



Wine Australia

Economic Contribution of the Australian Wine Sector 2019

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Abbreviations

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABS	Australian Bureau of Statistics
CGE	Computable General Equilibrium (model)
FTA	Free Trade Agreement
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GI	Geographical Indication
IO	Input Output (model)
OIV	International Organisation of Vine and Wine
TRA	Tourism Research Australia
WFA	Winemakers' Federation of Australia
WTO	World Trade Organisation

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Executive Summary

This report is an economic assessment of the wine sector's direct and flow-on contribution to the Australian economy in 2019¹. It updates the study that was prepared for Wine Australia in 2015.

The Australian wine sector includes grape growing, wine making and wine-related tourism. The wine sector makes a direct and significant contribution to output (the gross value of business turnover), gross domestic product (GDP) and employment. In addition to the wine sector's direct economic contribution, the sector also makes a flow-on contribution via strong linkages to other businesses that supply goods and services required for grape growing, wine making and the wine tourism experience, as well as the goods and services demanded by employees.

Wine grapes are grown in every Australian state with South Australia, NSW and Victoria being the largest wine grape producers. In 2018 there were estimated to be 6,251 wine grape growers with a vineyard area of 146,128 ha generating a gross wine grape sales value of \$1.11 billion.

Wine is Australia's fifth largest agricultural export industry. In 2018 there were estimated to be 2,468 Australian wineries and total Australian wine production was 1.29 billion litres with a gross value to the wine makers of \$6.3 billion.

Australian wine is export oriented with approximately 60% of output headed for wine markets including China, the United States, United Kingdom, Canada and Hong Kong.

Tourism Research Australia estimated that there were 8.3 million visits to wineries from both domestic and international travellers in year ending March 2019. For those travellers that included a visit to a winery, they spent \$9.3 billion in Australia during their trip and are typically higher spenders with an average spend per trip of \$1,125. While domestic travellers made up the majority (88%) of visits to wineries, internationals contributed to half of the spend in Australia.

Revenue, expenditure and employment profiles were developed for each of grape growing, wine making and wine related tourism. Input-Output analysis was then used to quantify both direct and flow-on output, value-added, income and employment for each of grape growing, wine making and wine related tourism. Total direct and flow-on impact was adjusted to eliminate double counting when each component within the sector was summed to estimate total economic impact – Table E1.

Table E1 Direct and Indirect Impact of the Total Wine Sector 2019

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL IMPACT
OUTPUT (\$'M)	15,038	14,106	16,403	30,509	45,547
<i>Type 11A Ratio</i>	1.00	0.94	1.09	2.03	3.03
VALUE-ADDED (\$'M)	7,075	6,424	9,033	15,458	22,533
<i>Type 11A Ratio</i>	1.00	0.91	1.28	2.18	3.18
INCOME (\$'M)	3,839	3,775	4,377	8,153	11,991
<i>Type 11A Ratio</i>	1.00	0.98	1.14	2.12	3.12
EMPLOYMENT (No.)	69,041	39,637	55,112	94,749	163,790
<i>Type 11A Ratio</i>	1.00	0.57	0.80	1.37	2.37

¹ Using 2018/19 data where this is available and the most recent alternative where it is not. For example ABS Regional Employment data is from calendar year 2016.

Because Input-Output modelling only examines backward linkages this analysis does not capture margins on wine sales through wholesale, retail and restaurant sales. Values for wine sales and grape sales are at the winery/farm gate. Inclusion of wholesale, retail and restaurant sales would make the estimates of total direct and flow-on contribution higher.

Input-Output analysis has shown that the Australian wine sector (defined as wine grape growing, wine making and wine related tourism):

- Contributes \$45.5 billion in gross output to the Australian economy. Gross output includes \$22.5 billion in value (value-added) and \$12.0 billion in wages and salaries from full and part time employment.
- Supports 163,790 direct and indirect full and part-time jobs², most of which are located in regional Australia, including 5,626 directly in grape growing, 13,563 directly in wine manufacturing and 55,885 directly associated with wine tourism. Estimates of full and part time employment are associated with economic activity linked to grape growing, wine making and wine tourism and do not include forward linkages such as employment in the retail sector.

