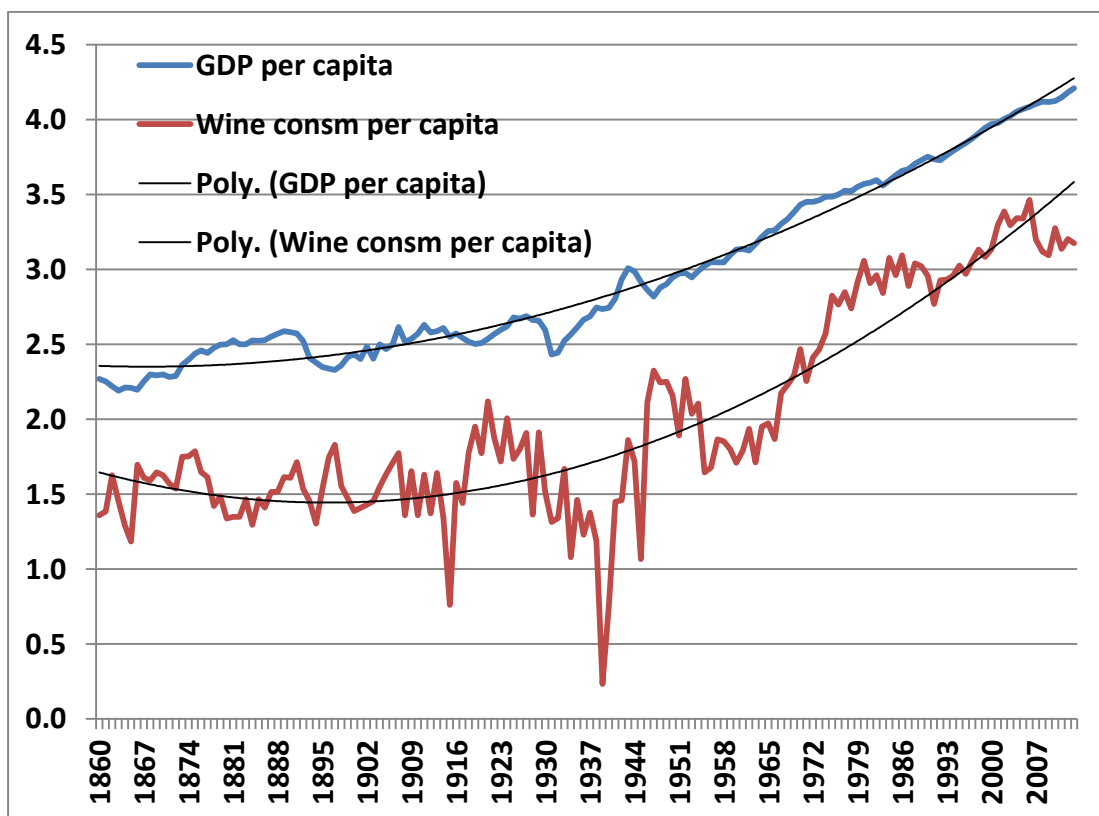
(b) Litres of alcohol



37. Wine and total alcohol consumption per \$ of real GDP, 1860 to 2013  
(litres of alcohol per \$million of GDP at 2010-11 prices)

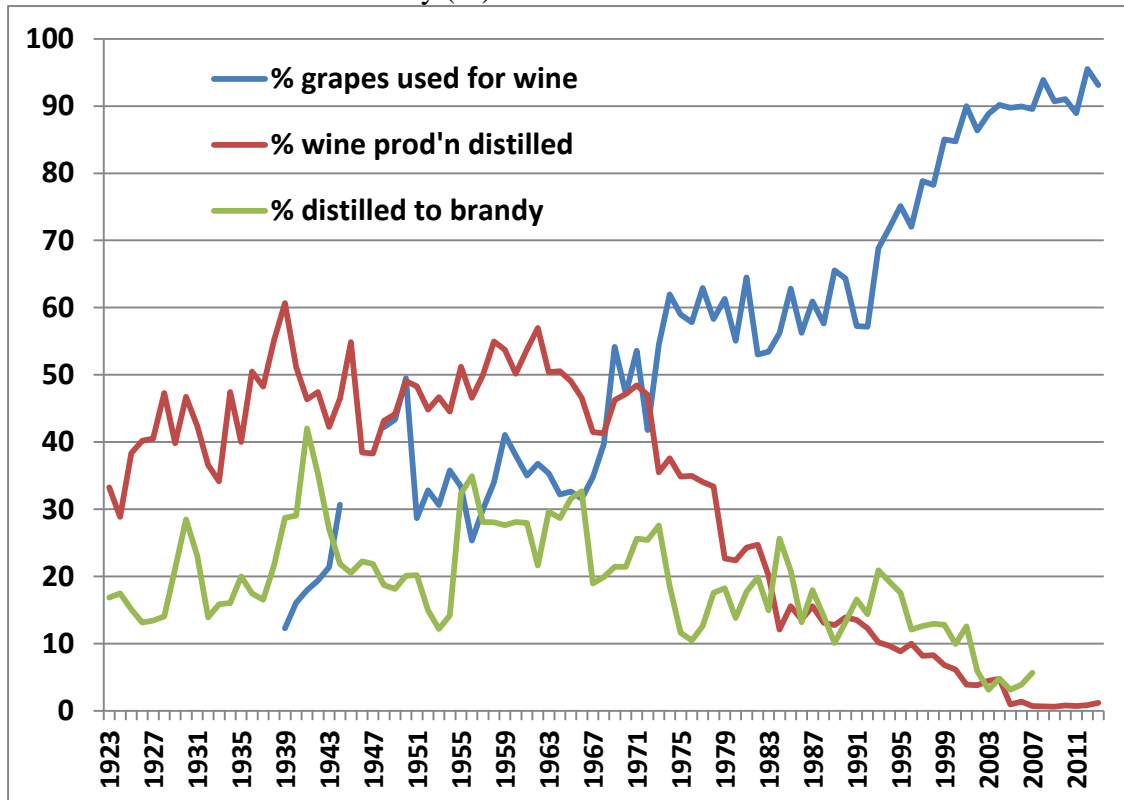


38. Wine consumption and real GDP, per capita, 1860 to 2013 (log-linear scale, polynomial fitted lines)

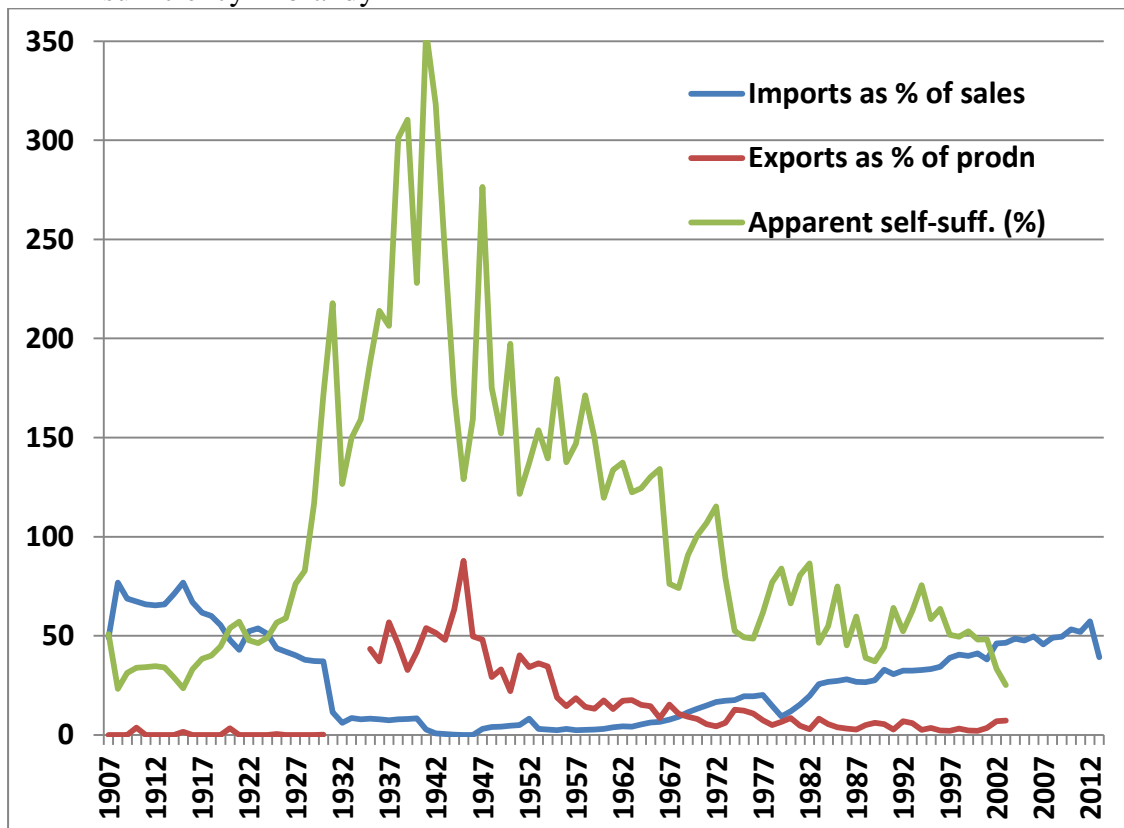


### 39. Structural changes to wine and brandy production, 1907 to 2013

(a) Shares of grape production for winemaking, wine production for distillation, and distillation for brandy (%)

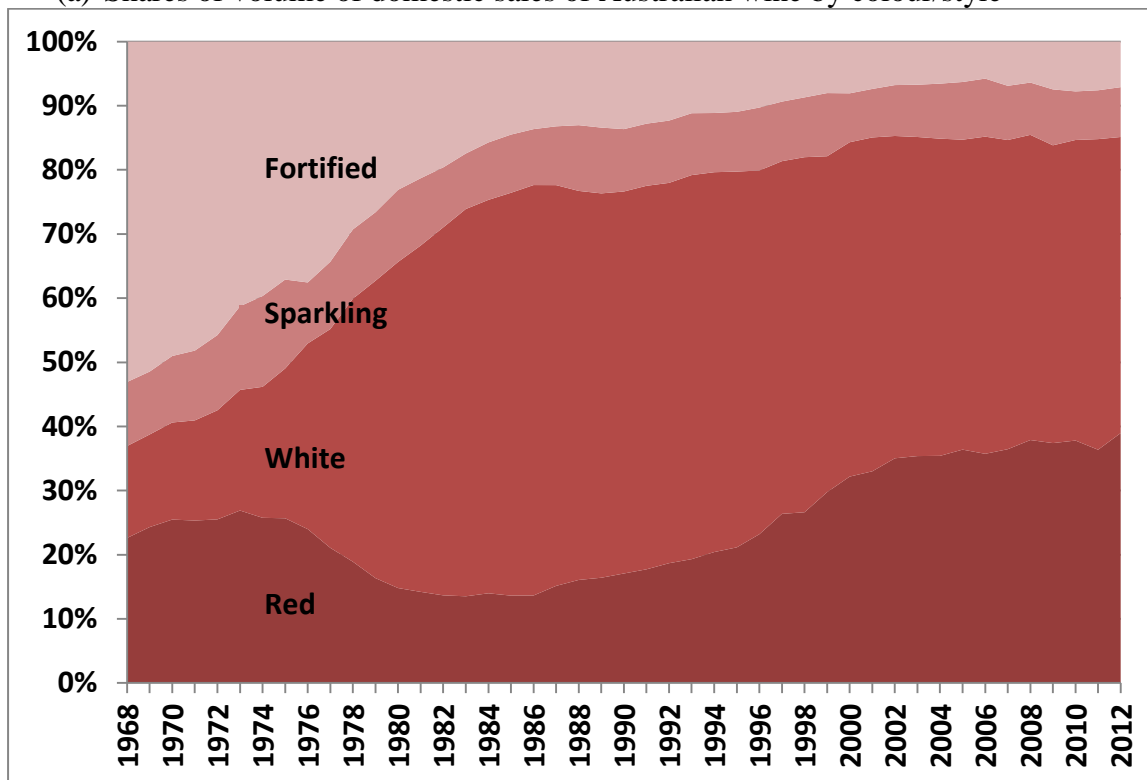


(b) Brandy exports as % of production, imports as % of consumption, and self-sufficiency in brandy

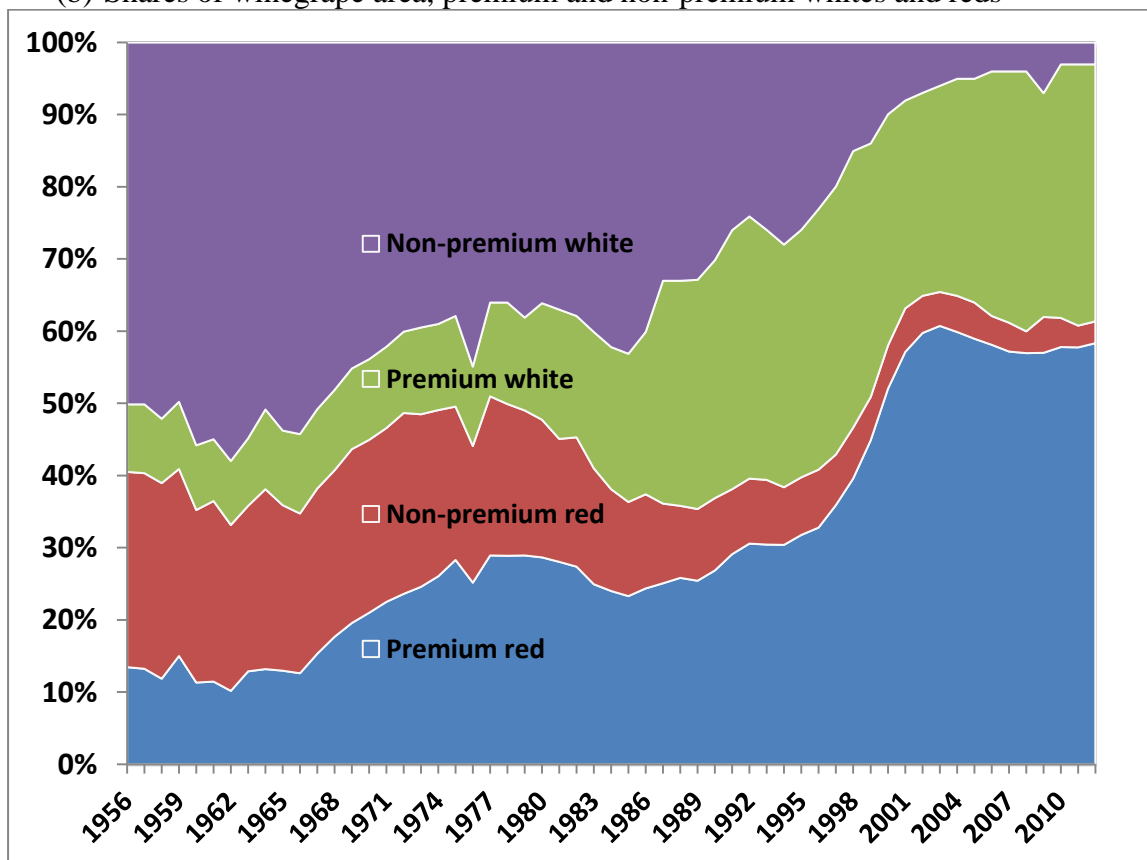


40. Evolution in consumption and plantings by colour/style, 1956 to 2012 (%)

(a) Shares of volume of domestic sales of Australian wine by colour/style

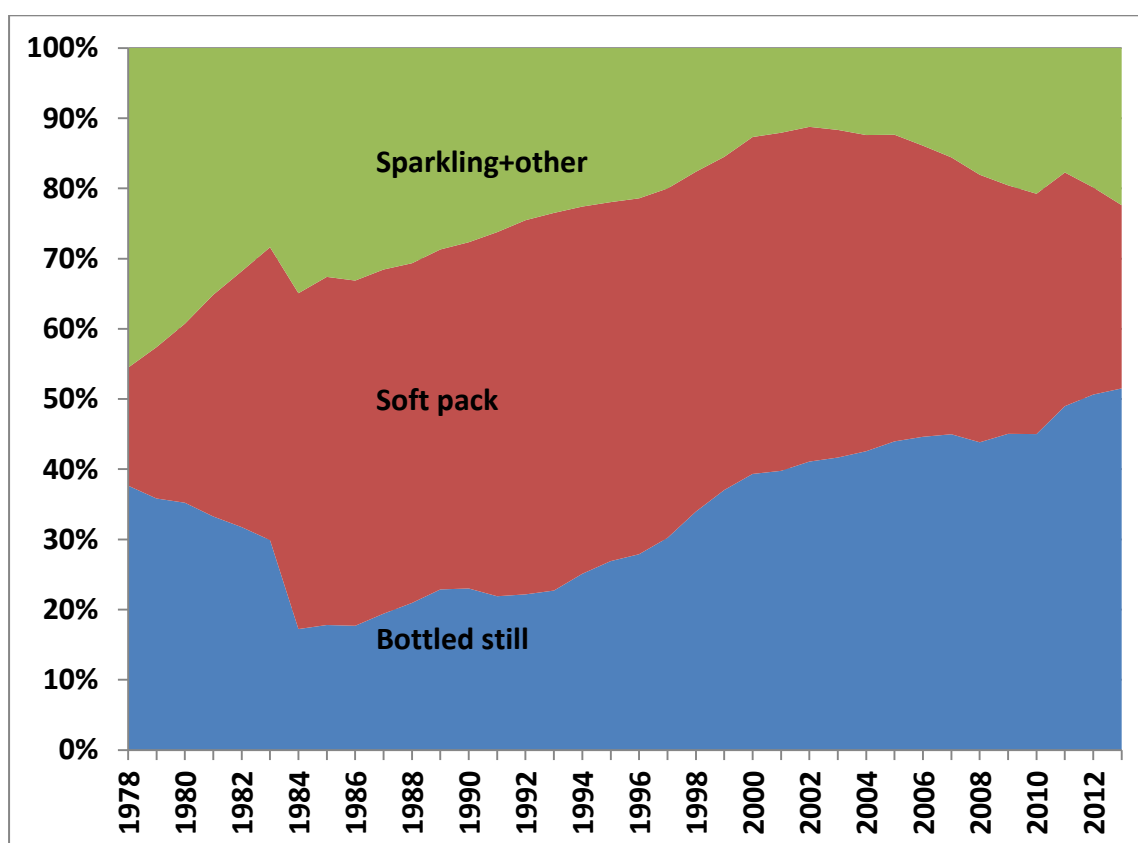


(b) Shares of winegrape area, premium and non-premium whites and reds

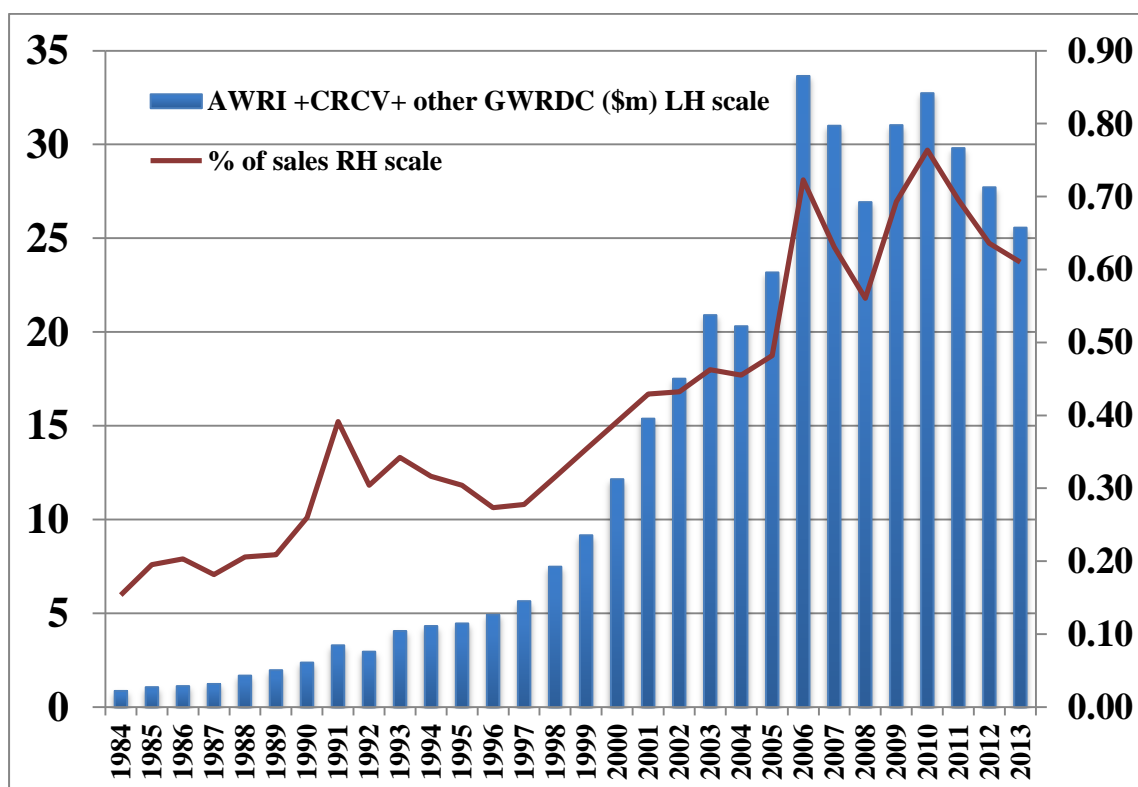




41. Shares of domestic wine sales, by container type, 1978 to 2013 (%)

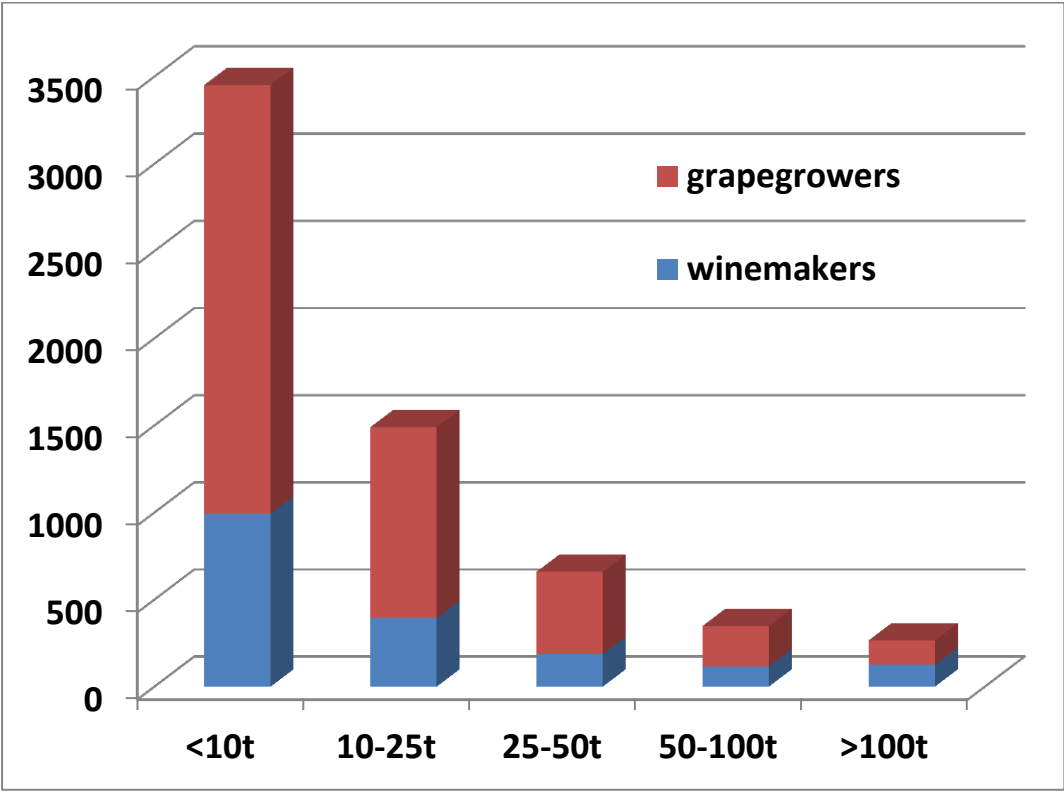


42. R&D investment, total and as a percent of wine sales, 1984 to 2013

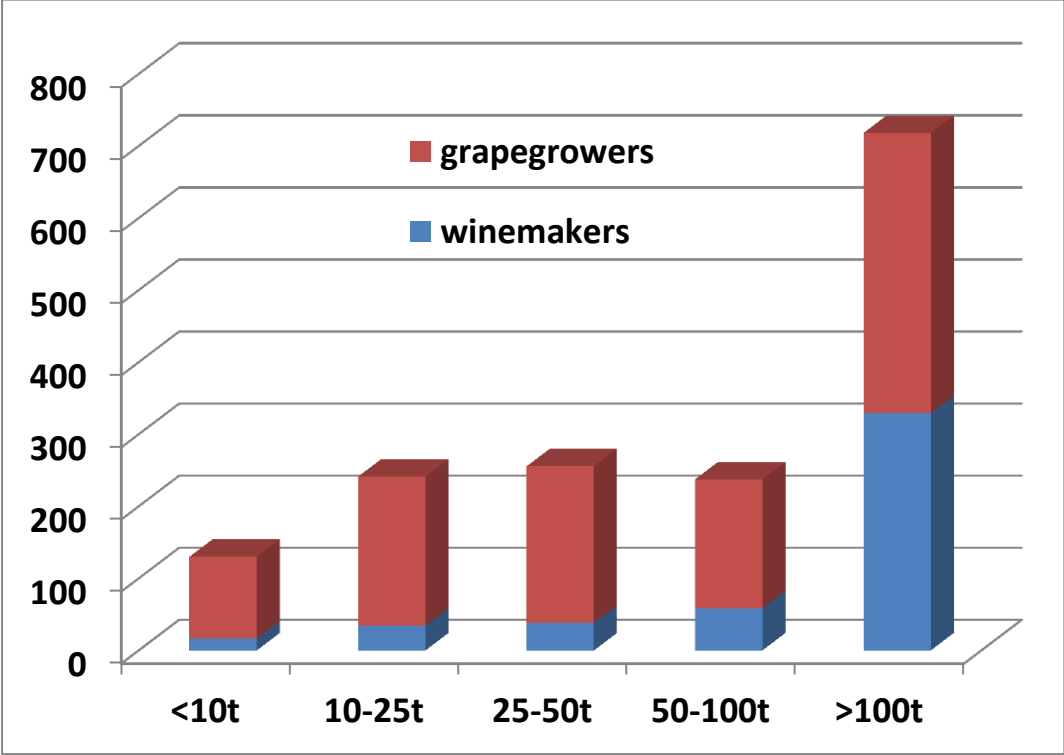


43. Number of producers and total output, by volume of grapes crushed, 2012

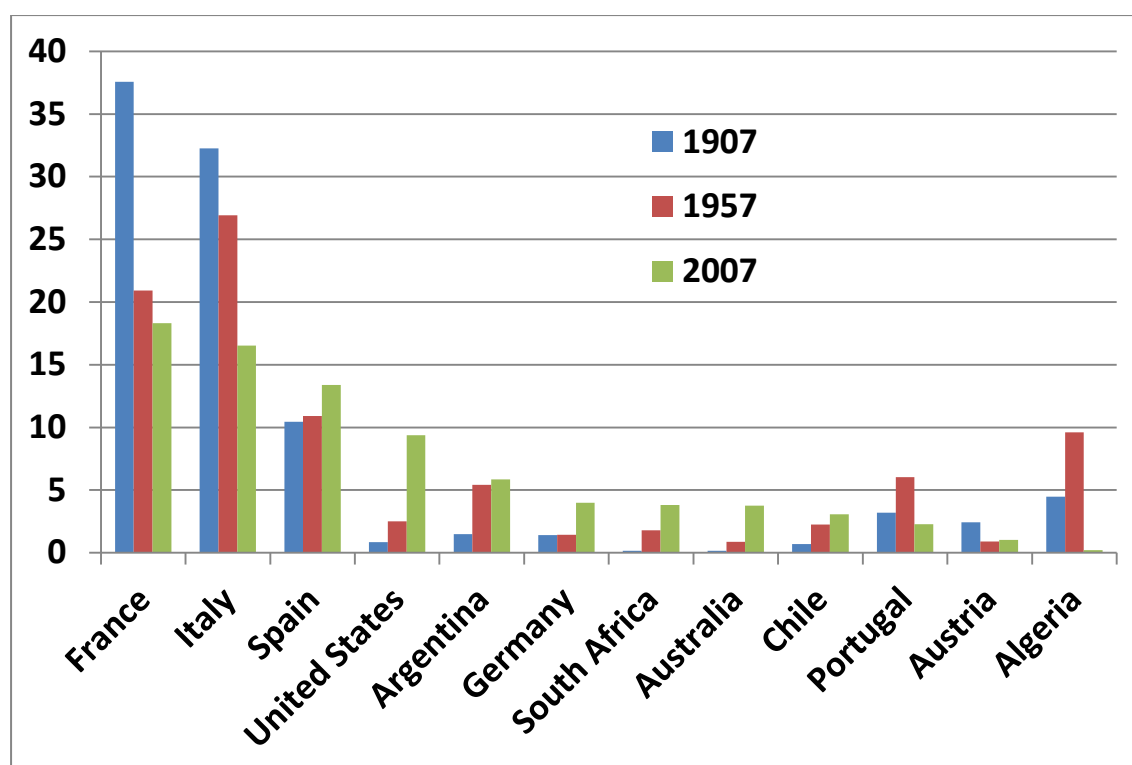
(a) Number of producers



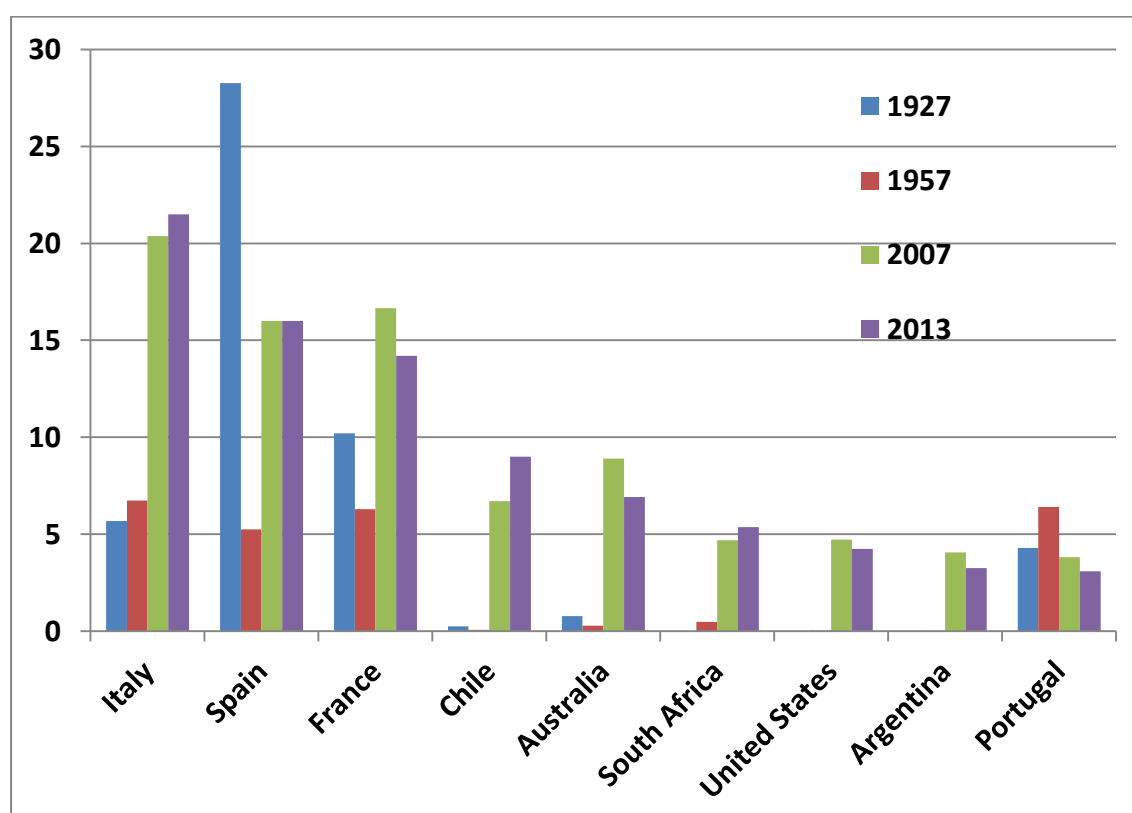
(b) Winegrape production (kt of grapes crushed)



44. National shares of global wine production volume, 1907 to 2007 (%)



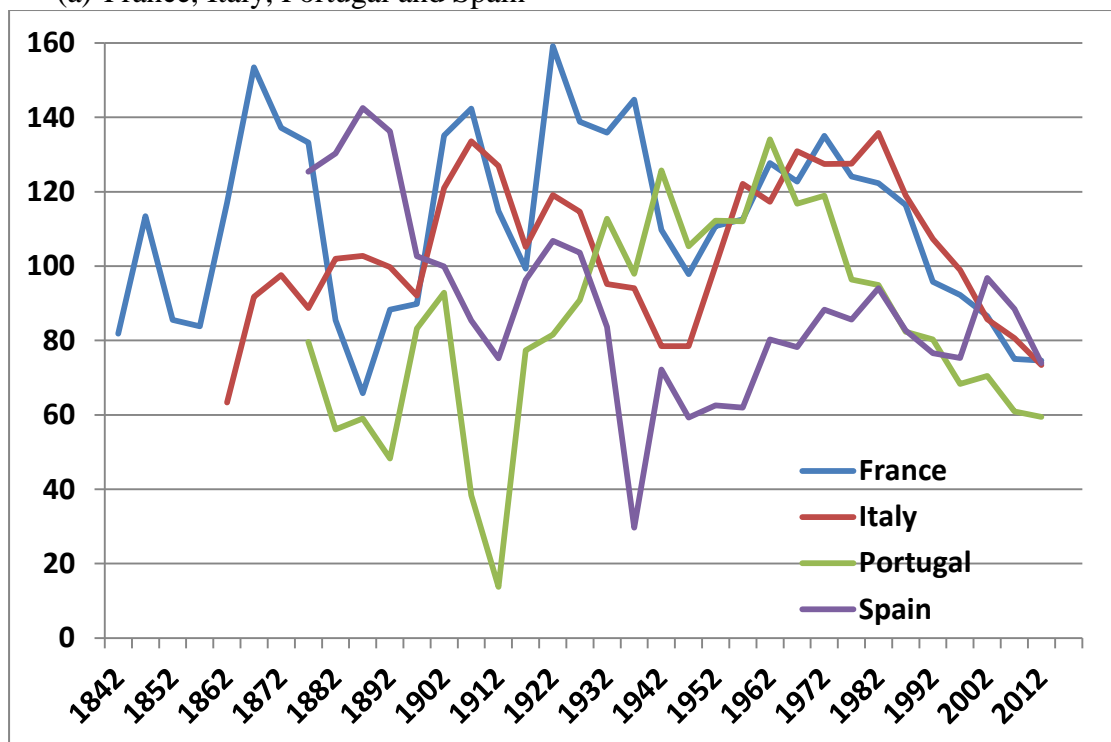
45. National shares of global wine export volumes, 1927 to 2013 (%)



<sup>a</sup> Algeria is not shown: its shares were 57% in 1907, 40% in 1957 and 0% in 2007 and 2013

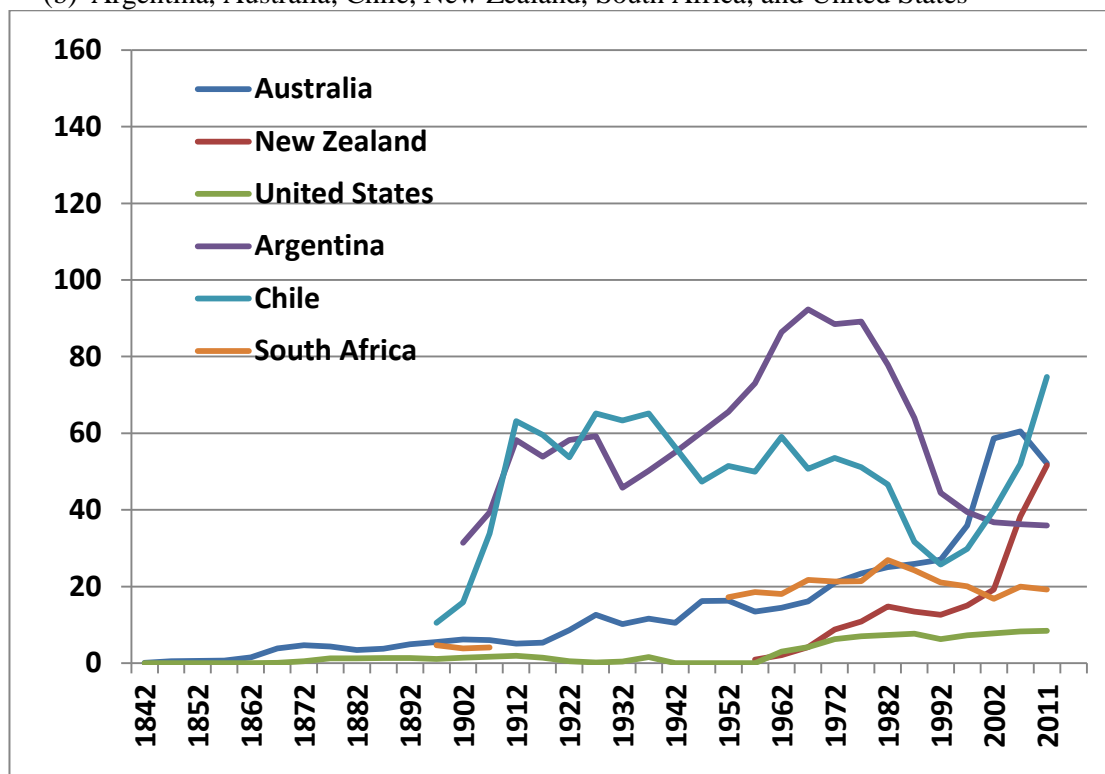
46. Wine production per capita, main Old and New World countries, 1840 to 2013  
(litres/year, 5-year averages around year shown except '2012' = 2010-13)

(a) France, Italy, Portugal and Spain<sup>a</sup>



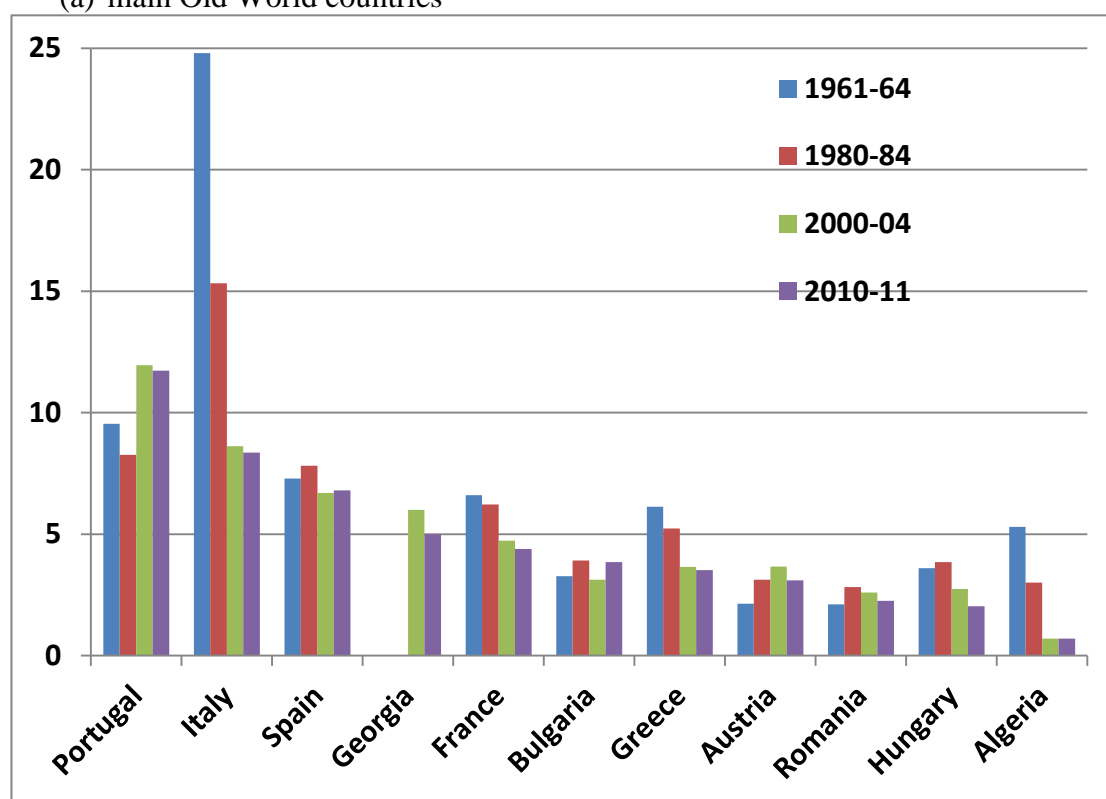
<sup>a</sup> Algeria is not shown: its production was more than 150 litres/capita during the 1950s but was only 30 in the 1970s, eight in the 1980s, and has been less than two since then.

(b) Argentina, Australia, Chile, New Zealand, South Africa, and United States



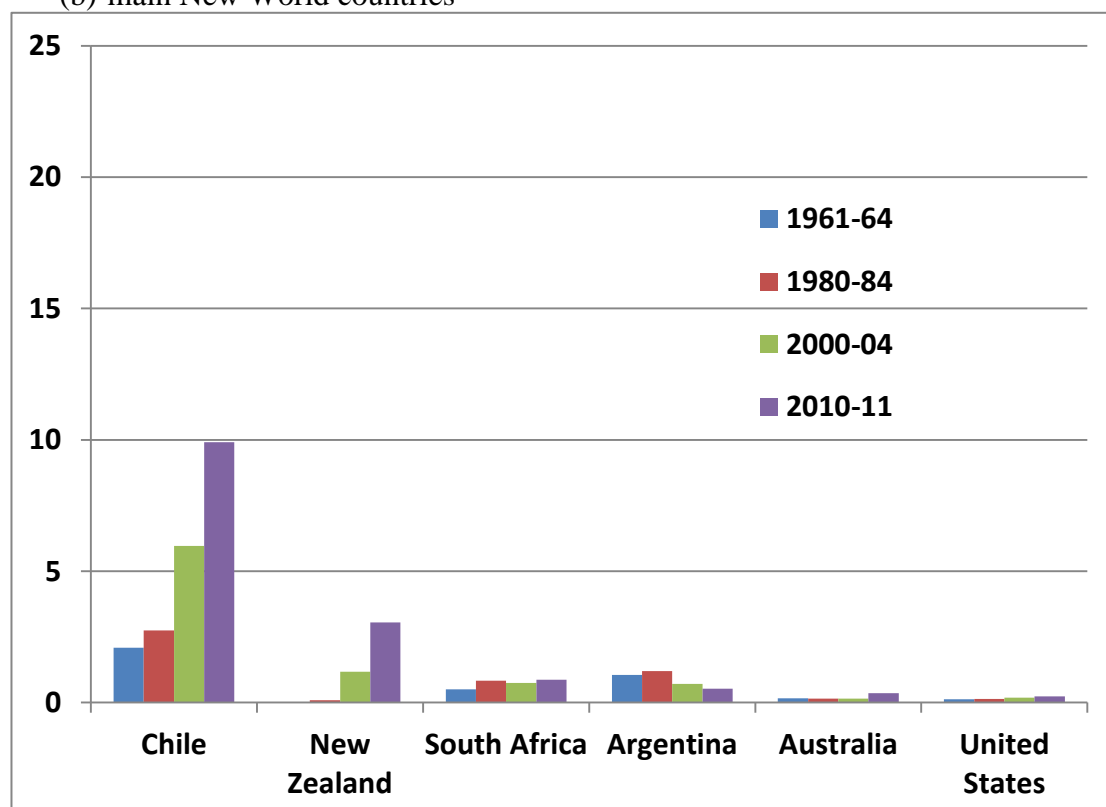
47. Vine area as a share of total crop area (%), main Old and New World countries, 1961 to 2011

(a) main Old World countries<sup>a</sup>

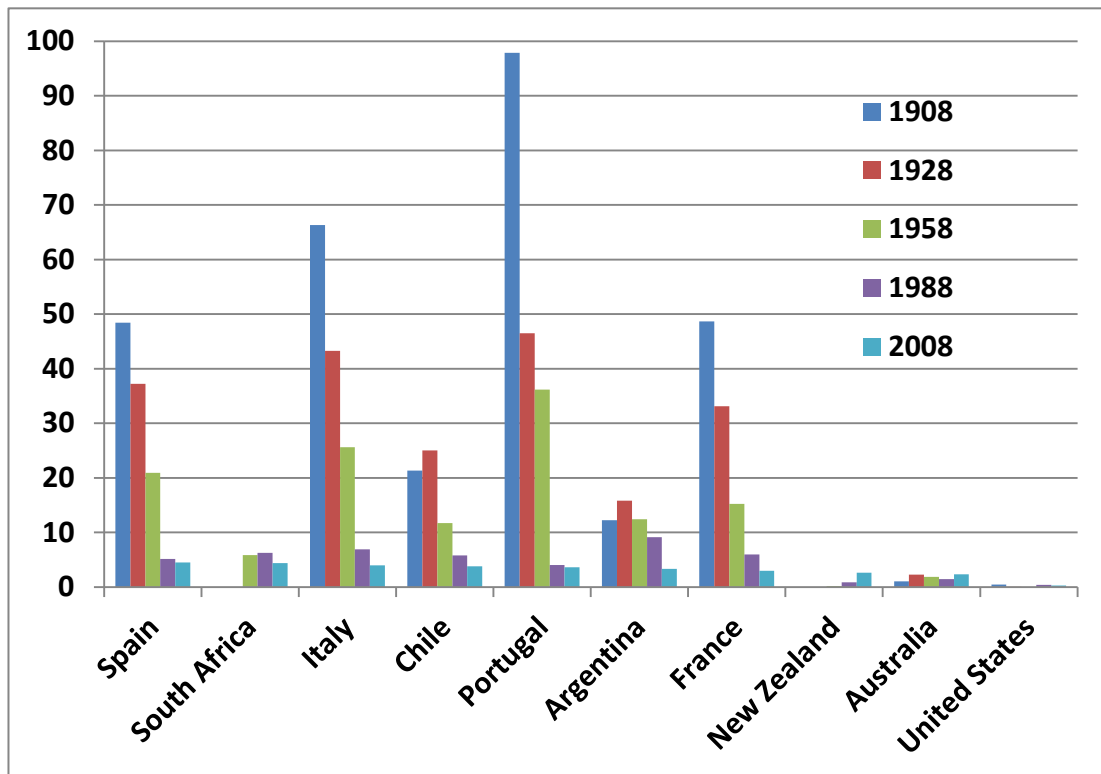


<sup>a</sup> Shares for Moldova averaged 7% over the 2000-09 period, the same as Spain.