A comparison of indicators derived in 2015 with current results is provided in Table E2. This shows that the industry has experienced strong growth over the last four years in terms of income (wages and salaries), outputs (business turnover), and value added (profit) but not employment.

Table E2 Comparison of Headline Indicators 2015 and 2019

Wine Sector Contribution	2015	2019	% Change	Compounded Annual Growth Rate
Employment	172,736	163,790 [#]	-5%	-1%
Income	\$10.4 billion	\$12.0 billion	15%	4%
Gross Output	\$40.2 billion	\$45.5 billion	13%	3%
Value Added	\$19.7 billion	\$22.5 billion	14%	3%

[#] decrease in employment reflects ongoing mechanisation especially in the grape growing and wine making subsectors.

Unlike Computable General Equilibrium modelling³, Input-Output analysis does not generate taxation indicators. Input Output analysis accounts for tax paid on inputs purchased by grape growers, wine makers and the wine tourism sector and this tax paid is captured in estimates of value-added.

Input-Output analysis has shown that the average effects of a contraction or expansion within the wine sector would be:

- The economy would gain an extra \$2.04 million for every additional \$1 million of gross output generated by the wine sector.
- The economy would gain an extra \$2.19 million in contribution to value-added for every additional \$1 million of value-added generated by the wine sector.

² As defined in the Australian National Accounts as 'Full time and part time employees, employers, own account workers and contributing family workers'

³ Computable General Equilibrium (CGE) analysis is unsuitable for providing a 'snapshot' of an existing industry and its inter-sectoral linkages and is more applicable to assessing the effects of a change or shock to the economy. For instance, NZIER (2014) 'The economic contribution of the New Zealand wine sector, the impact of growth since 2008', used CGE to examine the impact of growth in the wine and grape industry in New Zealand compared to if growth had stagnated at 2008 levels. Consequently, for this Australian study which is focused on providing a 'snapshot' of an existing industry, Input-Output analysis was preferred.

- The wider economy would gain an extra 1.35 jobs for every job gained in the wine sector.

The Australian wine sector is forecast to experience further export growth including sales to China. The domestic sales outlook is positive with Australians buying higher priced wine and tourism should benefit from a favourable exchange rate and further interest from wealthy young adults and retirees from Asia. Industry forecasts suggest ongoing growth in the wine sector economic contributions described in this report.

1. Introduction

The Australian wine sector makes a significant contribution to the Australian economy. This includes the economic activity associated with grape growing in vineyards and wine production, and extends to the economic activity from wine related tourism. These three components of the Australian wine sector also have strong linkages to other sectors of the Australian economy, in particular the businesses that supply the goods and services required for grape growing, wine making and the wine tourism experience, as well as the goods and services demanded by employees. Consequently, the contribution of the Australian wine sector to the Australian economy is greater than just its direct effects.

This report is an economic assessment of the wine sector's direct and indirect contribution to the Australian economy in 2019. It updates the study that was prepared for Wine Australia in 2015.