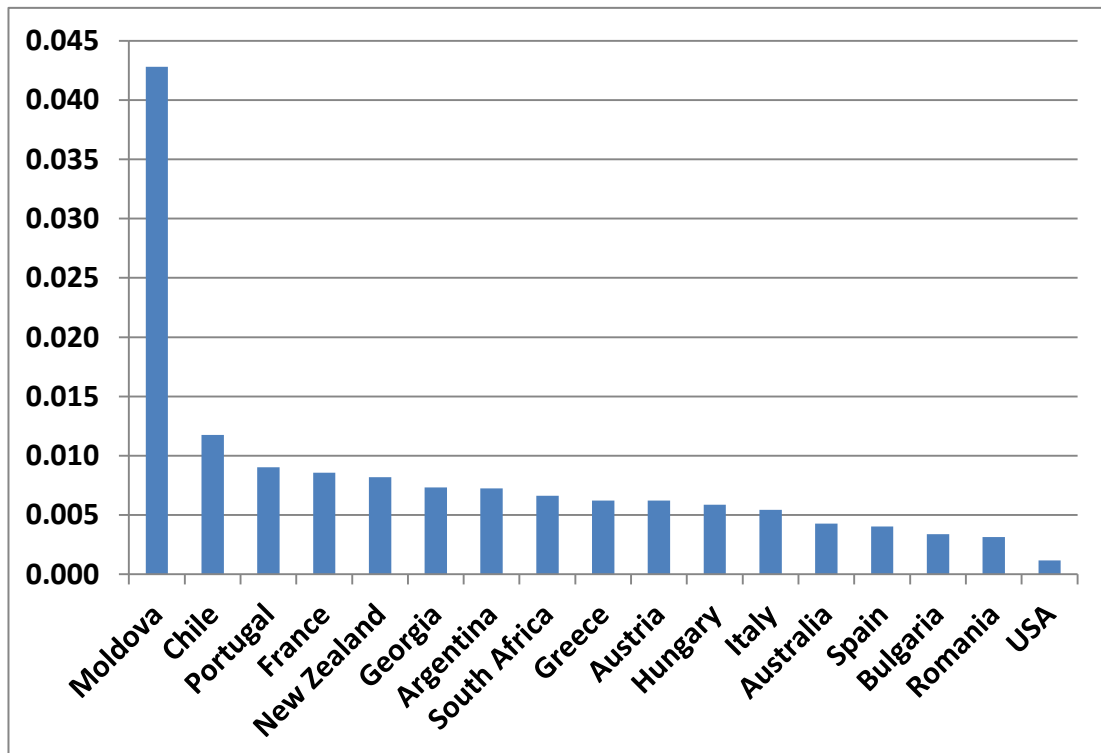
(b) main New World countries



48. Wine production volume per \$ of real GDP, main Old and New World countries, 1908 to 2008 (kl per million 1990 International Geary-Khamis dollars)

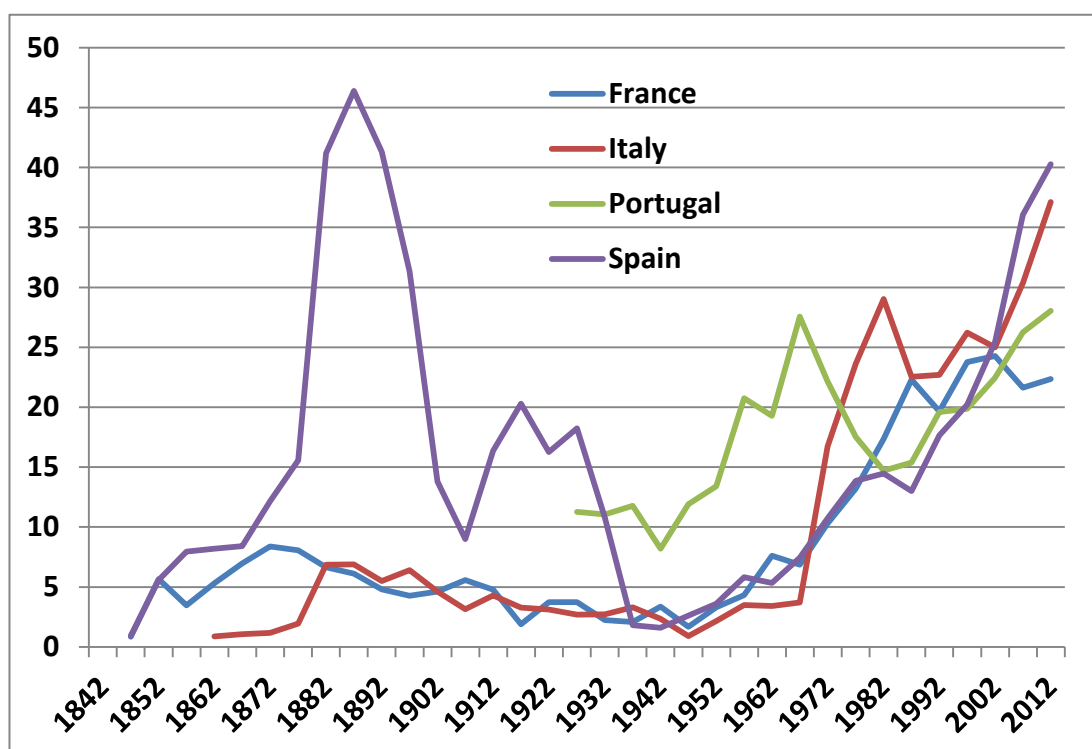


49. Wine production value as a share of GDP, main Old and New World countries, 2009 (%)



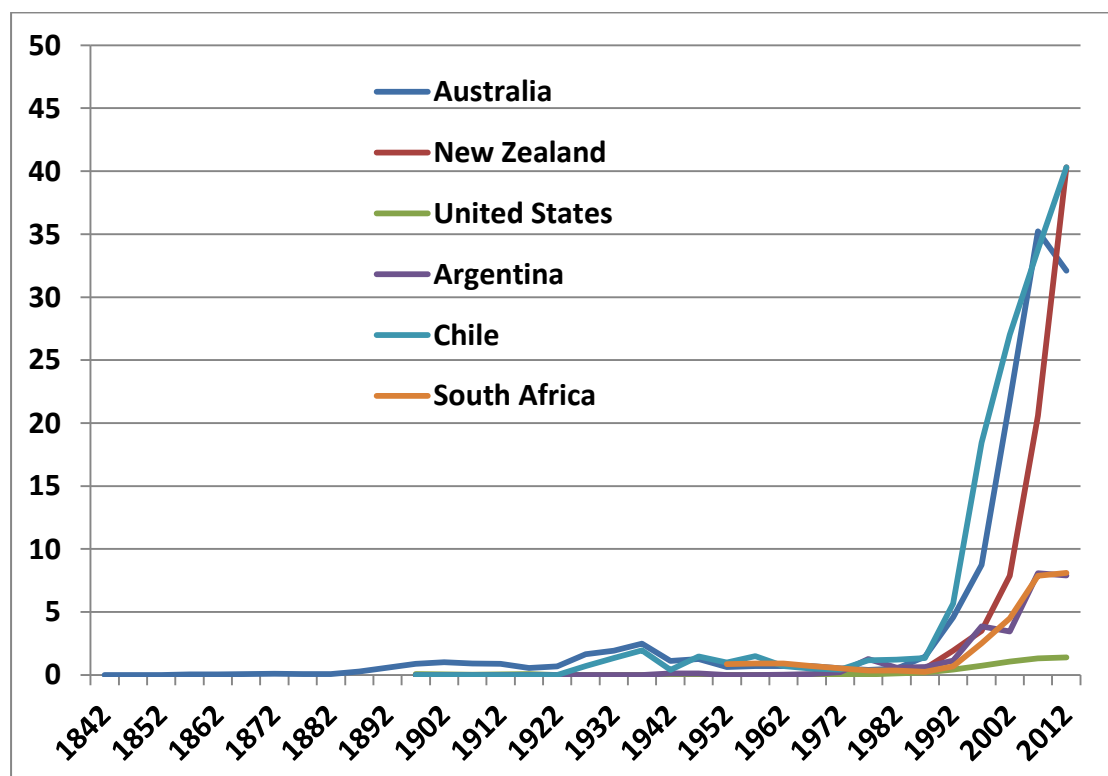
50. Wine exports per capita, main Old and New World countries, 1840 to 2013  
(litres/year, 5-year averages around year shown except '2012' = 2010-13)

(a) France, Italy, Portugal and Spain<sup>a</sup>

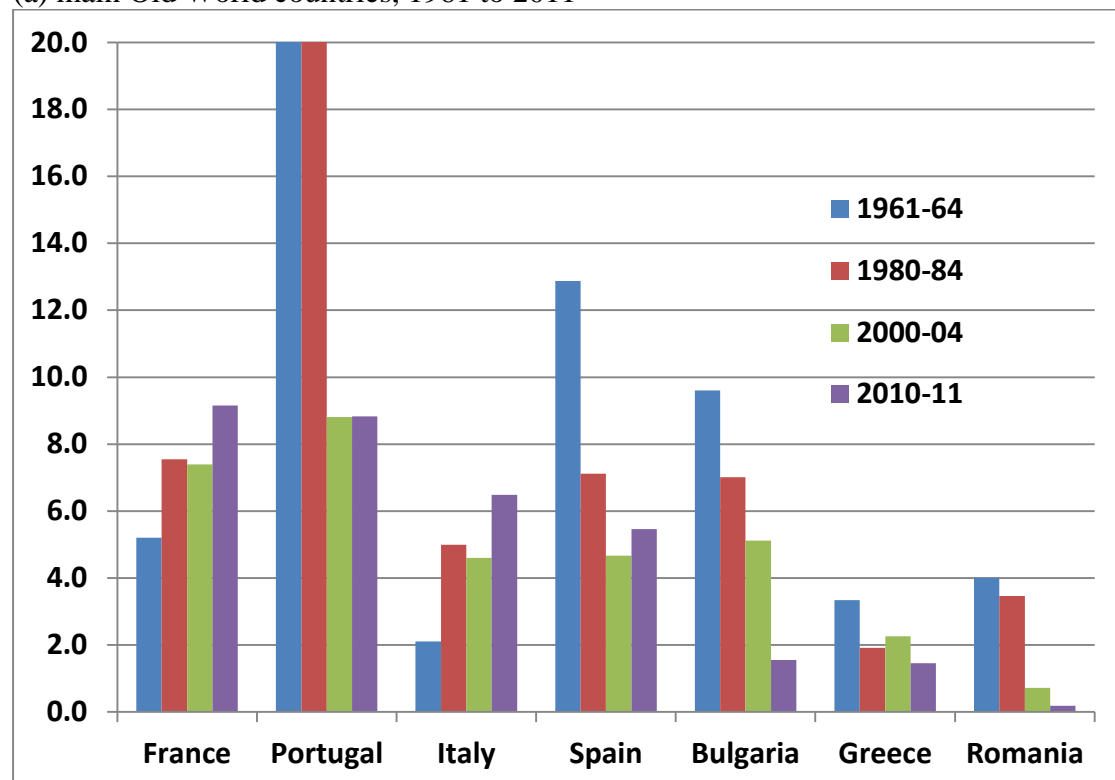


<sup>a</sup> Algeria is not shown: it exported more than 100 litres per capita per year during 1900-60 but only six litres in the 1980s and less than 0.5 litre since then.

(b) Argentina, Australia, Chile, New Zealand, South Africa, and United States

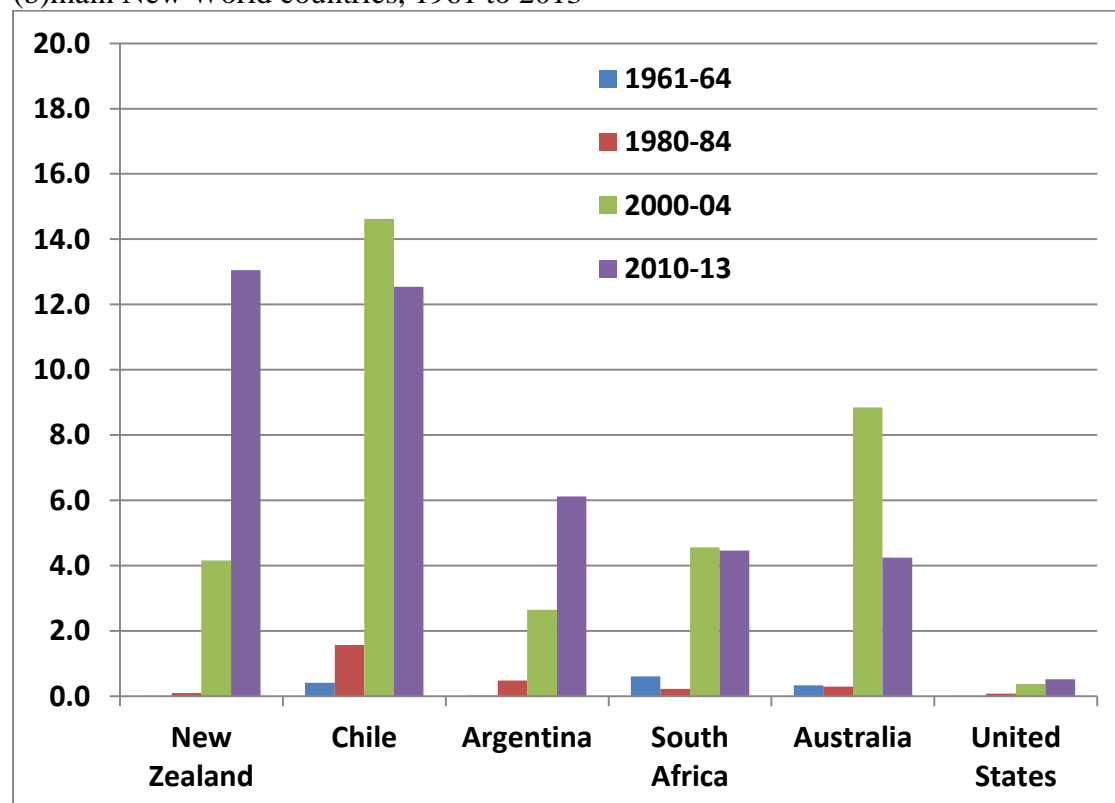


51. Wine comparative advantage index,<sup>a</sup> 1961 to 2013  
 (a) main Old World countries, 1961 to 2011<sup>b</sup>



<sup>b</sup> Algeria, Tunisia, Georgia and Moldova are not shown: the indexes for Algeria and Tunisia in 1961-64 were 118 and 49, but were <0.5 from 1980; the indexes for Georgia and Moldova were 43 and 100 in 2000-04 and 14 and 42 in 2010-11.

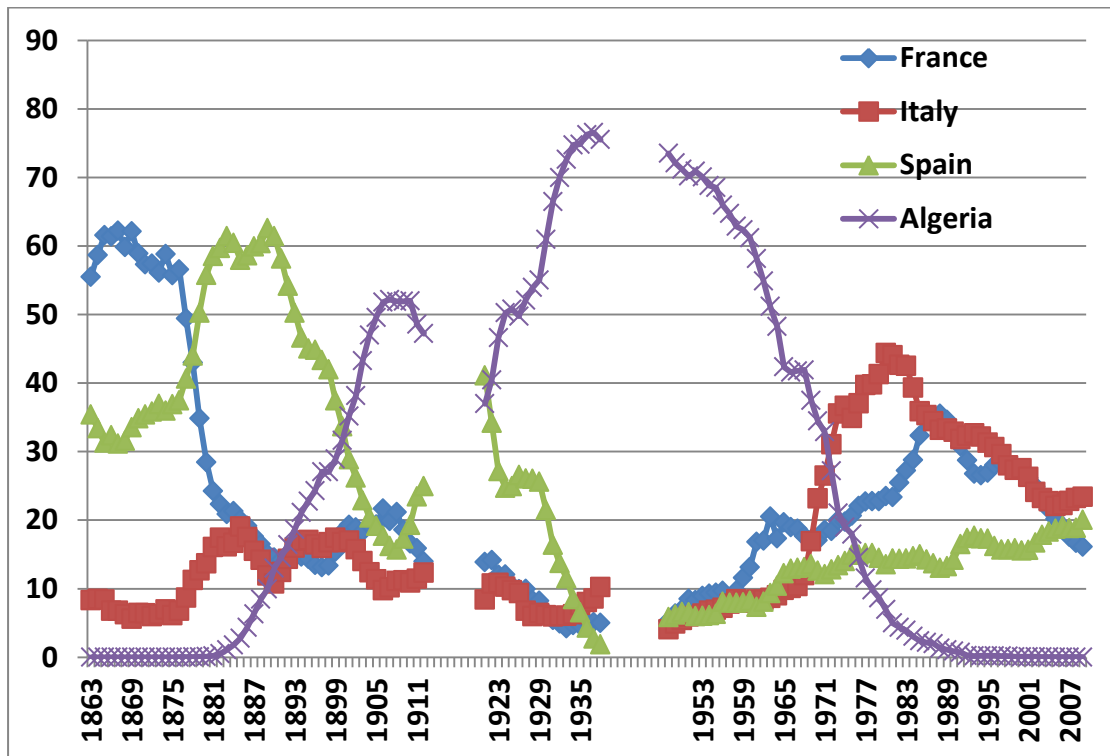
(b) main New World countries, 1961 to 2013



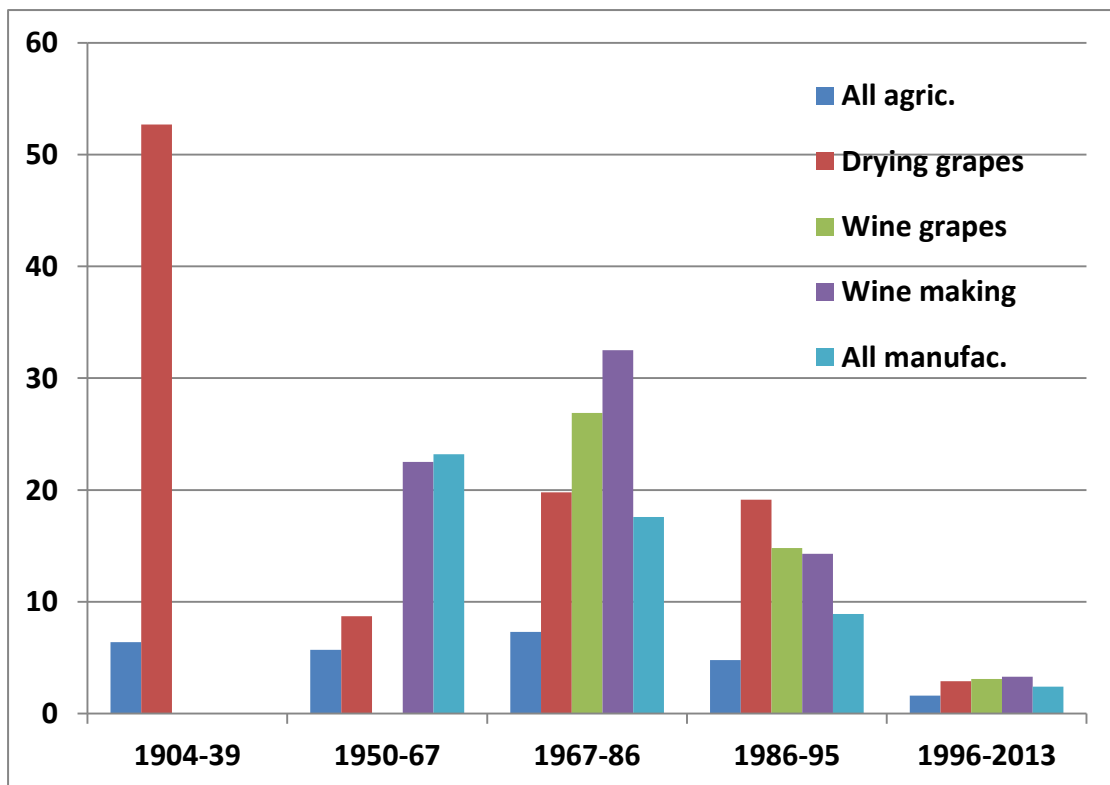
<sup>a</sup> Index is the share of wine in national merchandise exports divided by wine's share of global exports.



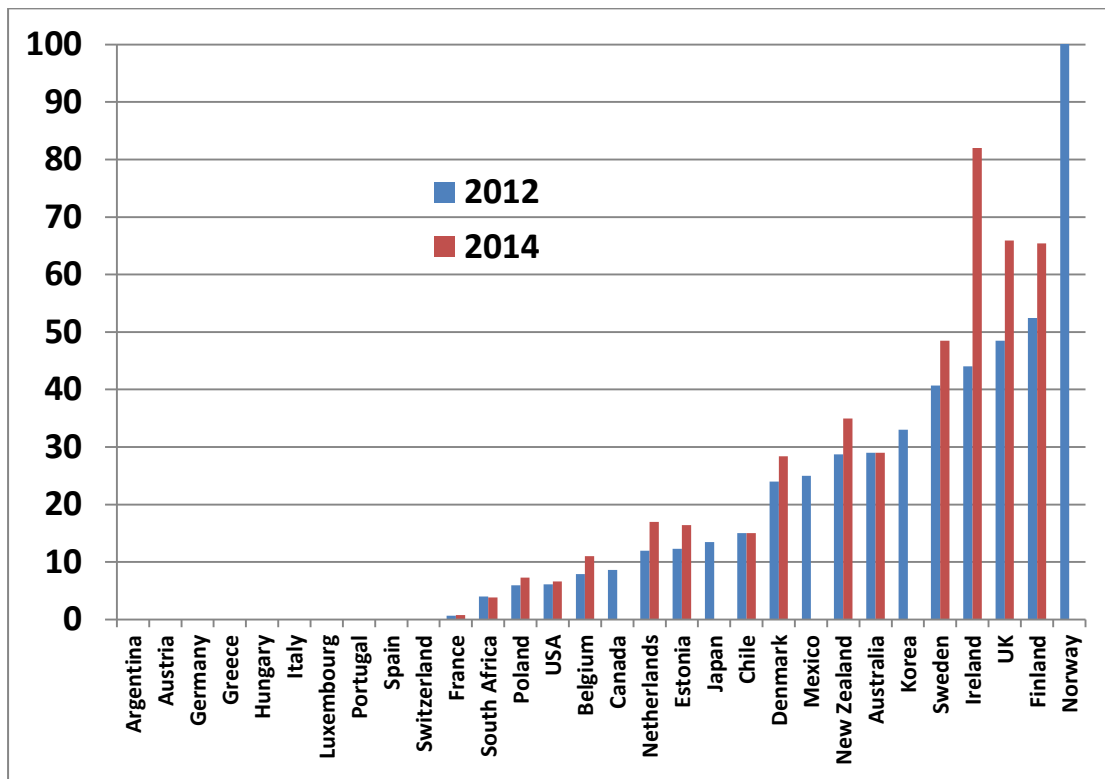
52. Share of volume of global wine exports, key Mediterranean countries, 1861 to 2011 (% , 5-year moving average)



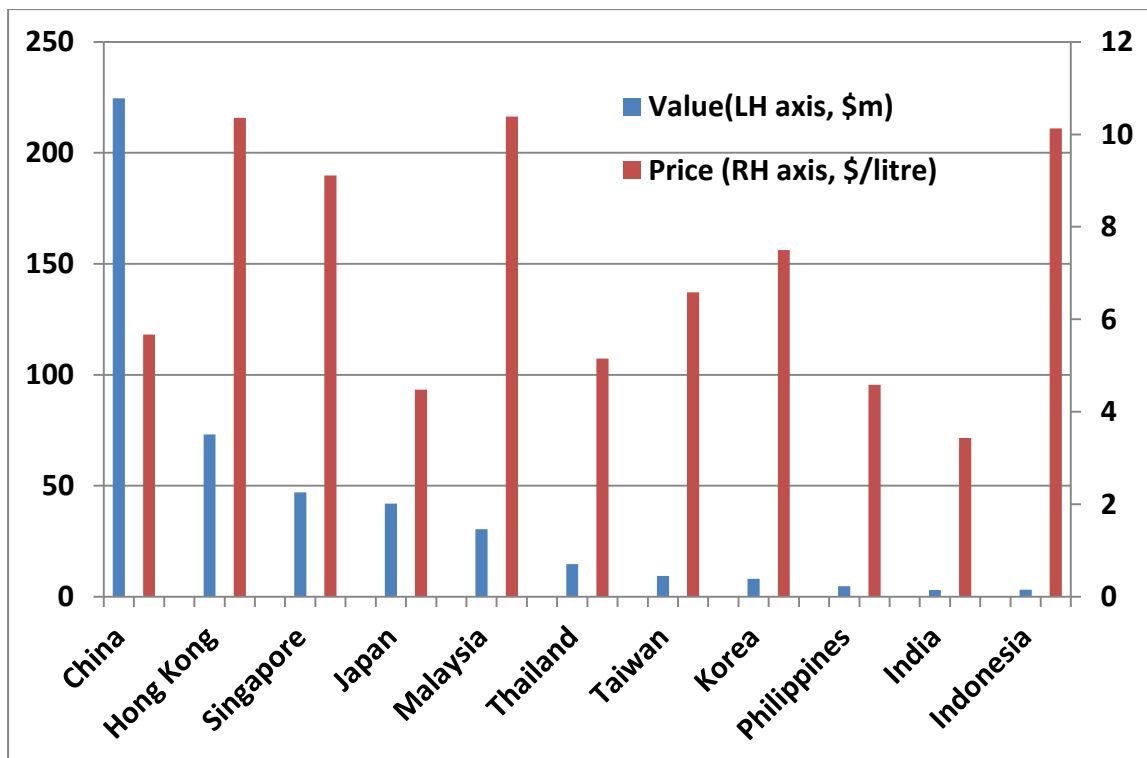
53. Nominal rates of assistance to grape growing, wine making, all agriculture, and all manufacturing, 1904 to 2013



54. Ad valorem consumer tax equivalent of excise in commercial premium wines, various countries, 2012 and 2014

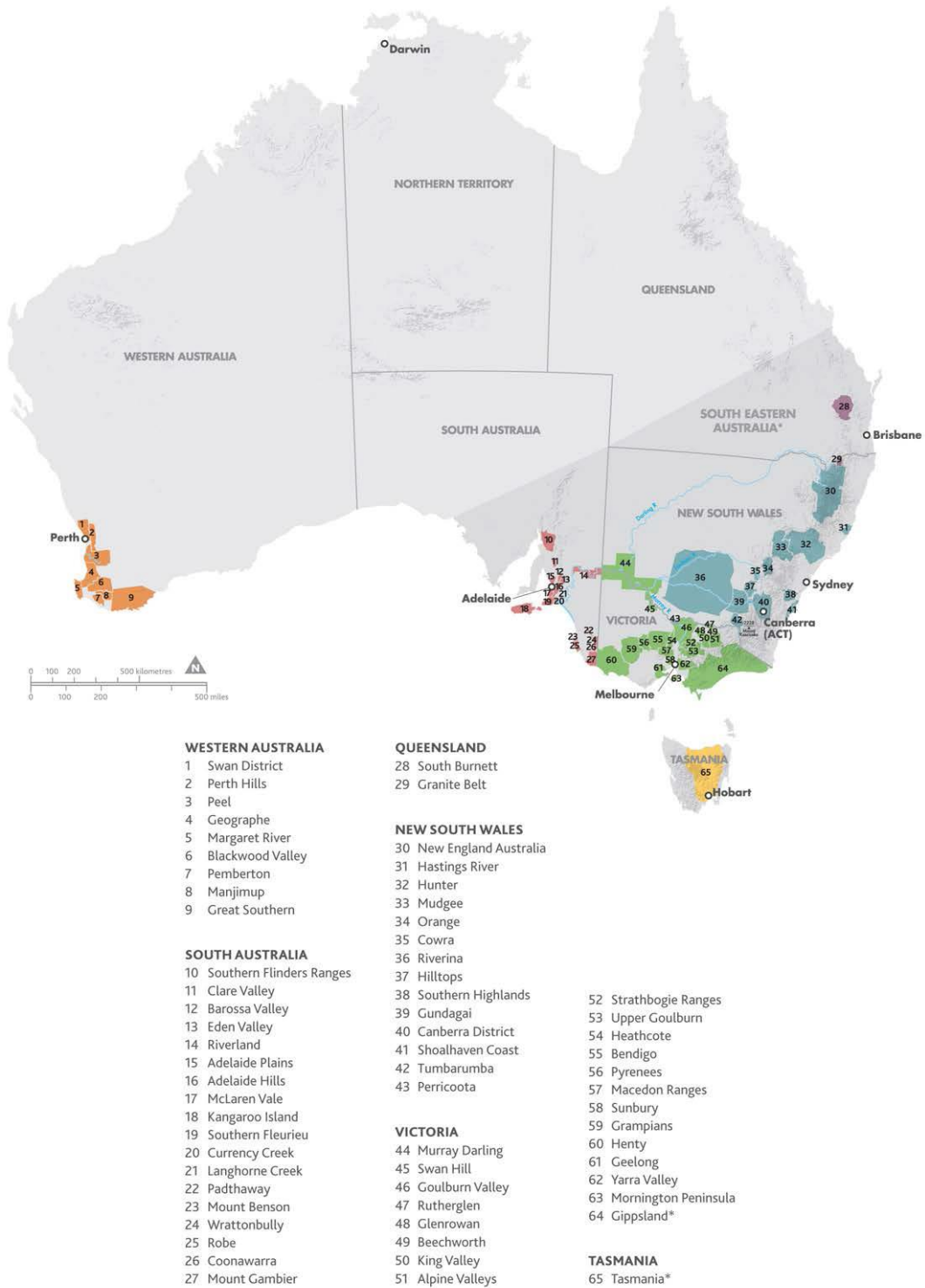


55. Total and unit value of Australia's wine export to Asia, 2011-14 (A\$m/year and A\$/litre, July 2011 to June 2014)



## **Section II. Regional grape and wine developments from the late 20<sup>th</sup> century**

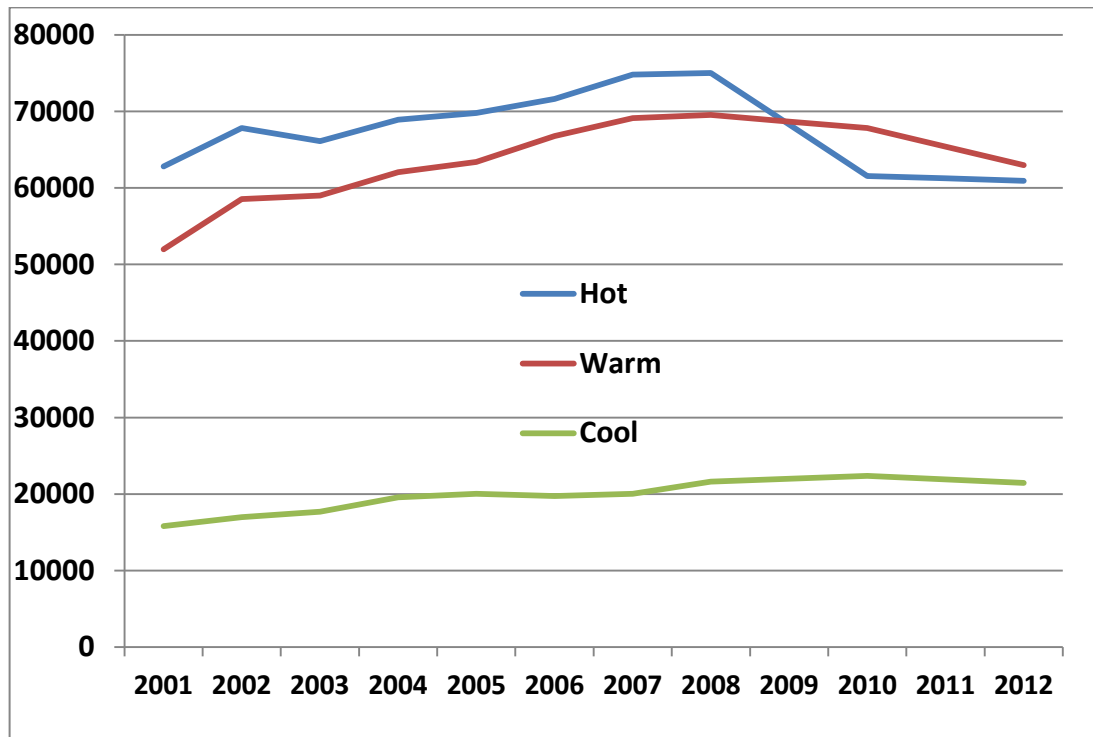
56. Map of Australia's 65 wine regions



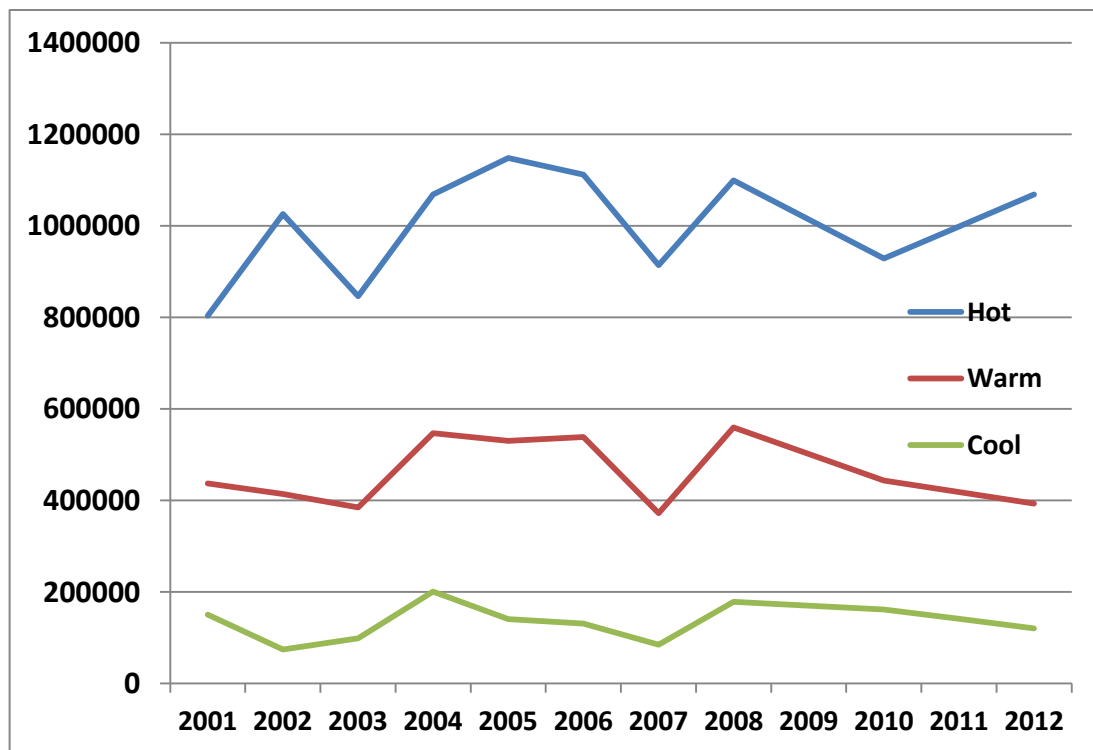
Source: Australian Grape and Wine Authority

## 57. Winegrape bearing area and winegrape production, by climate zone, 2001 to 2012

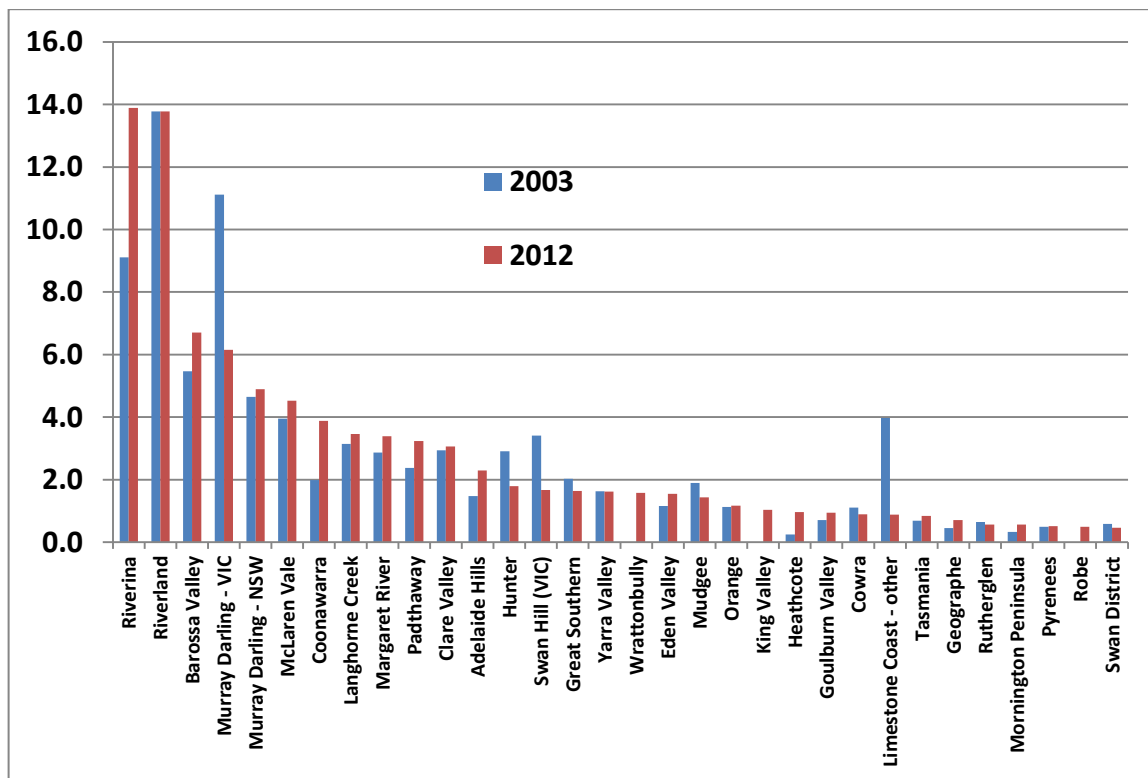
(a) Bearing area (ha)



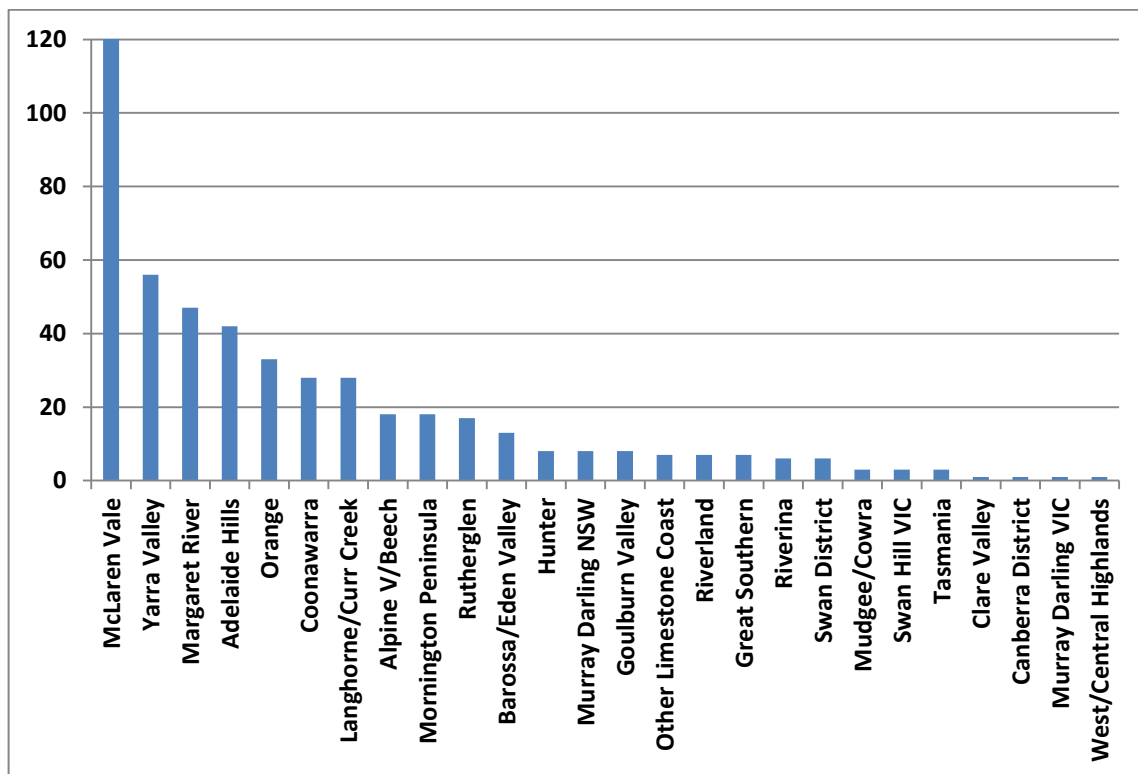
(b) Winegrape production (tonnes)



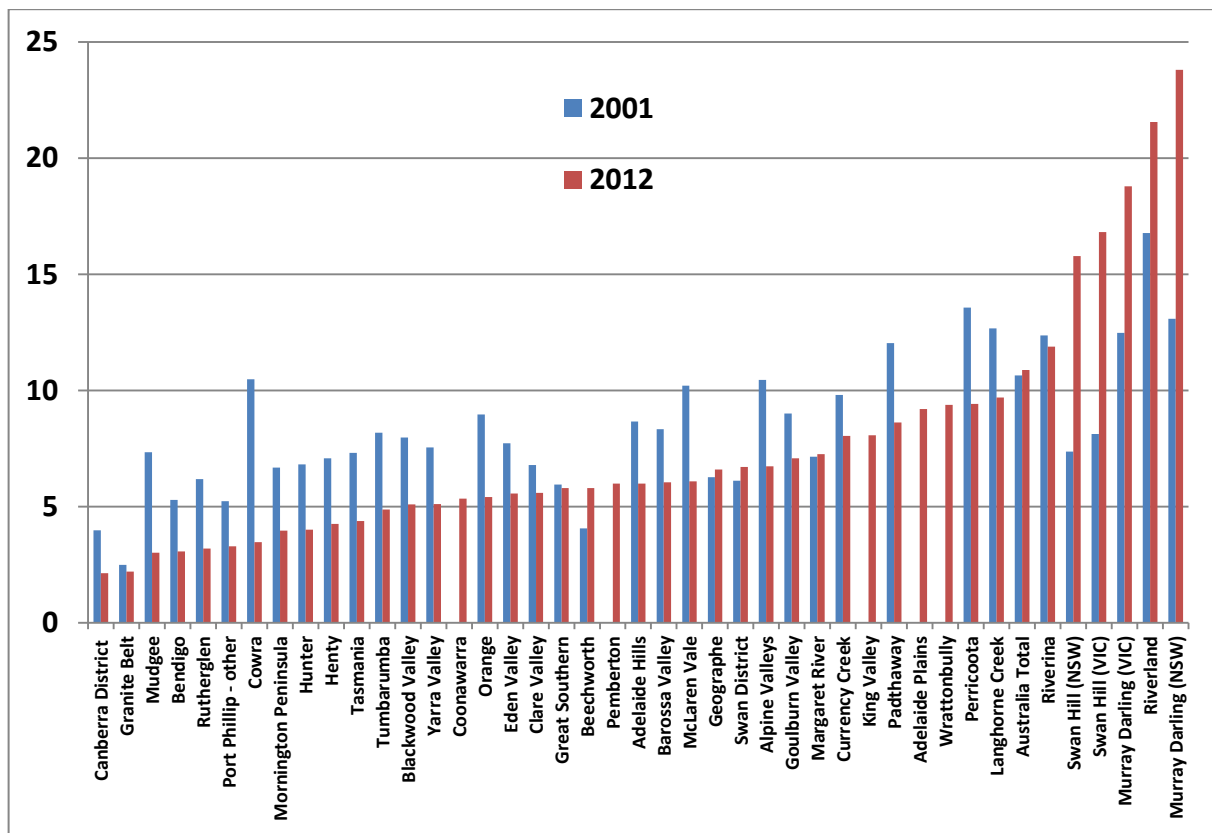
58. Regional shares of national winegrape bearing area, 2003 and 2012 (%)



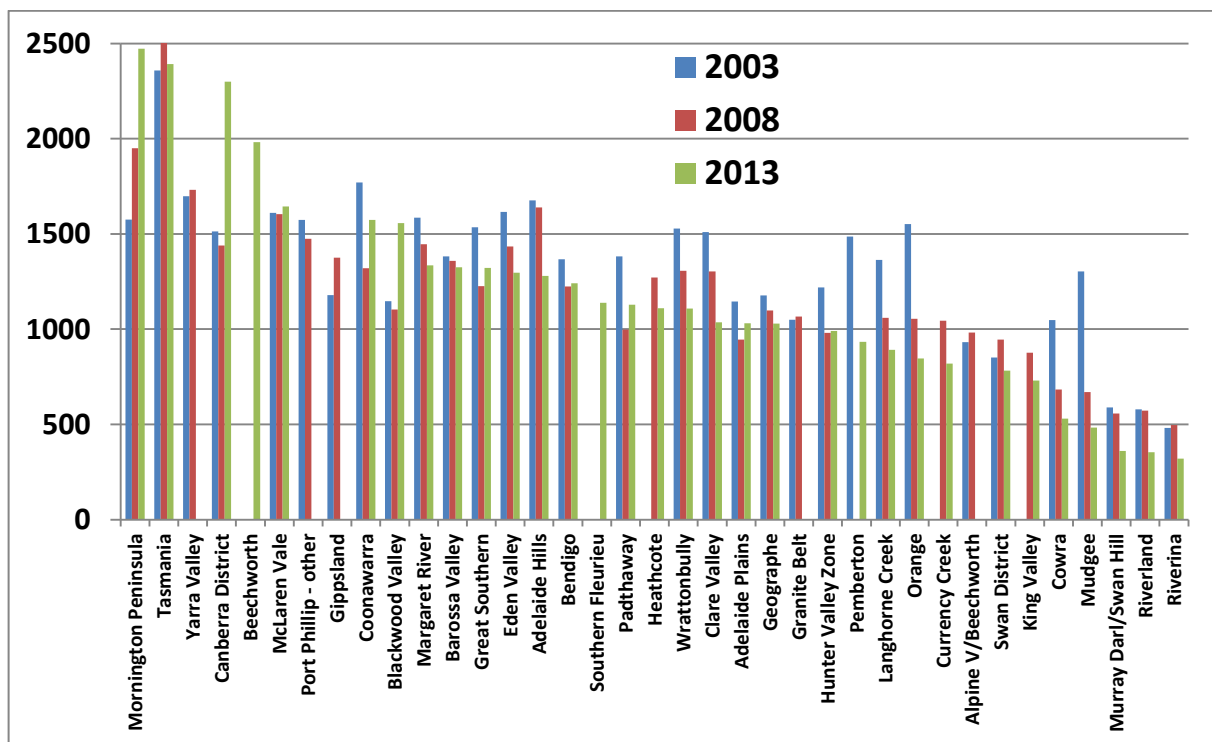
59. Regional diversity in terms of vine intensity of cropping, 2006



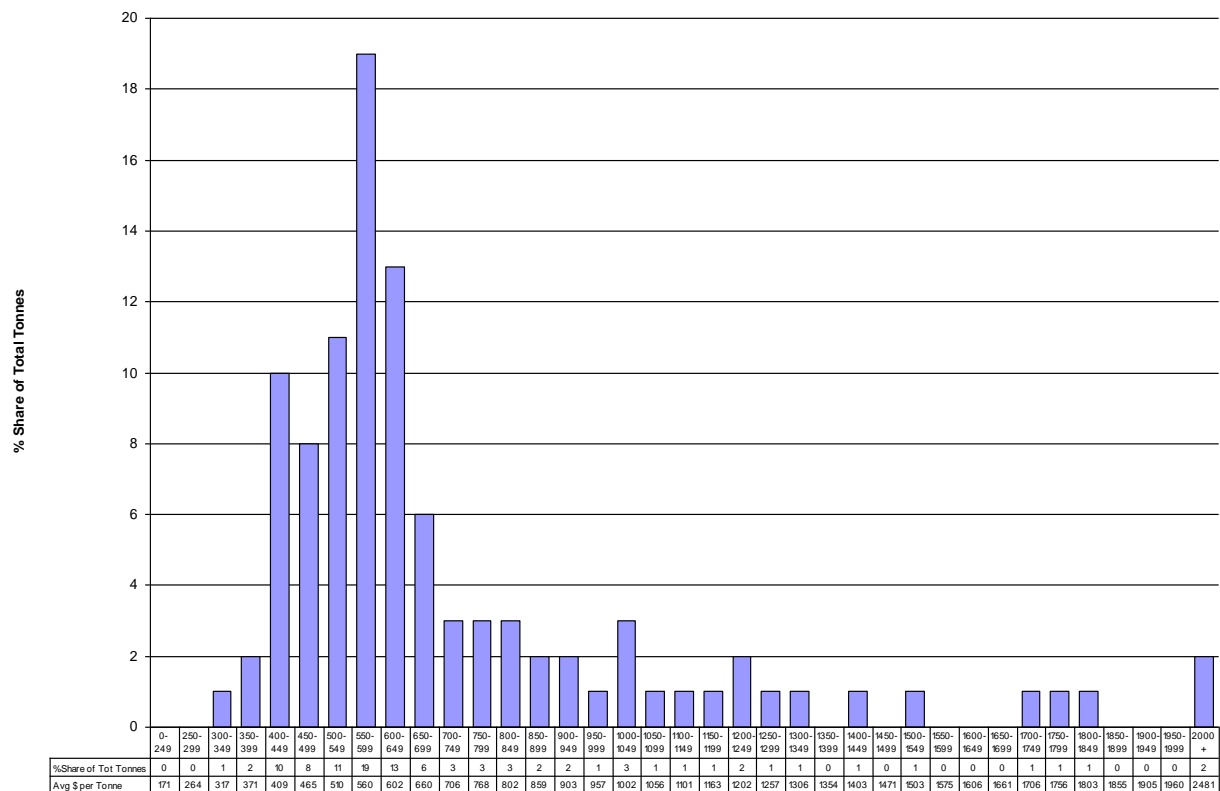
60. Regional diversity in terms of winegrape yield per hectare, 2001 and 2012 (t/ha)