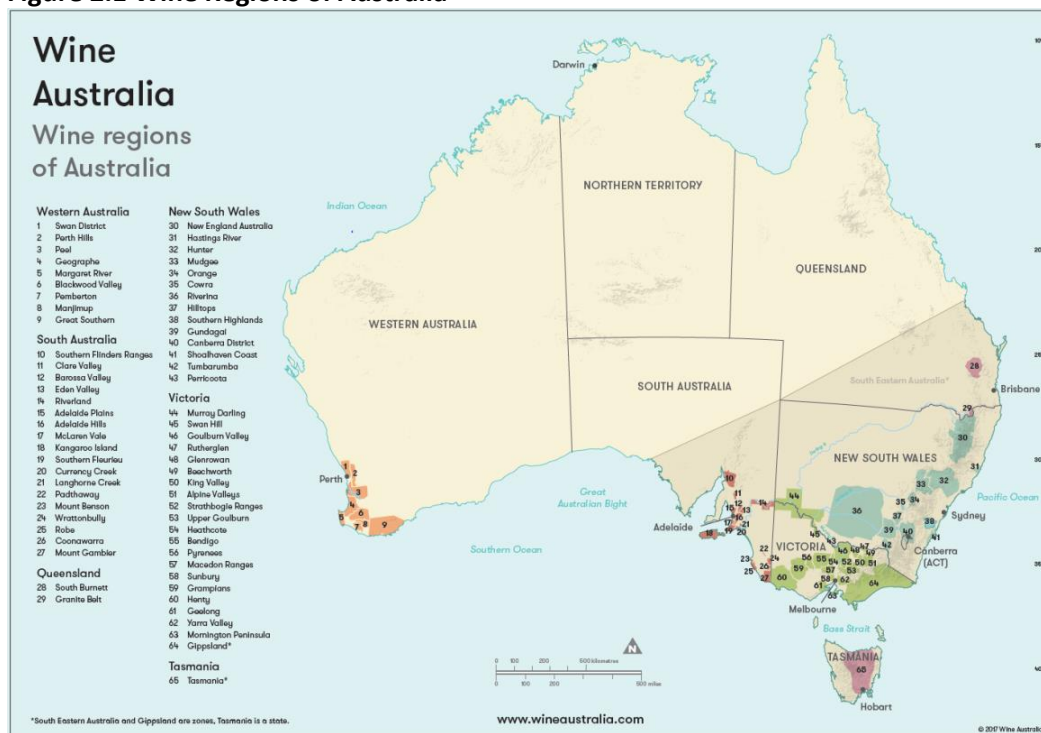
Section 2 of the report locates the industry geographically and provides an overview of the nature and scope of the components of the wine sector. Section 3 outlines the input-output (IO) modelling method used to examine the direct and indirect economic effects of the wine sector. Section 4 combines available data to develop a revenue, expenditure and employment profile for the grape growing, wine making and wine tourism sectors of the Australian economy. The modelling of these sectors to assess their flow-on effects for the economy is then reported in Section 5. Conclusions are provided in Section 6.

2. Australian Wine Sector Background

2.1 Locality

Wine grape growing, wine making and wine related tourism occur in all Australian states. Australia has sixty five wine regions⁴. The main Australian wine regions are shown on Figure 2.1.