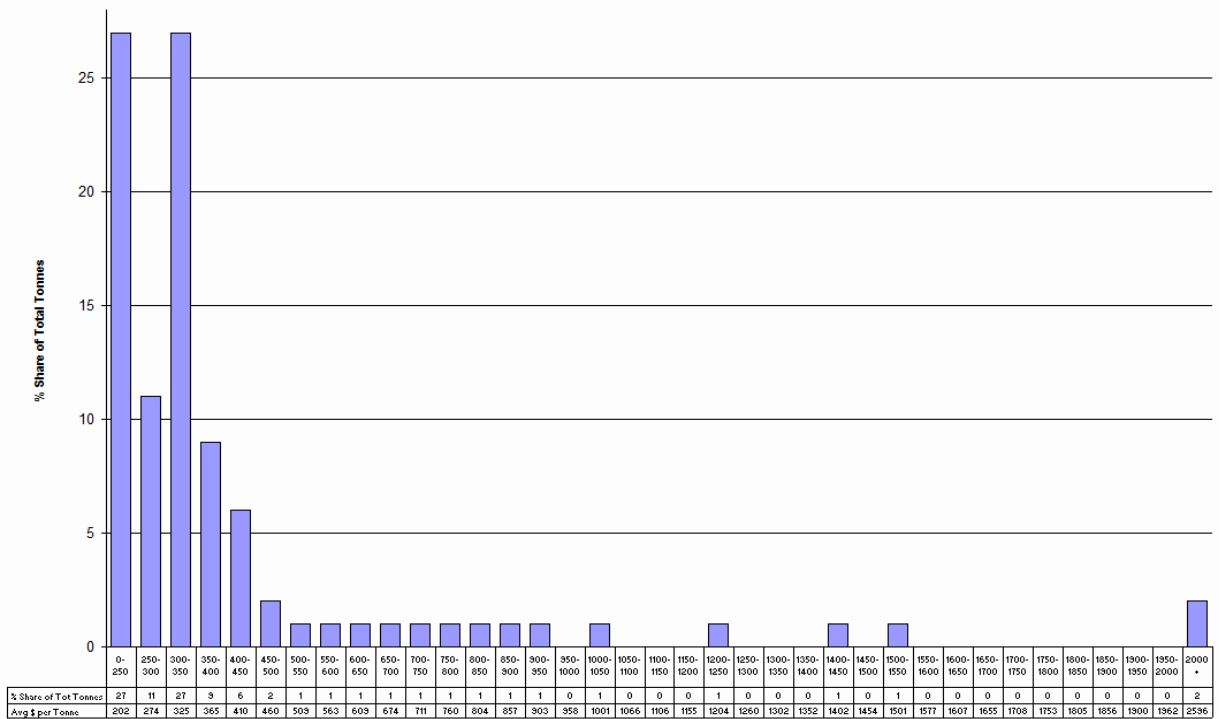
61. Average price of winegrapes, by region, 2003, 2008 and 2013 (AUD/tonne)



62. Distribution of winegrape prices across price points nationally, 2008 and 2014  
 (% of total tonnes crushed, from AGWA (2014) and the earlier 2008 report)  
 (a) 2008, all varieties



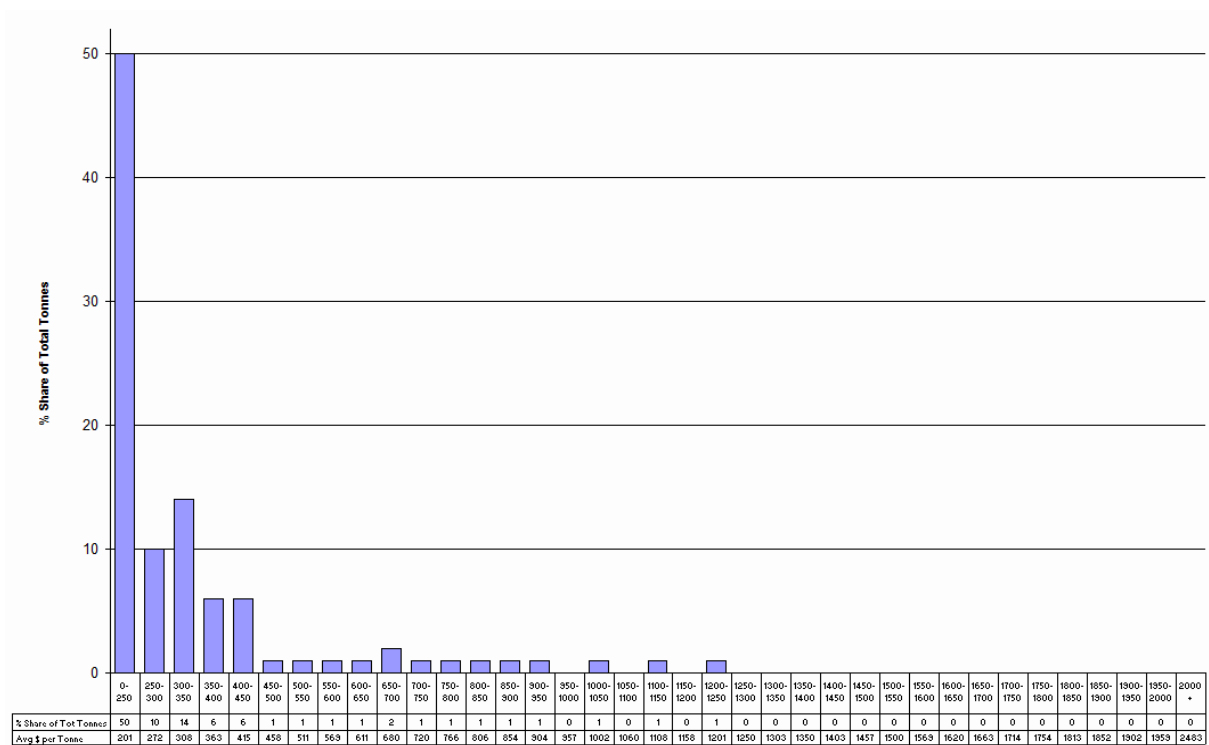
(b) 2014, all varieties



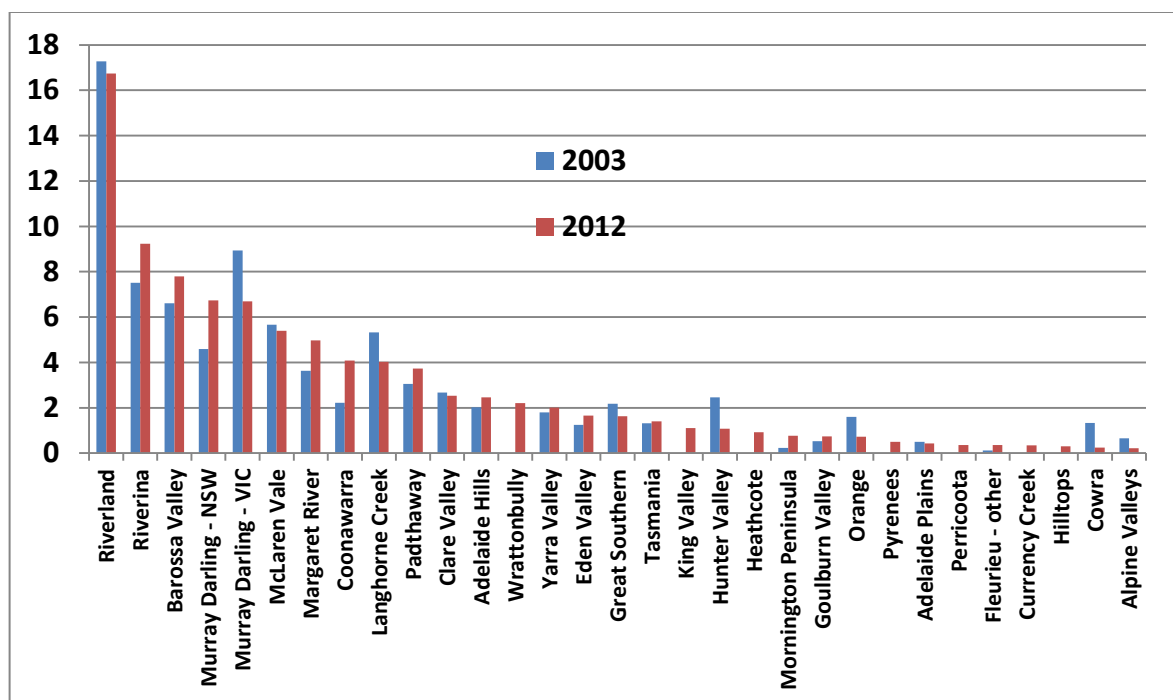


62 (cont). Distribution of winegrape prices across price points nationally, 2008 and 2014  
(% of total tonnes crushed, from AGWA (2014))

(c) 2014, white varieties

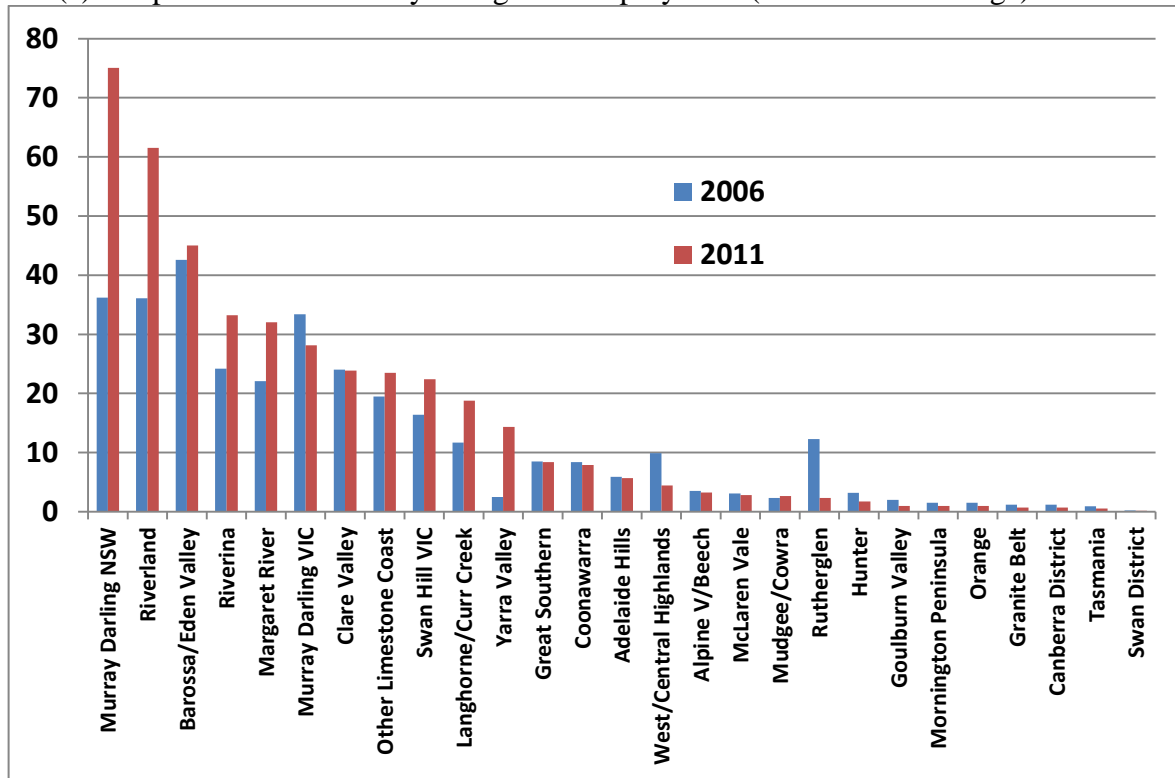


63. Regional shares of national winegrape production value, 2003 and 2012 (%)

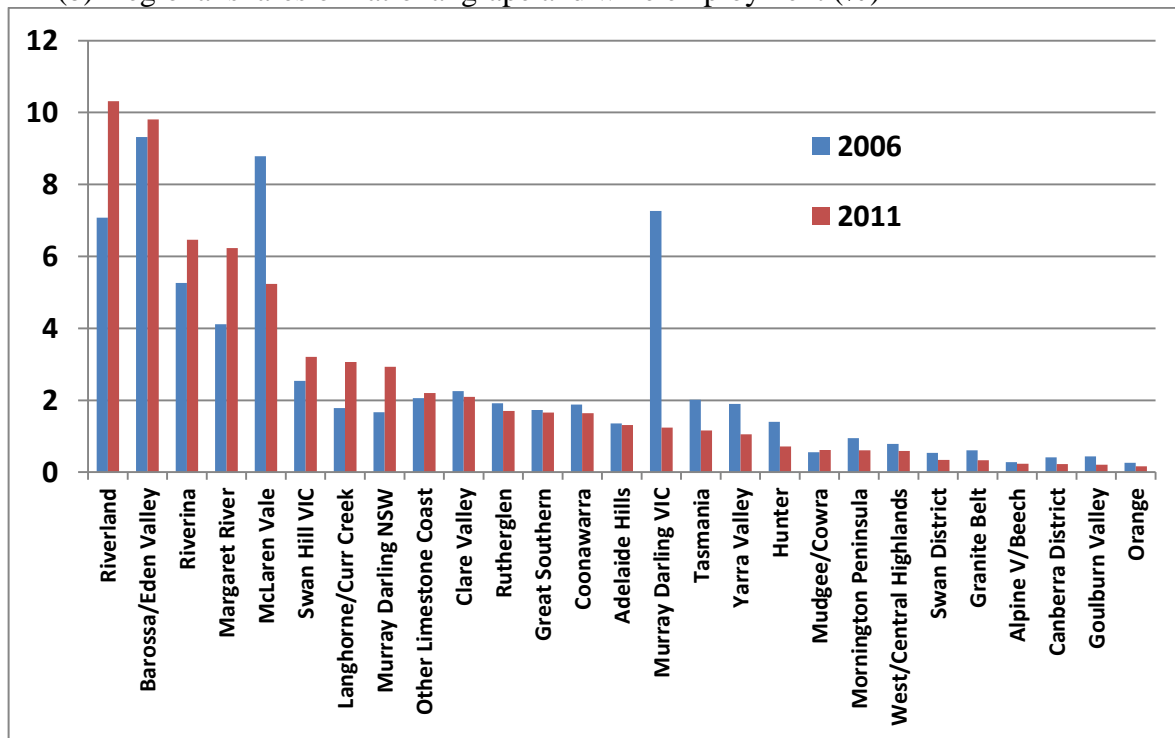


64. Regional diversity in terms of grape and wine industry employment, 2006 and 2011

(a) Grape and wine intensity of regional employment (1 = national average)

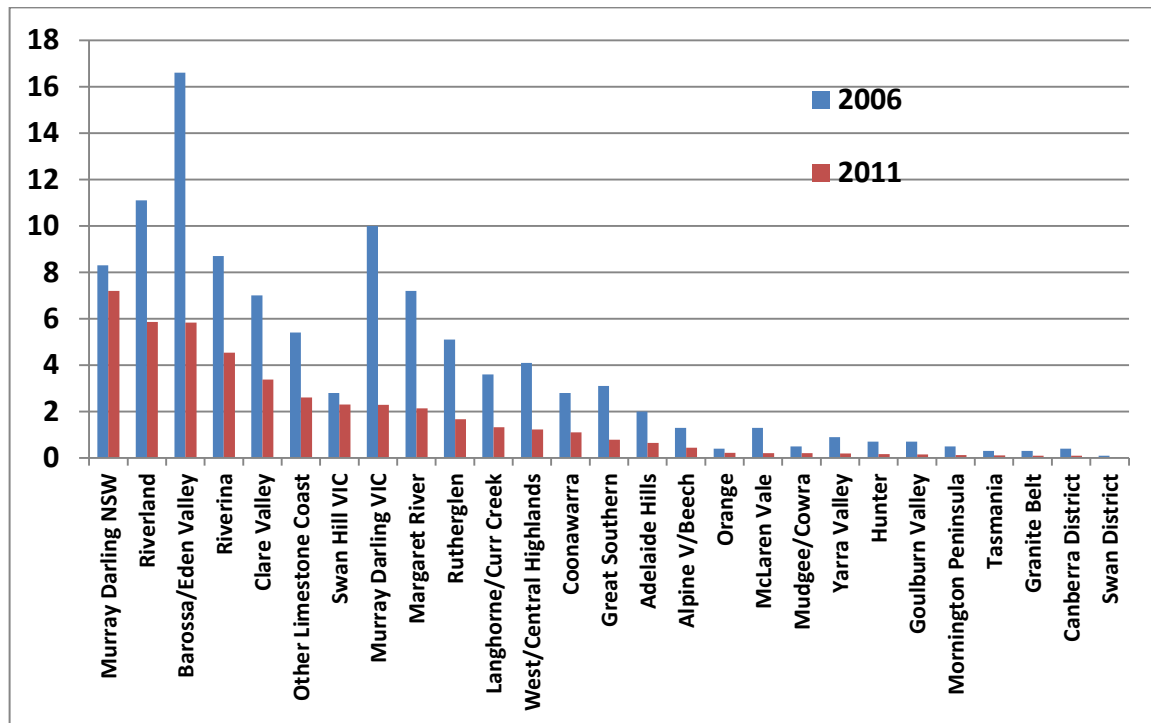


(b) Regional shares of national grape and wine employment (%)

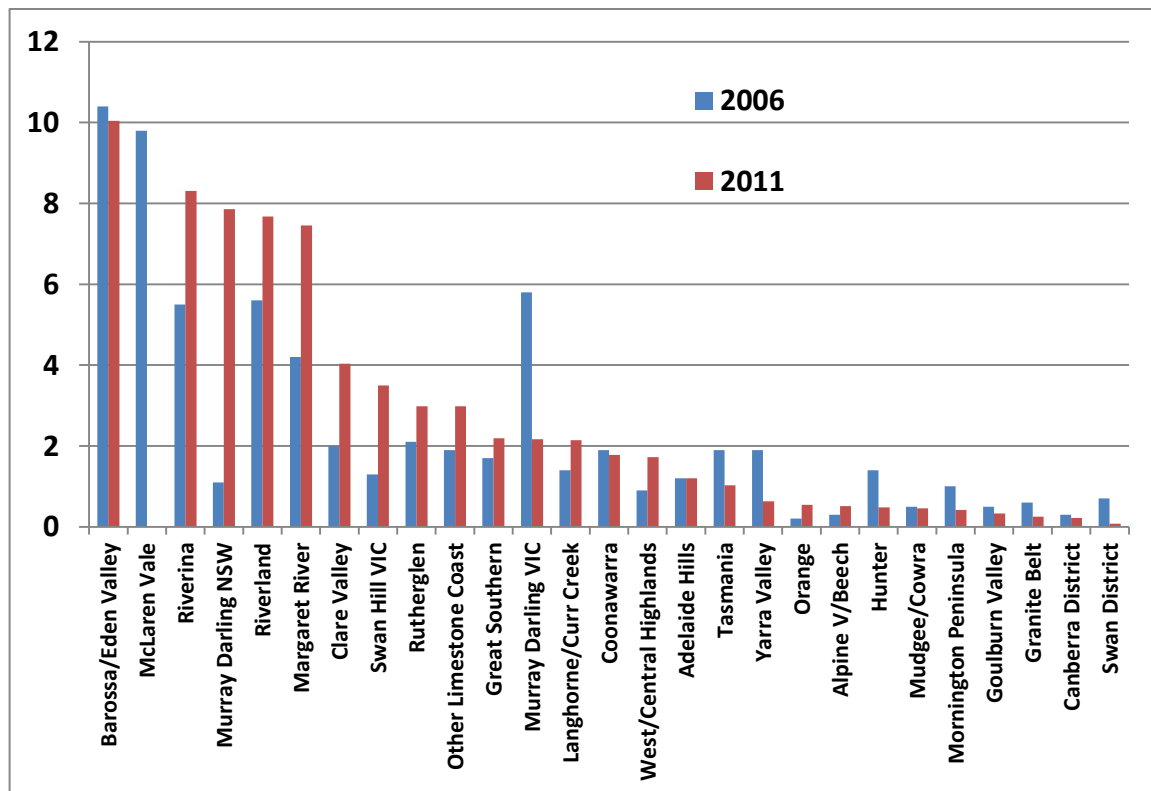


65. Regional diversity in terms of grape and wine value added, 2006 and 2011

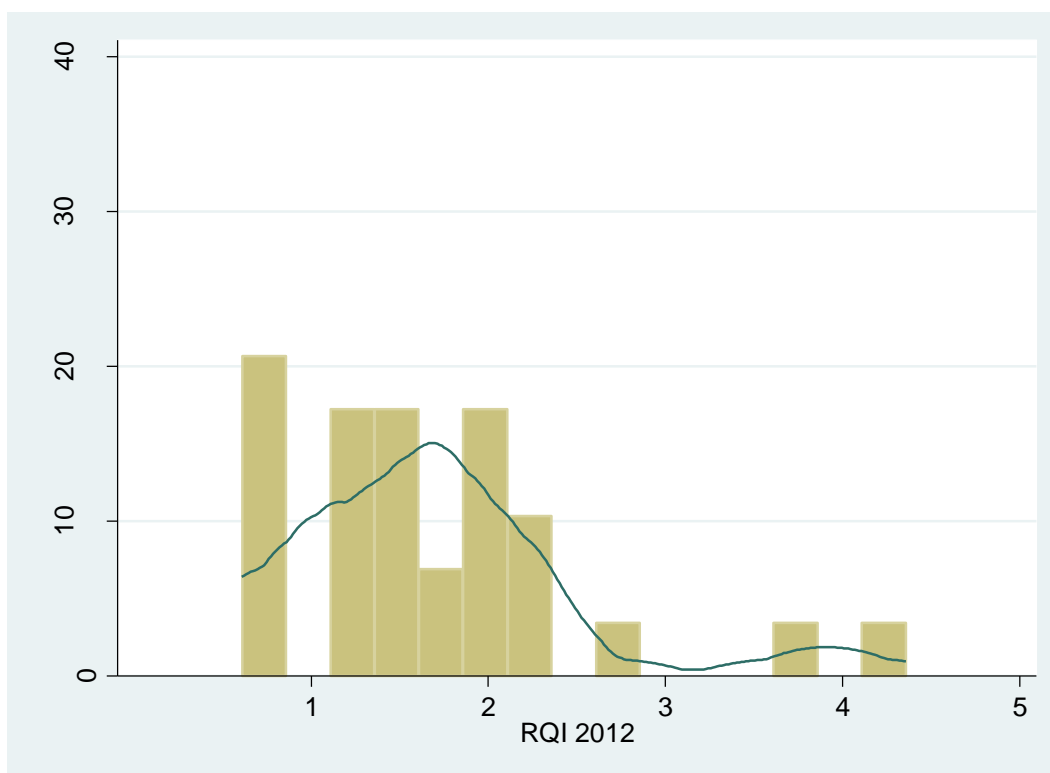
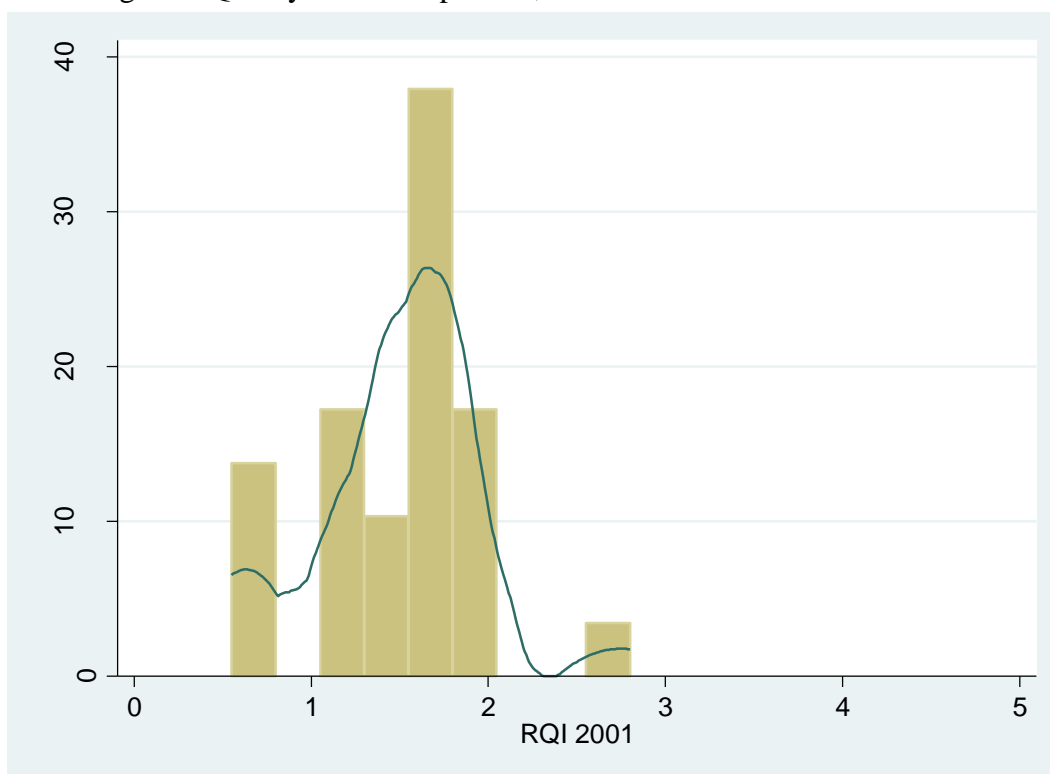
(a) Grape and wine share of value added of regional economy (%)



(b) Region's share of national grape and wine value added (%)



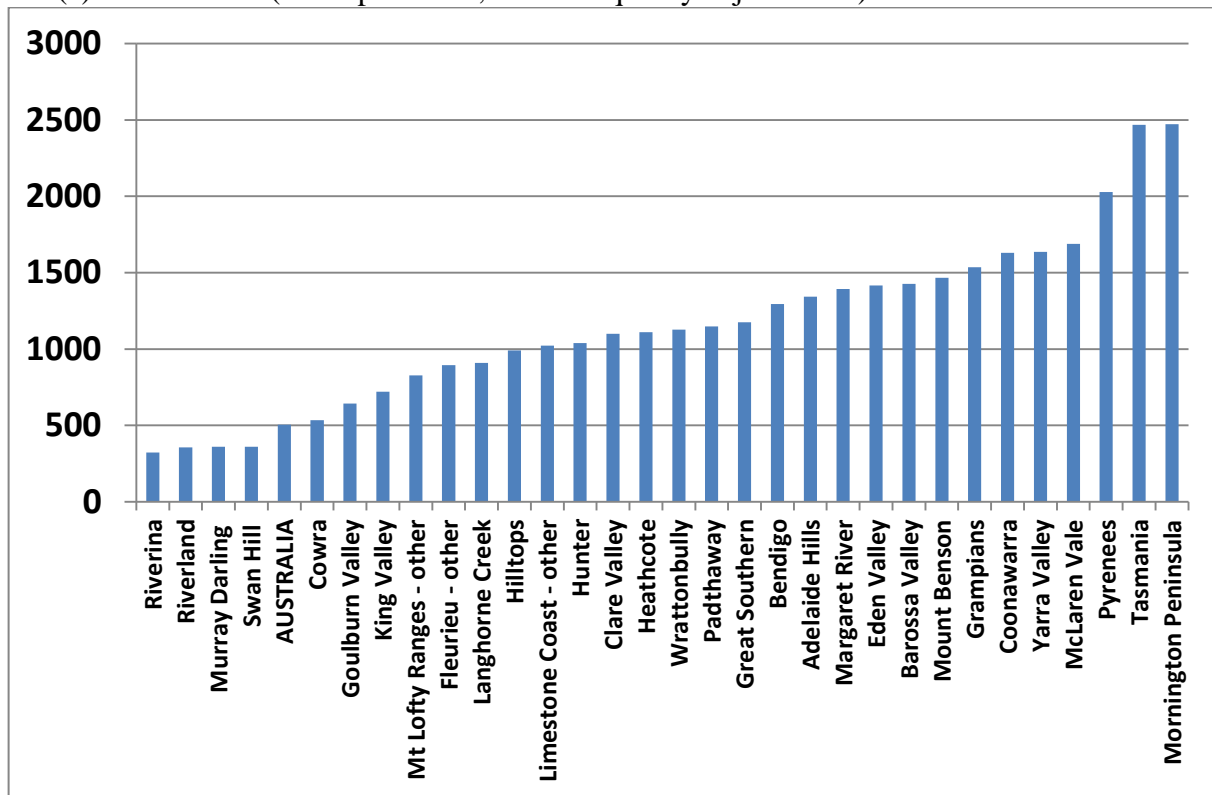
66. Regional Quality Index<sup>a</sup> dispersion, 2001 and 2012



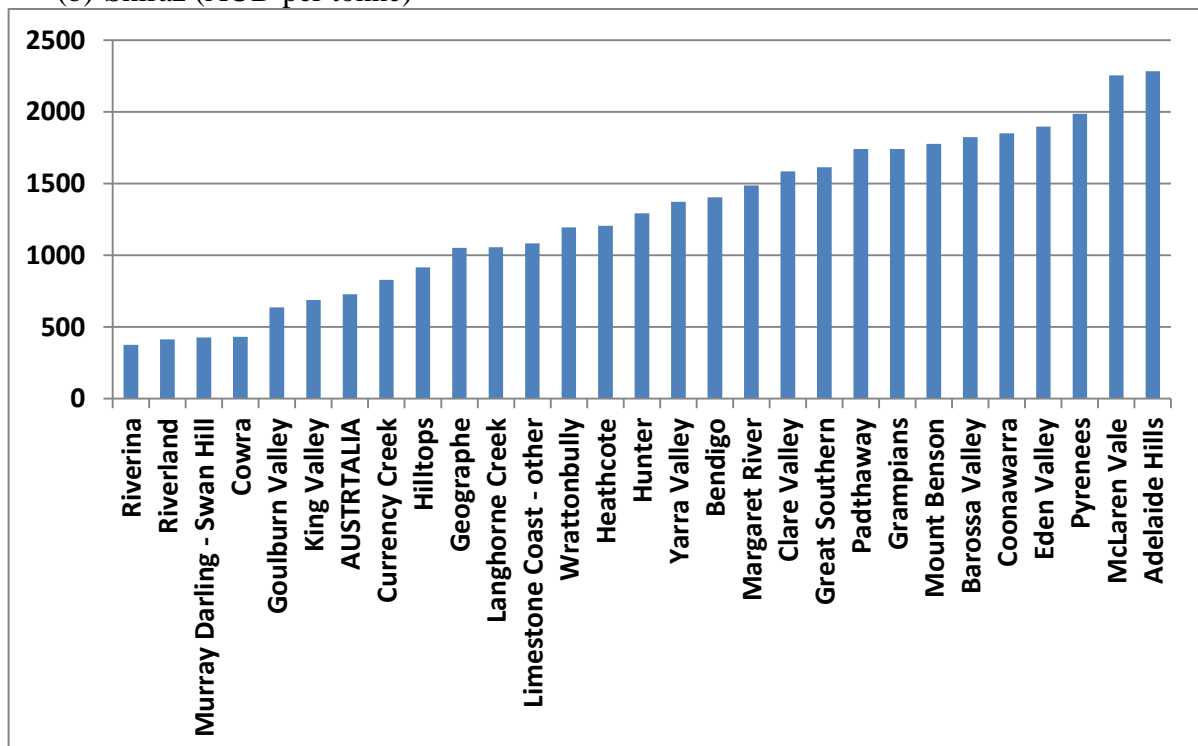
<sup>a</sup> Regional Quality Index is defined as the ratio of the regional average price for all varieties to the national average price for all winegrapes.

67. Average price of winegrapes, by region, Australia, 2013

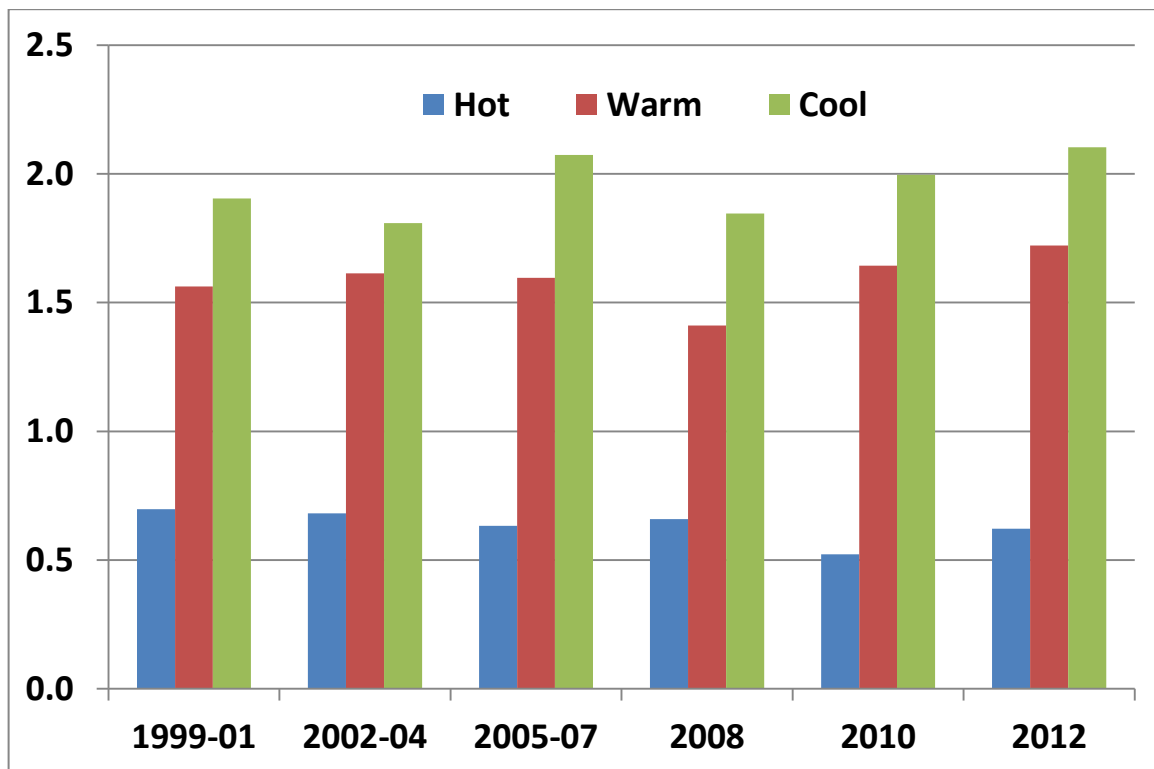
(a) All varieties (AUD per tonne, V2 after quality adjustments)



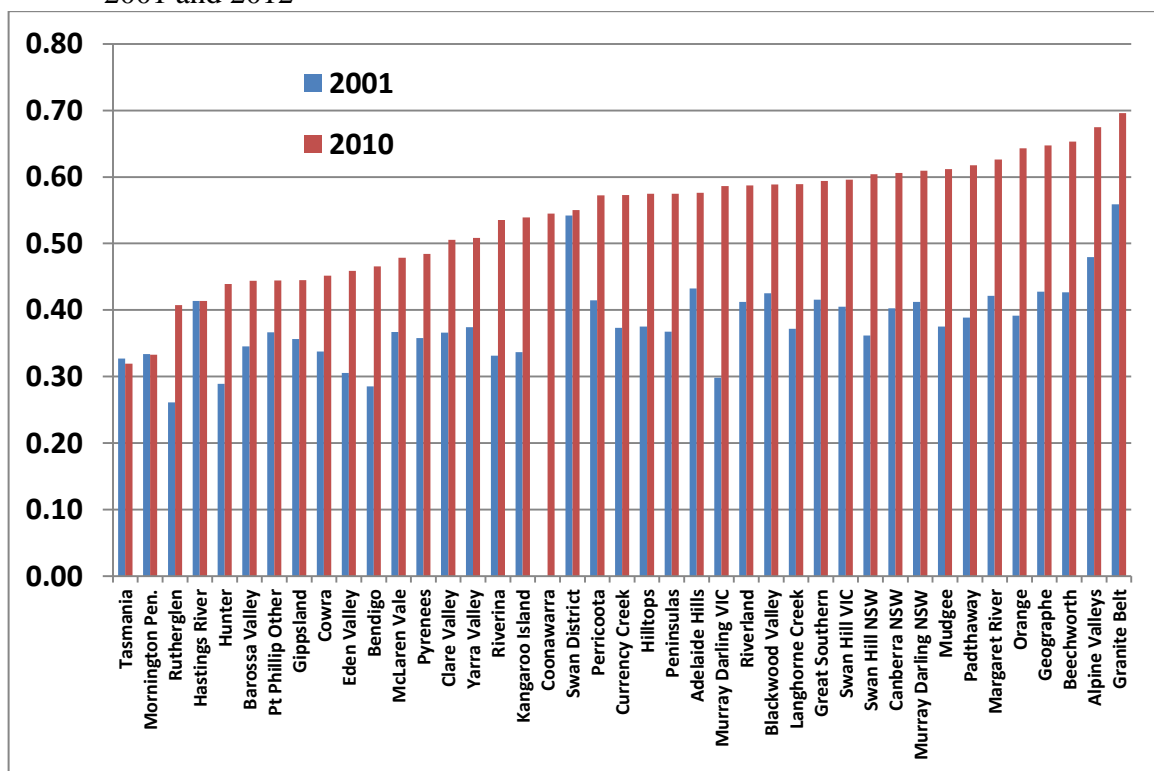
(b) Shiraz (AUD per tonne)



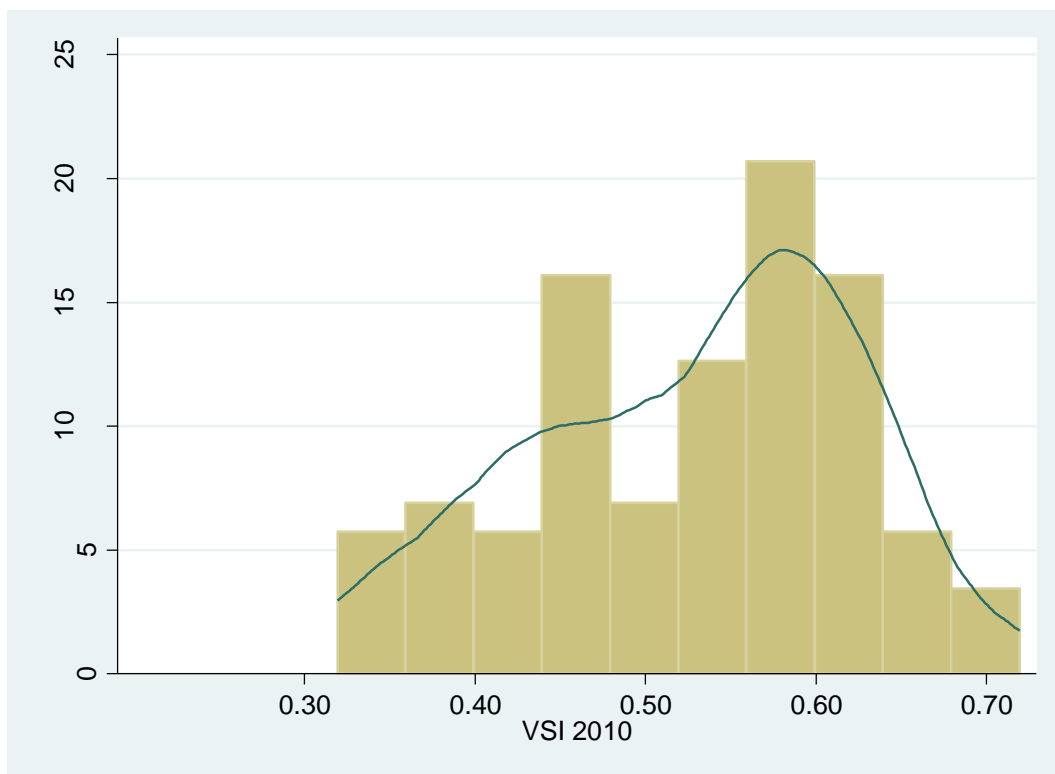
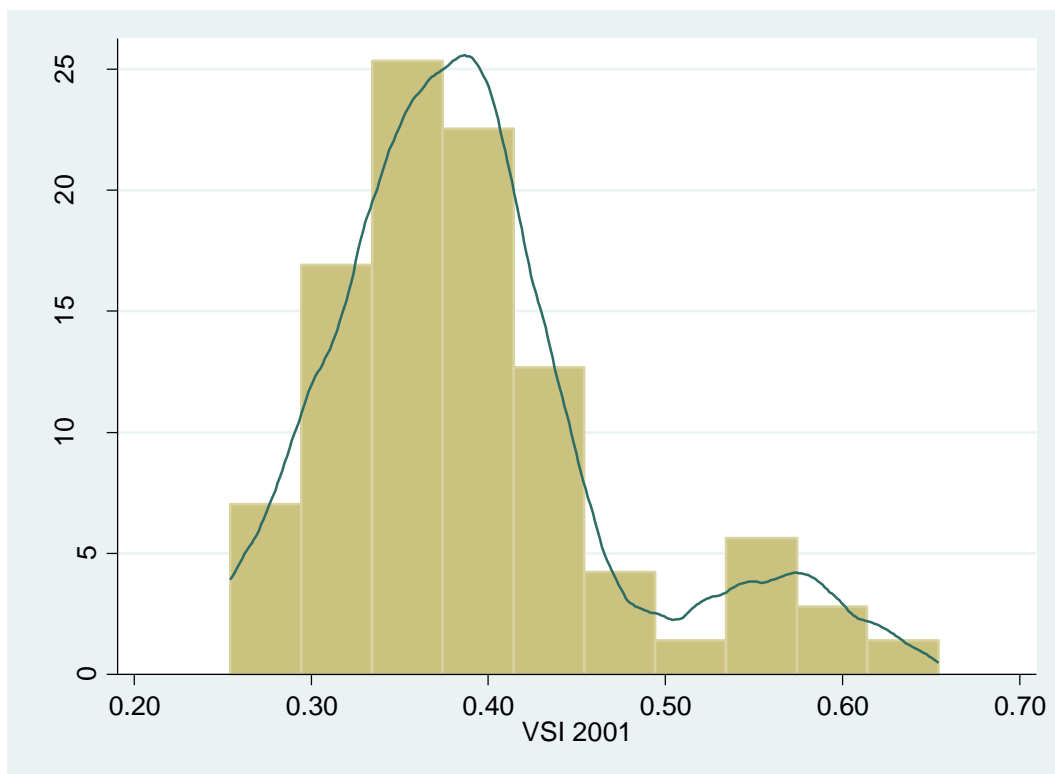
68. Regional Quality Index diversity across climate zones, 1999 to 2012



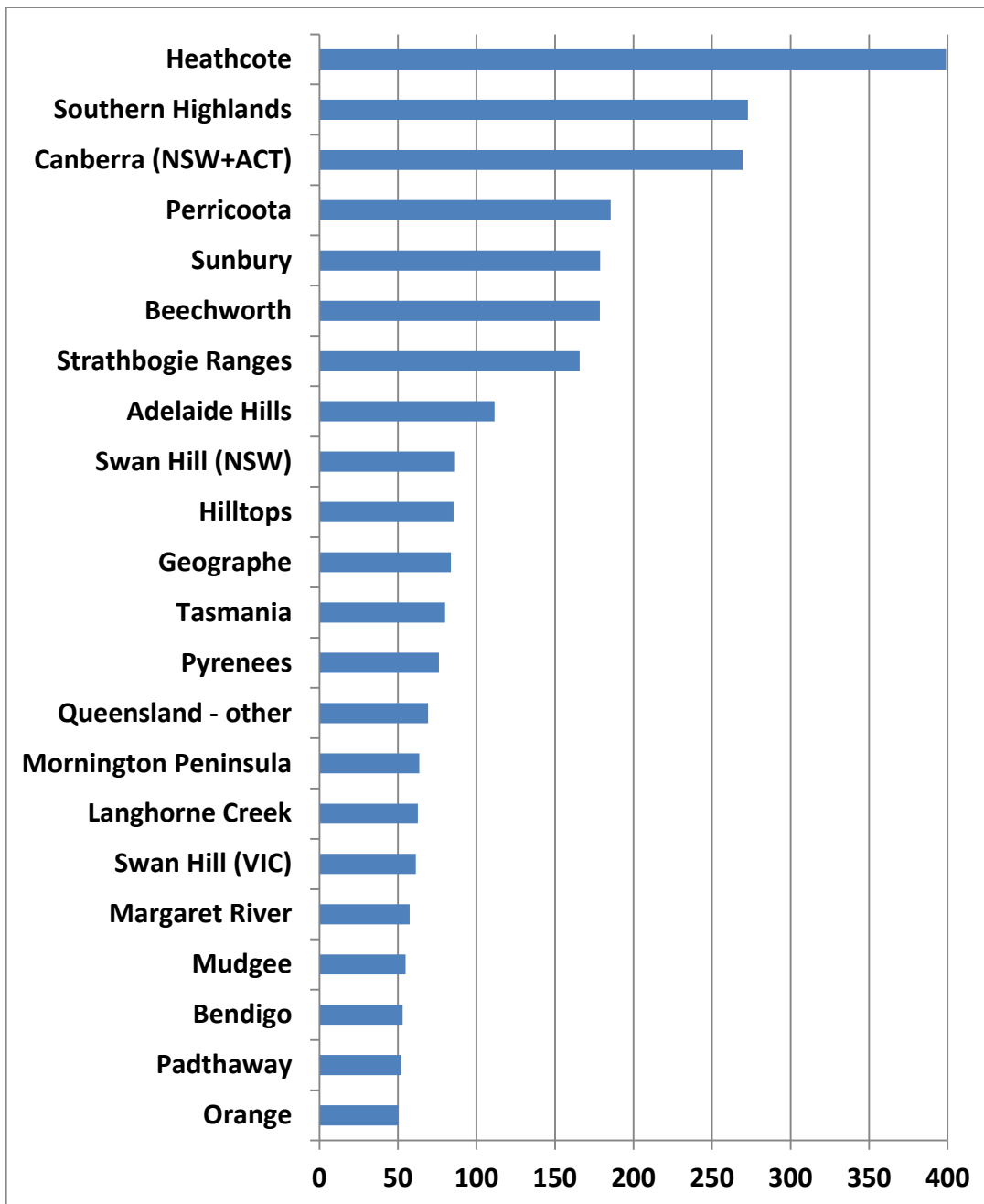
69. Regional diversity in terms of winegrape varieties (Varietal Similarity Index), 2001 and 2010



70. Varietal Similarity Index<sup>a</sup> dispersion, 2001 and 2010



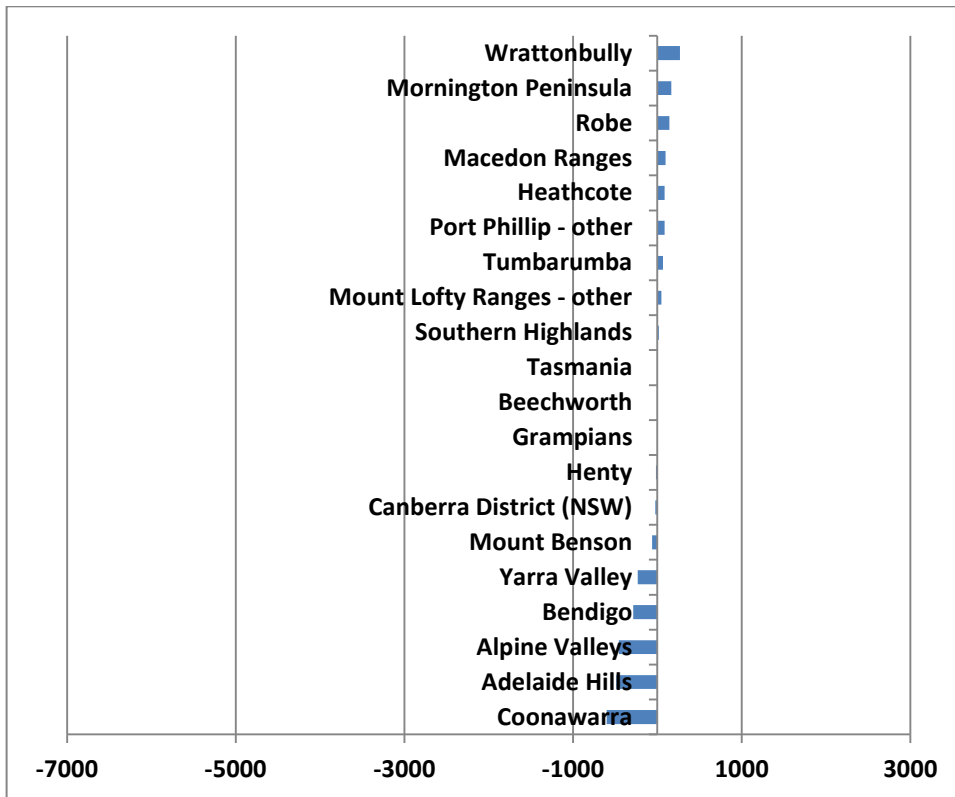
71. Percentage change in winegrape bearing area, by region, 2001 to 2008 (%)