Figure 2.1 Wine Regions of Australia

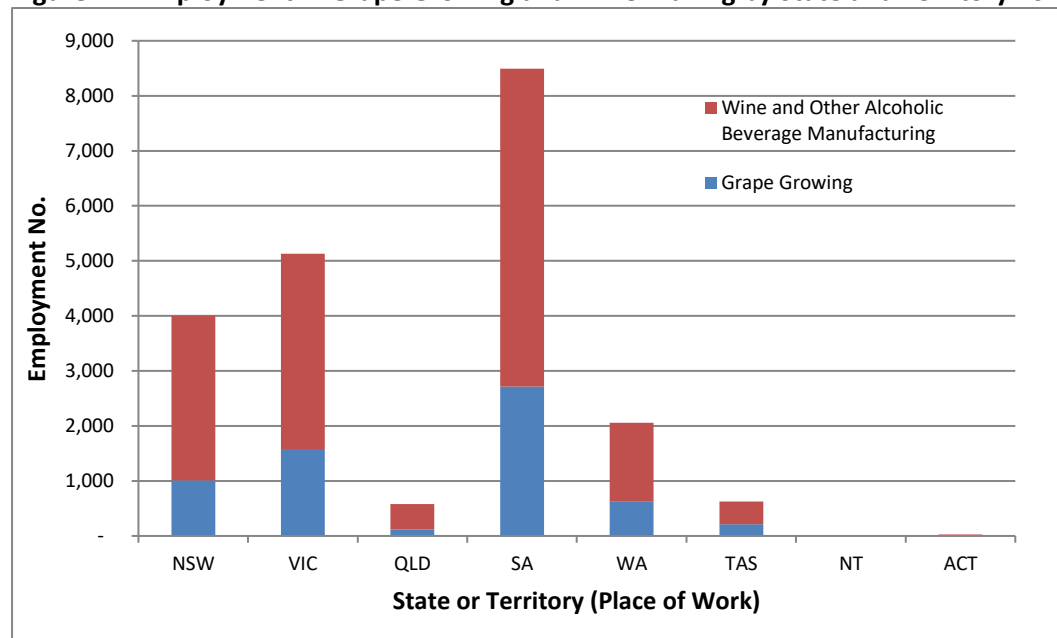


Source: Wine Australia, sourced June 2019 at <https://www.wineaustralia.com/getmedia/9da8ba52-21da-46e8-b27e-3521d362b1c3/Australian-Wine-Regions.pdf>

⁴ South Eastern Australia and Gippsland are zones, Tasmania is a state

The relative scale of direct economic activity by state and territory is indicated by Australian Bureau of Statistics (ABS) 2016 employment levels in the Grape Growing Sector⁵ and Wine and Other Alcoholic Beverage Manufacturing Sector⁶ - see Figure 2.2. From this data it is evident that the wine sector is most significant in South Australia, Victoria and NSW.

Figure 2.2 Employment in Grape Growing and Wine Making by State and Territory 2016



Source: ABS 2016 Census of Population and Housing - 4 digit employment by state/territory

No ABS employment data is available for wine tourism because there is no specific tourism industry sector in the Australian and New Zealand Standard Industrial Classification. The 'tourism sector' is made up of components of several industry sectors, including transportation, accommodation, food and beverage, recreation and entertainment and travel services. Economic activity, including employment, for the tourism sector needs to be generated based on visitation levels and expenditure. This is discussed further in Section 3 and Tourism Research Australia data is presented in Section 2.4.

2.2 Wine Grape Growing

Wine grapes are grown and crushed in every Australian state with South Australia, NSW and Victoria being the largest wine grape producers - Table 2.1.

Table 2.1 Grape Crush by State 2018 – Red and White (tonnes)

State or Region	Tonnes
South Australia	879,000
New South Wales	538,000
Victoria	319,000
Western Australia	39,000
Tasmania	15,000
Total	1,790,000

Source: Wine Australia – Australian Wine Sector 2018 at a Glance

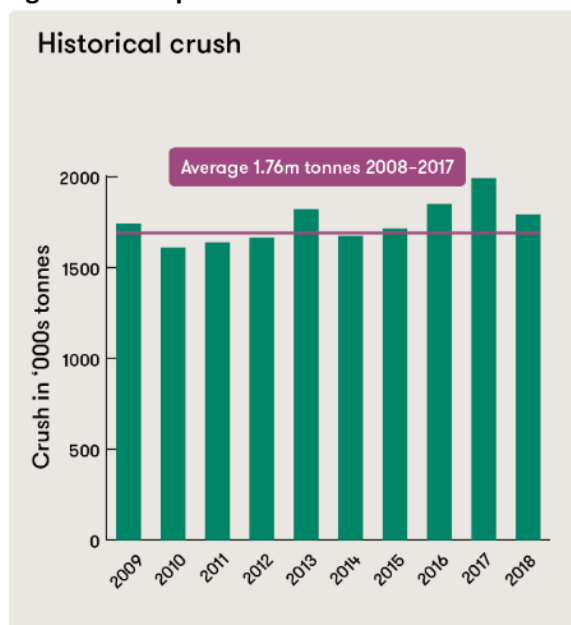
⁵ Employment estimates include wine grape, table grape and dried grape production

⁶ Employment estimates include wine making, wine blending, wine vinegar, fermentation of cider and alcoholic beverages not elsewhere classified.