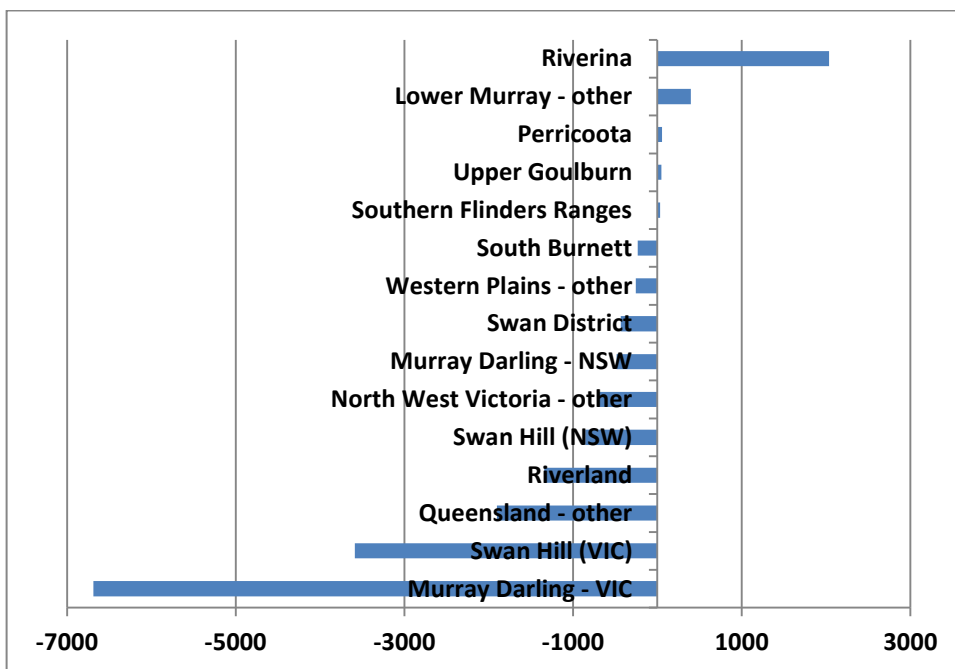


72. Change in winegrape bearing area, by region, 2008 to 2012 (ha)

(a) Cool regions



(b) Hot regions



72(continued) Change in winegrape bearing area, by region, 2008 to 2012 (ha)

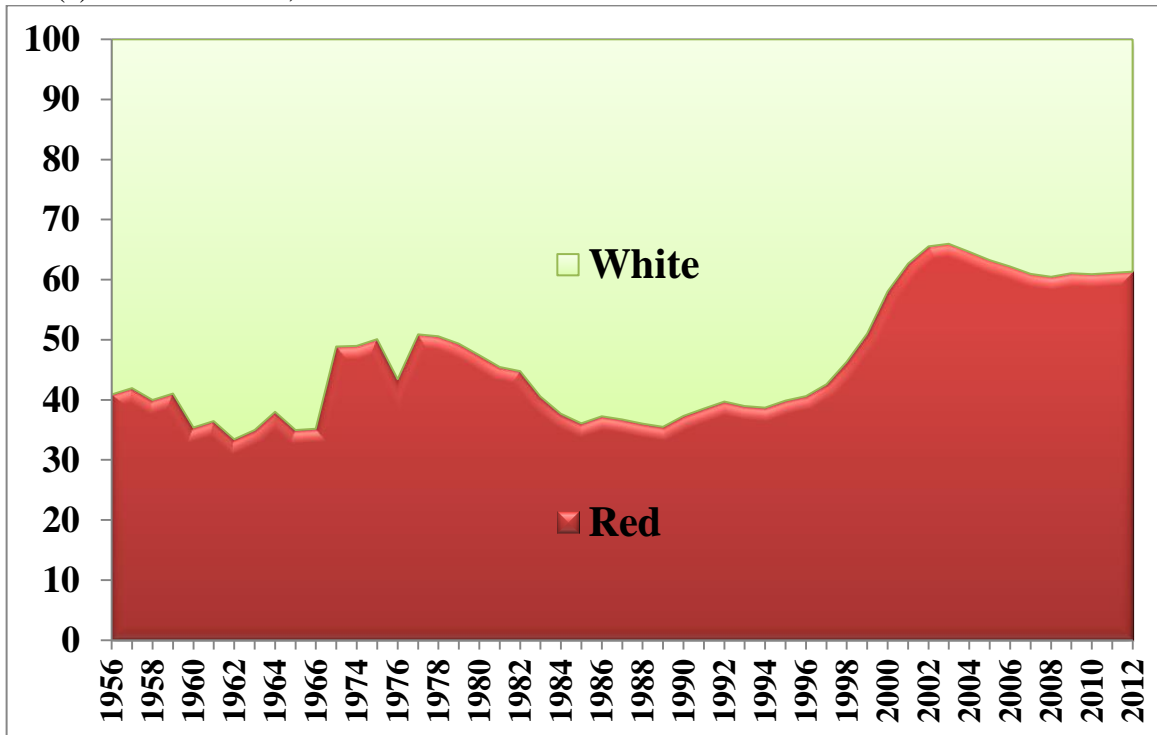
(c) Warm regions



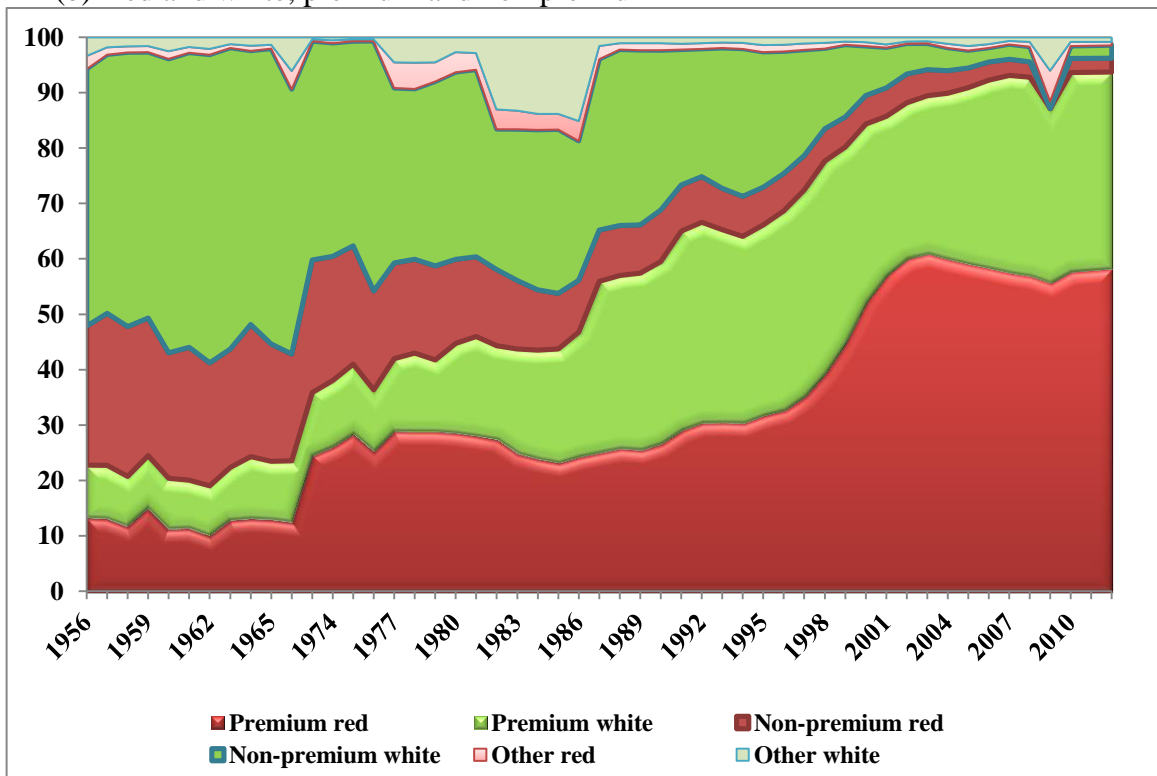
### **Section III. Winegrape varietal developments since the mid-1950s**

73. Shares of Australian winegrape area, by varietal colour and quality, 1956 to 2012

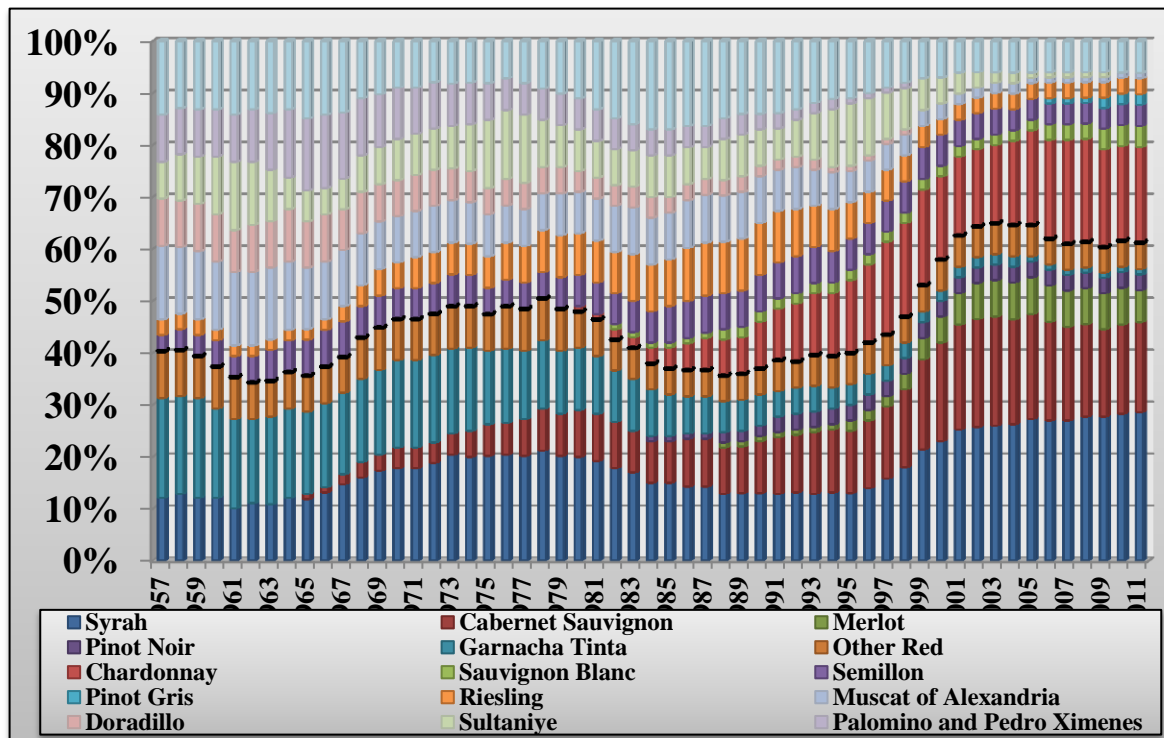
(a) Red and white, total



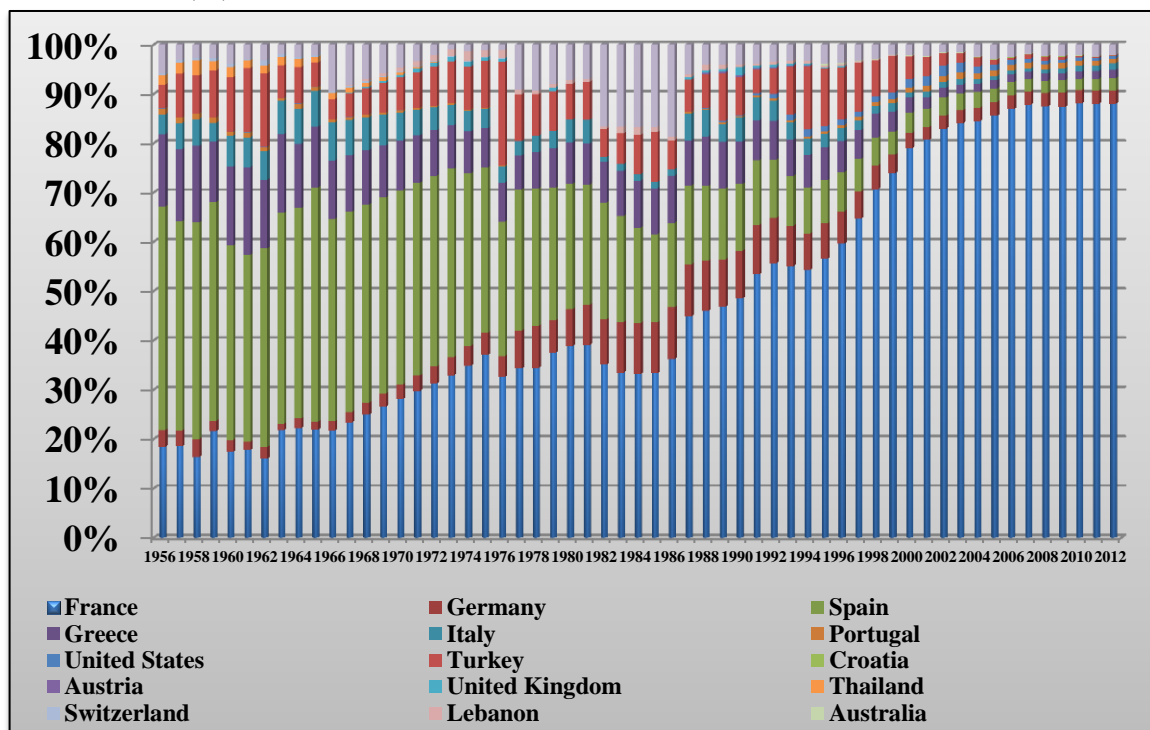
(b) Red and white, premium and non-premium



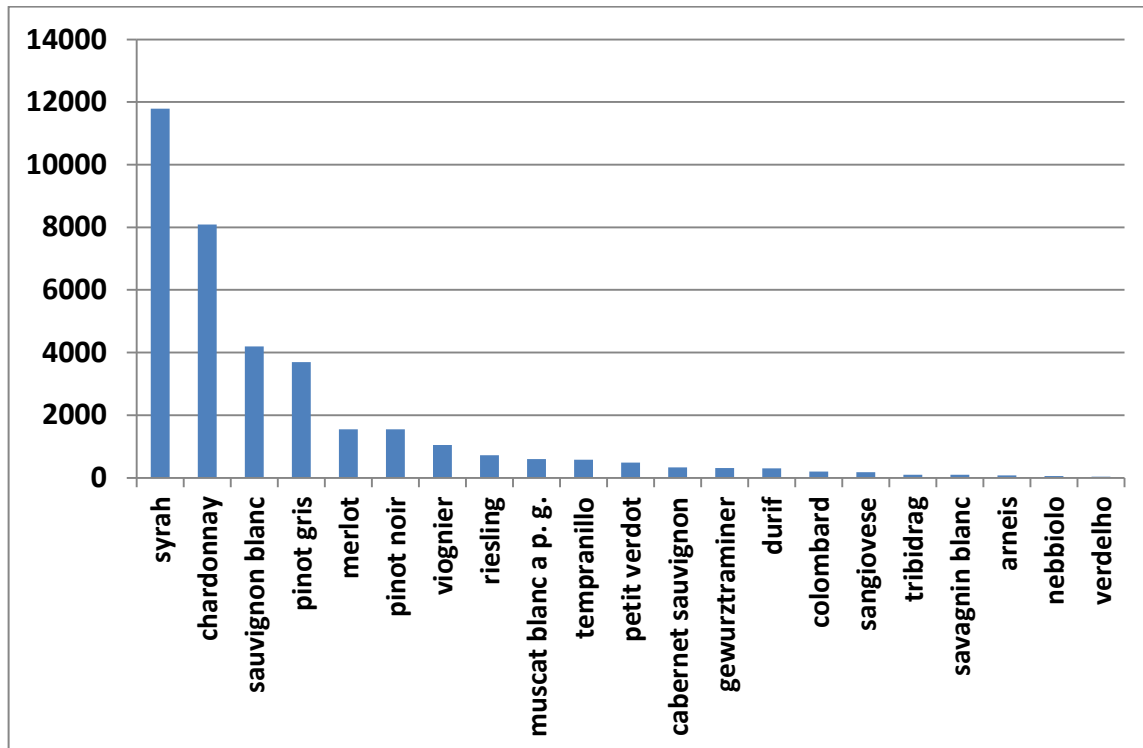
74. Shares of winegrape bearing area, by variety, 1956 to 2012  
(%, 3-year moving average)



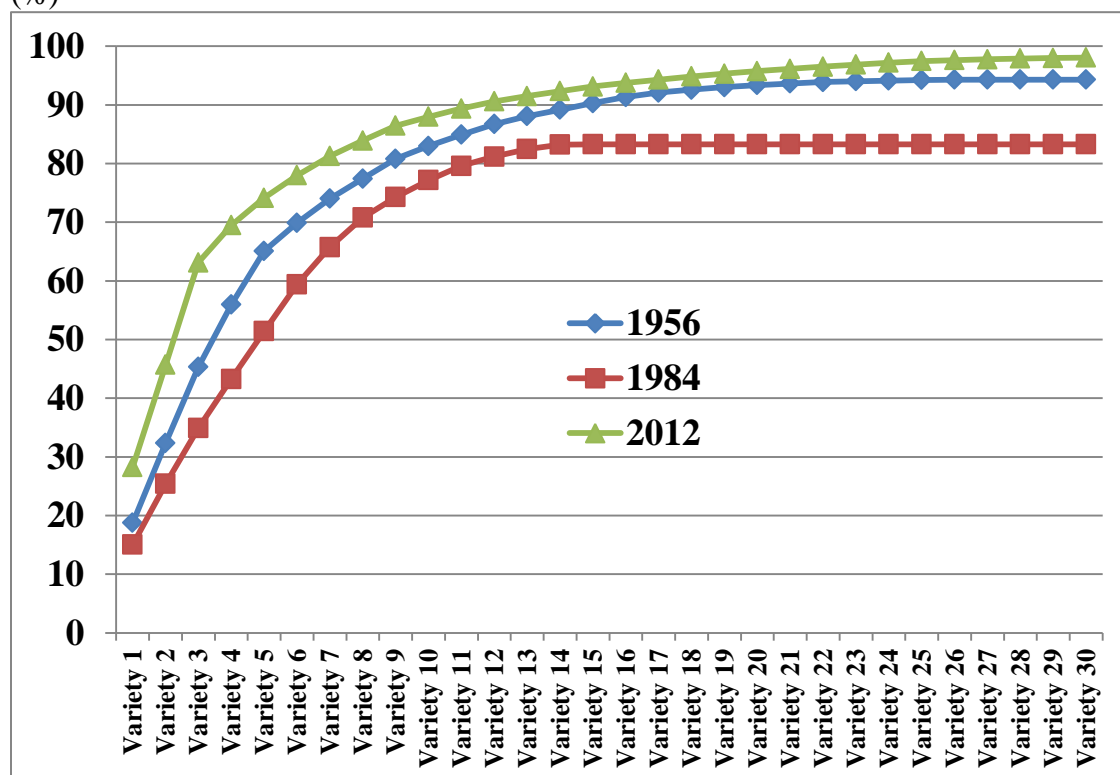
75. Shares of winegrape bearing area, by varietal country of origin, 1956 to 2012 (%)



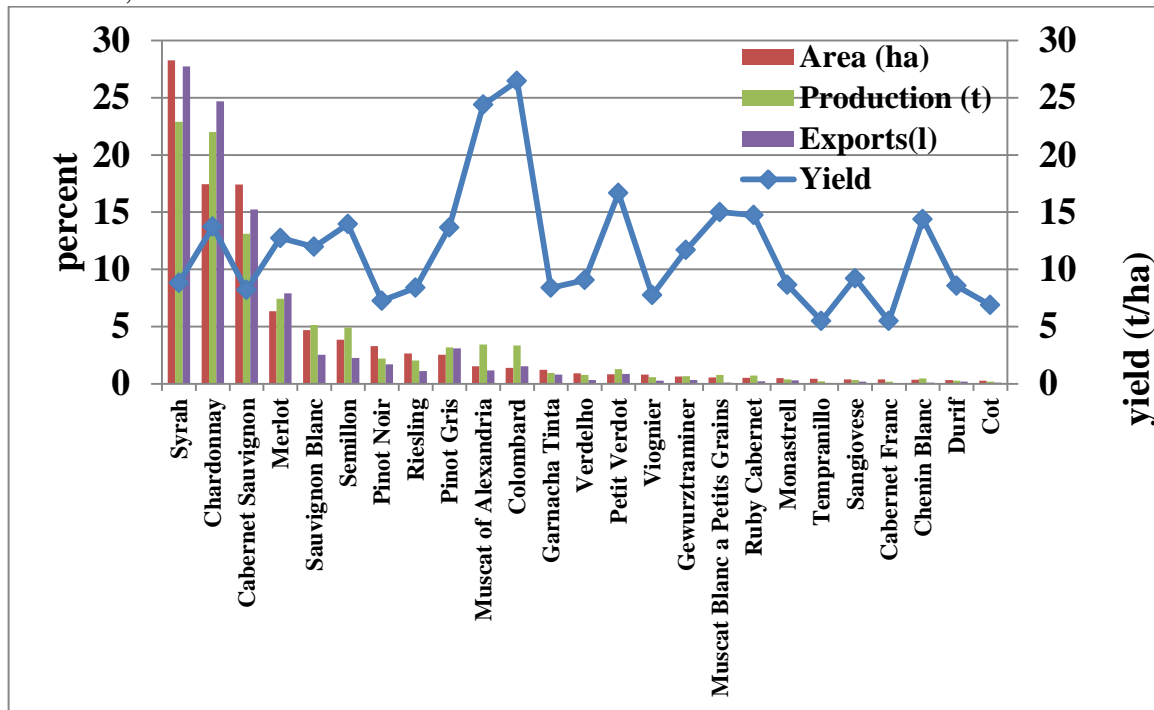
76. Change in bearing area for most-expanded varieties, Australia, 2001 to 2012 (ha)



77. Cumulative shares of Australian winegrape area, by main varieties, 1956, 1984 and 2012 (%)

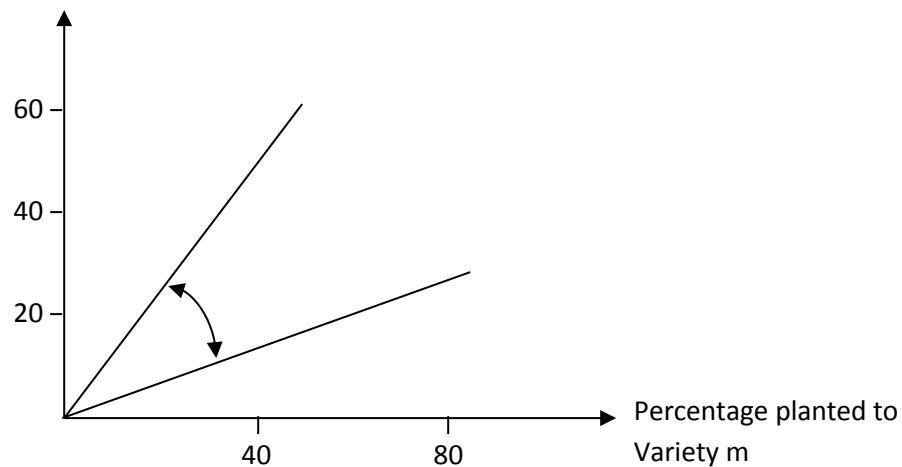


78. Shares of national wine area, production and exports of key varieties, and yield per ha, 2012

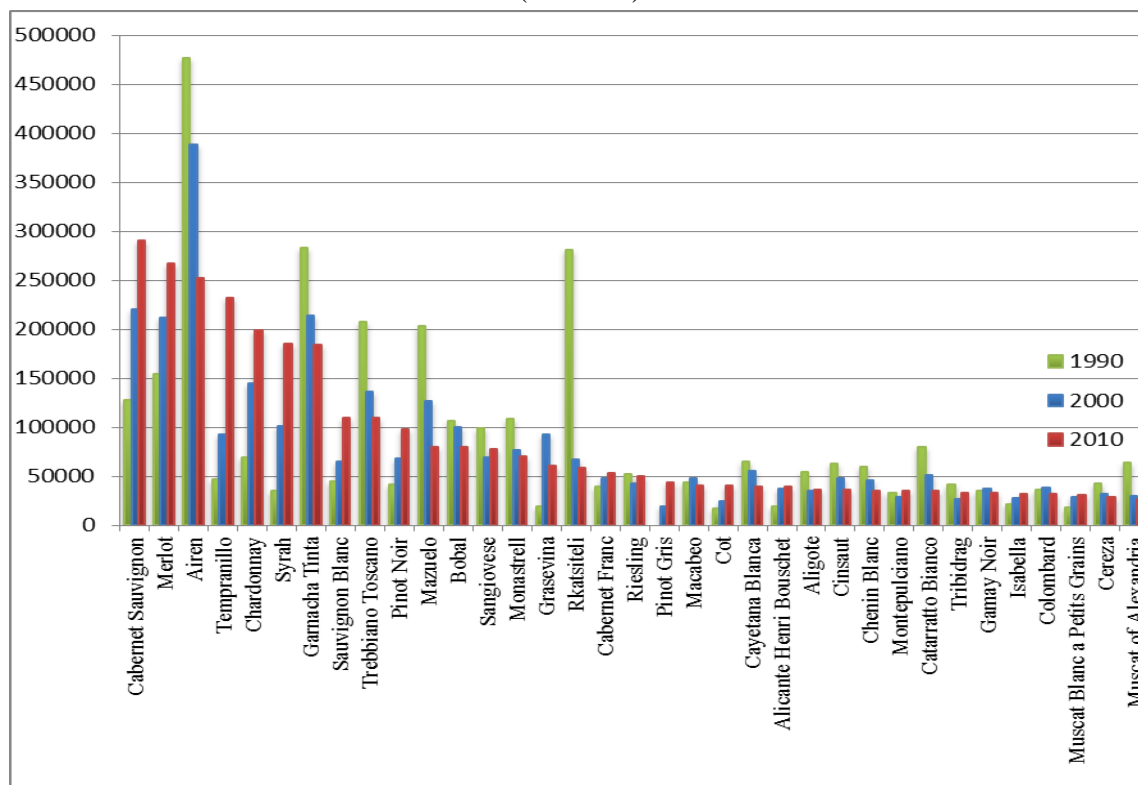


79. Angular separation between two regions, each growing two grape varieties

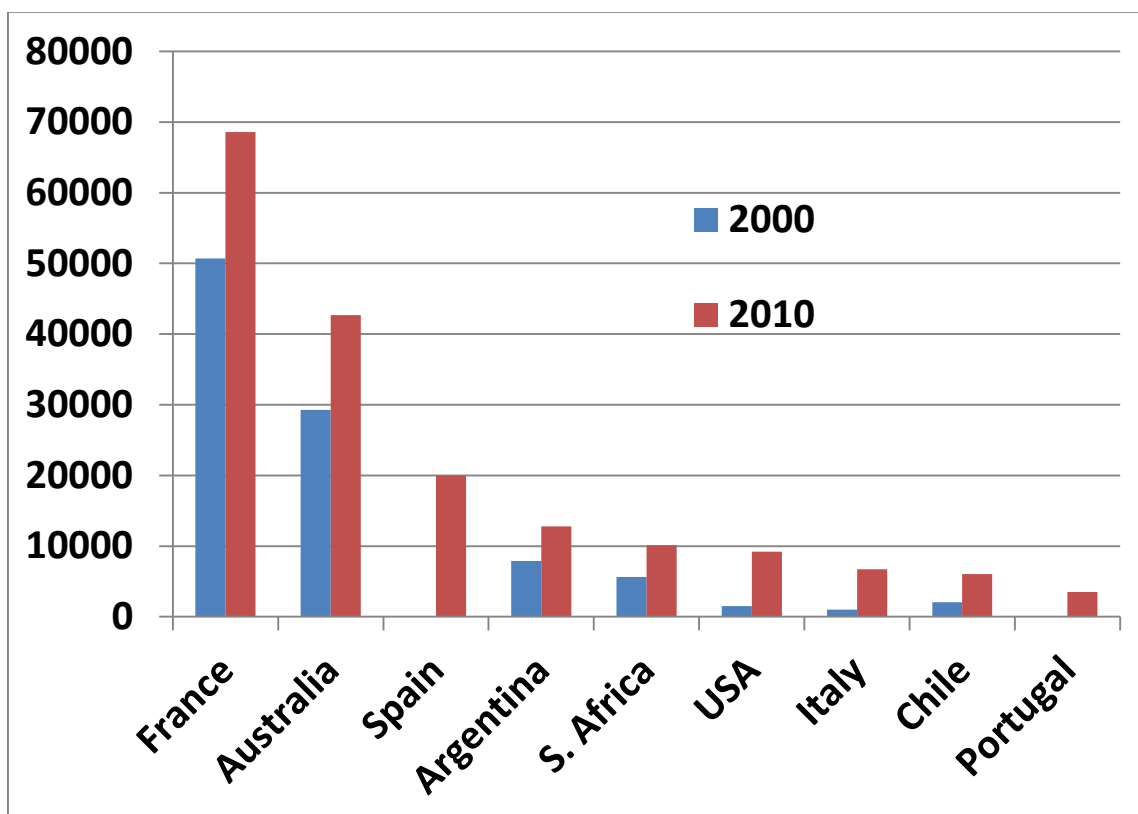
Percentage planted



80. World's top 35 varieties in 2010, compared with 1990 and 2000  
(hectares)

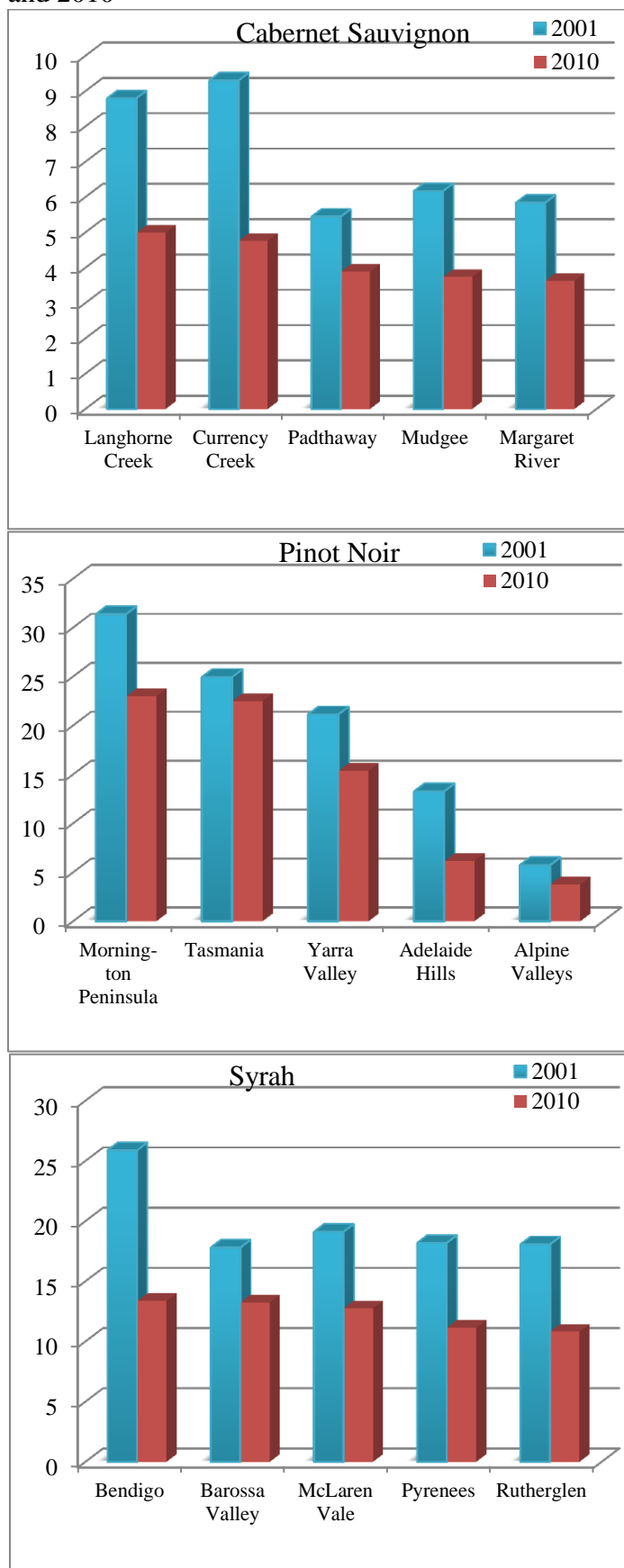


81. Bearing area of Syrah, key producing countries, 2000 and 2010  
(hectares)

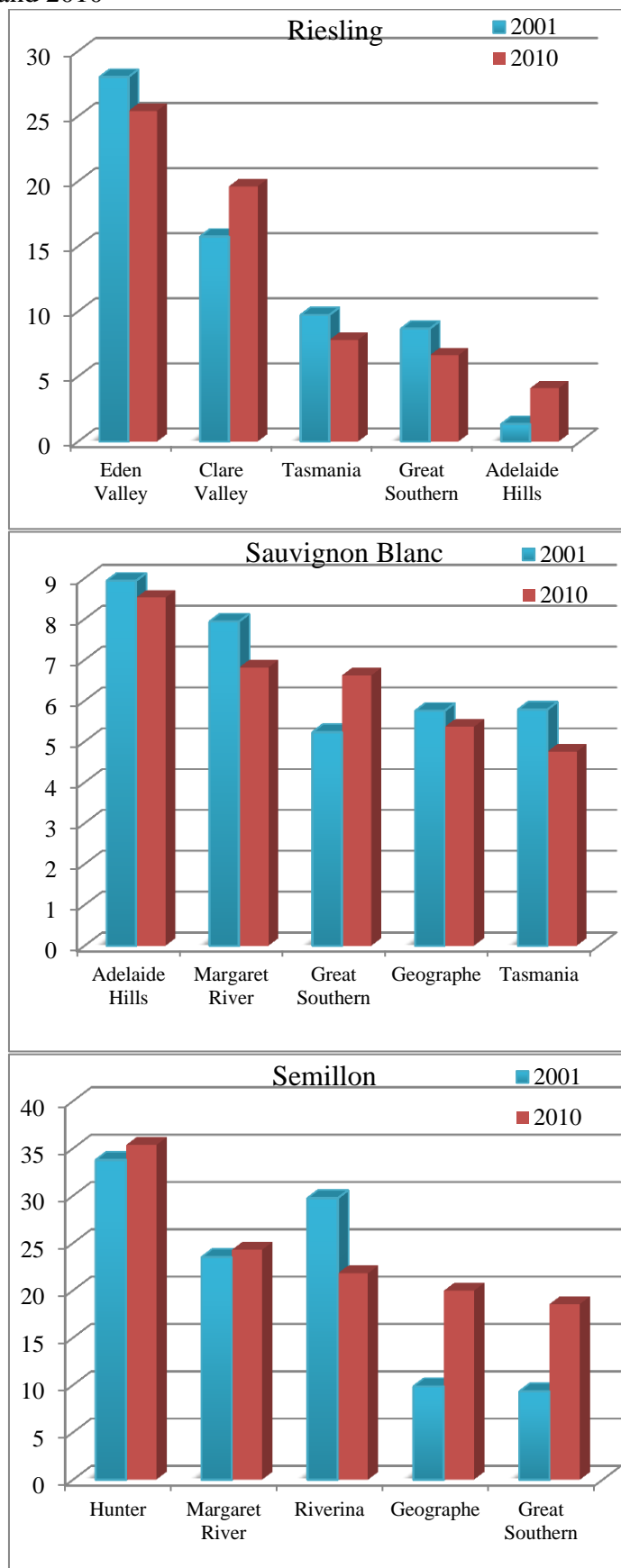




82. Australian regions with largest Varietal Intensity Index relative to global average, key red varieties, 2001 and 2010

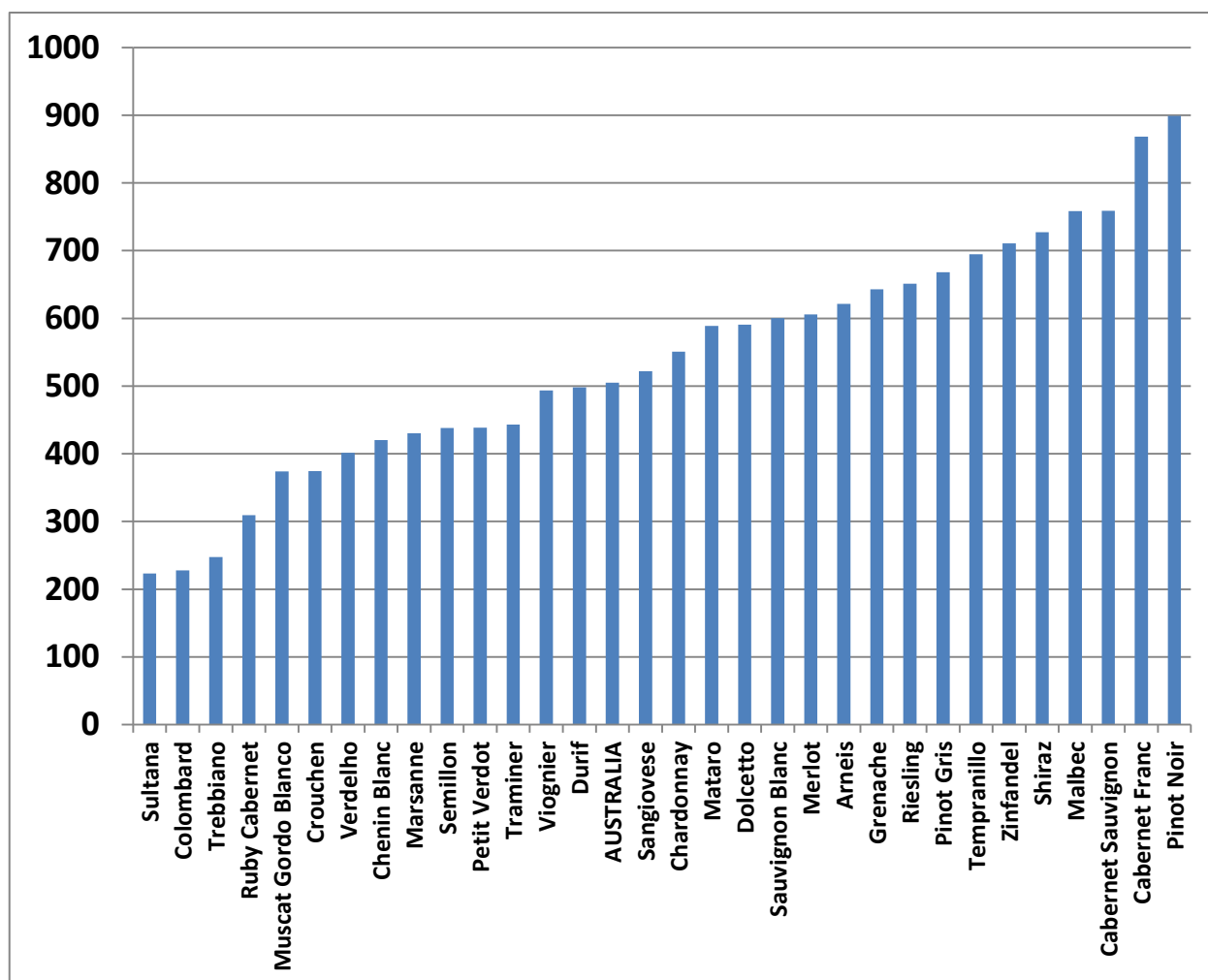


83. Australian regions with largest Varietal Intensity Index relative to global average, key white varieties, 2000 and 2010



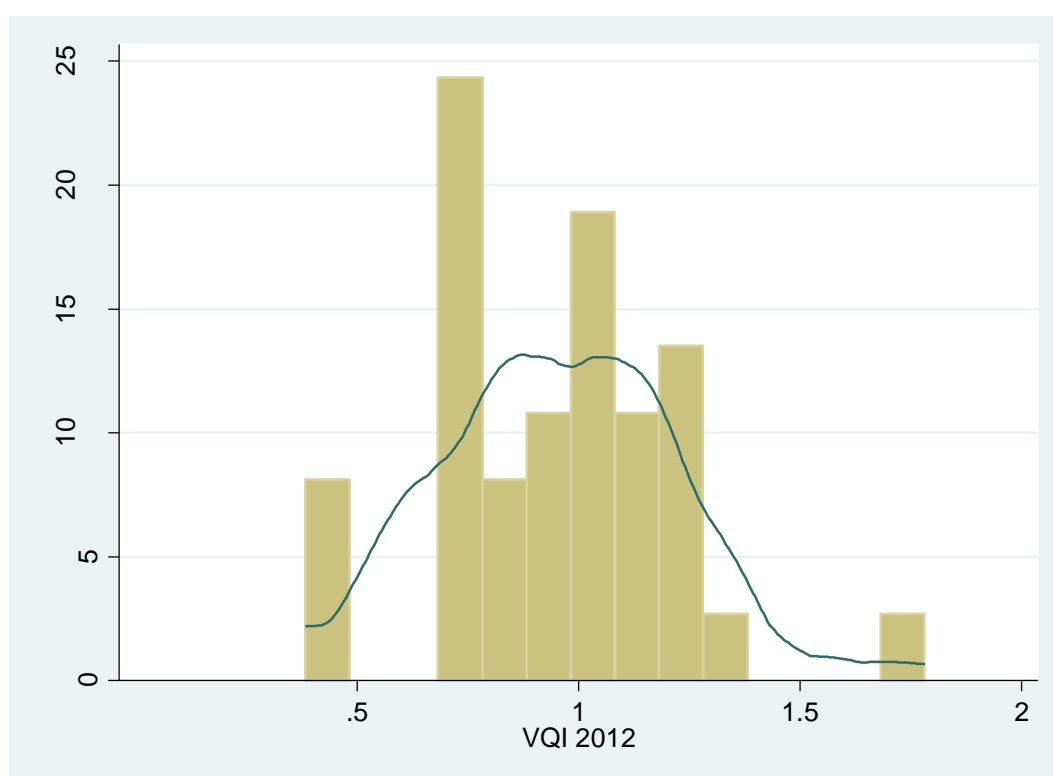
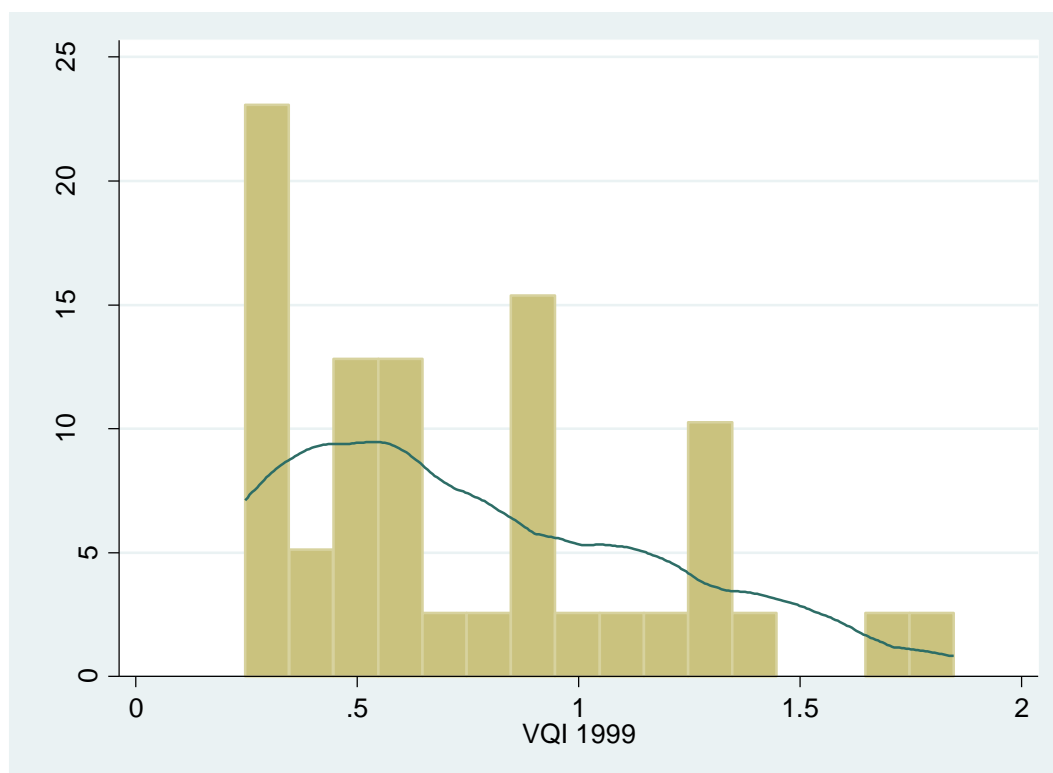
84. National average prices of main winegrape varieties,<sup>a</sup> 2013

(AUD per tonne)



<sup>a</sup> These are the varieties with the largest bearing area in Australia, using the varietal names most commonly used in Australia (as distinct from the prime varietal names used above).

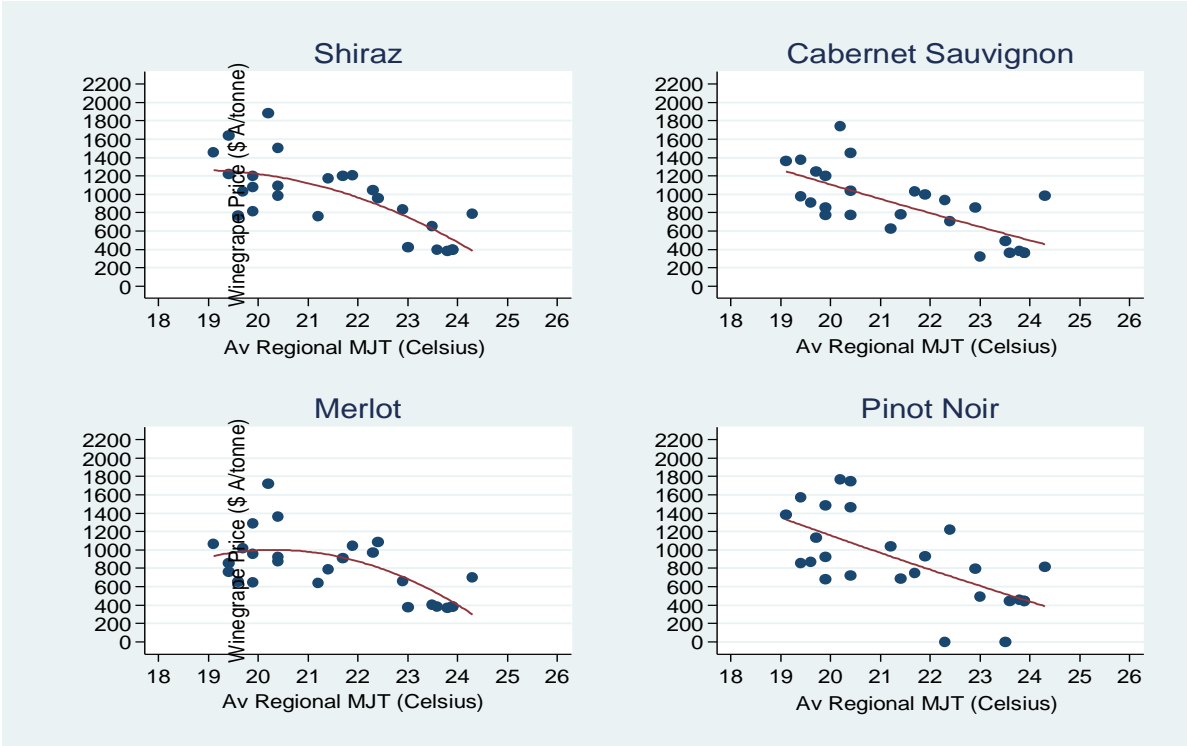
# 85. Varietal Quality Index<sup>a</sup> dispersion, Australia, 1999 and 2012



<sup>a</sup> The Varietal Quality Index is defined as the ratio of the national average price for a variety to the national average price of all winegrape varieties.

86. Winegrape price and mean January temperature, select varieties, 2006 (AUD/t)

(a) Key red varieties



(b) Key white varieties