In 2018, there were an estimated 6,251 grape growers with 146,128 ha of grape growing area producing 1,790,000 tonnes of grape crush (Wine Australia – Australian Wine Sector 2018 at a Glance and National Vineyard Scan 2018).

Historical wine grape crush, 2009 to 2018 is shown in Figure 2.3.

Figure 2.3 Grape Crush 2009 to 2018



Source: Wine Australia – Vintage Report 2018

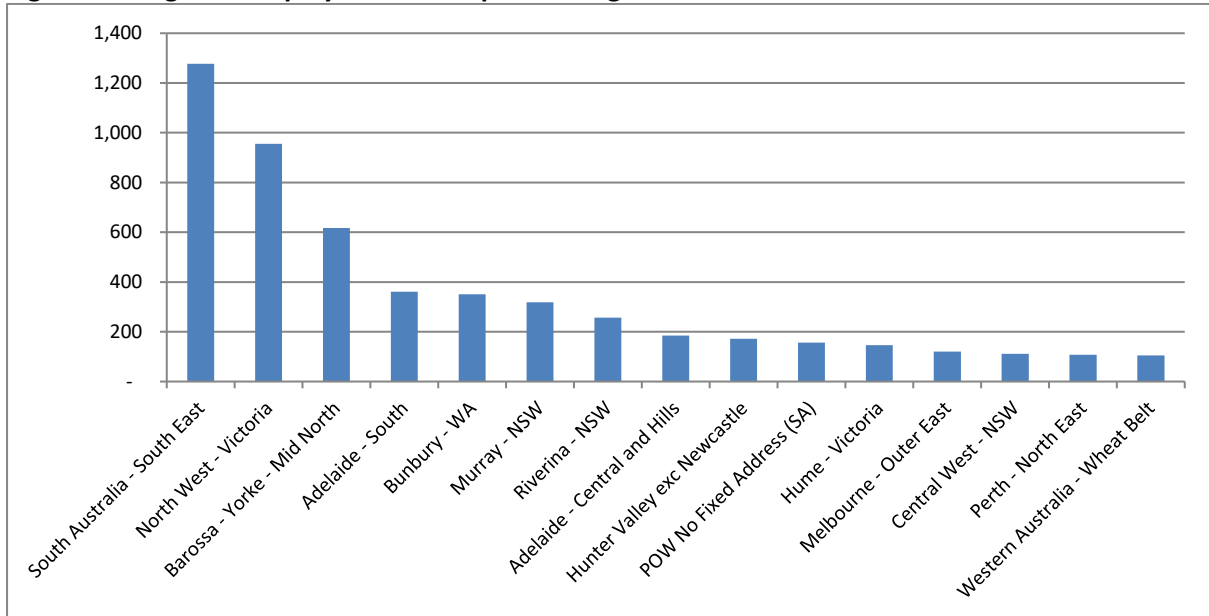
In 2018, the total wine grape crush was valued at \$1.11 billion with an average purchase price of \$609/tonne. Average purchase price was made up of 'warm inland' production of 1.29 million tonnes valued at \$396/tonne and 'cool climate' production of 0.5 million tonnes valued at an average of \$1,342/tonne (Wine Australia – Vintage Report 2018).

The cost of growing wine grapes varies according to the size of the vineyard, the degree of mechanisation and the method of irrigation. Harvesting and pruning can be labour-intensive, although mechanisation is increasing within the industry. The location of the vineyard, fluctuations in yields achieved and prices received also cause variations in enterprise return.

Approximately 80% of Australian wine grape growing enterprises operate on less than 50 ha, 2% of enterprises operate on more than 500 ha. Similarly, almost 98% of enterprises employ fewer than 20 people and this is due to the high number of family managed vineyards. Grape growing is often reliant on the grower's own labour plus the labour of family members.

Figure 2.4 identifies the top 15 regions in Australia for employment in grape growing.

Figure 2.4 Regional Employment in Grape Growing 2016

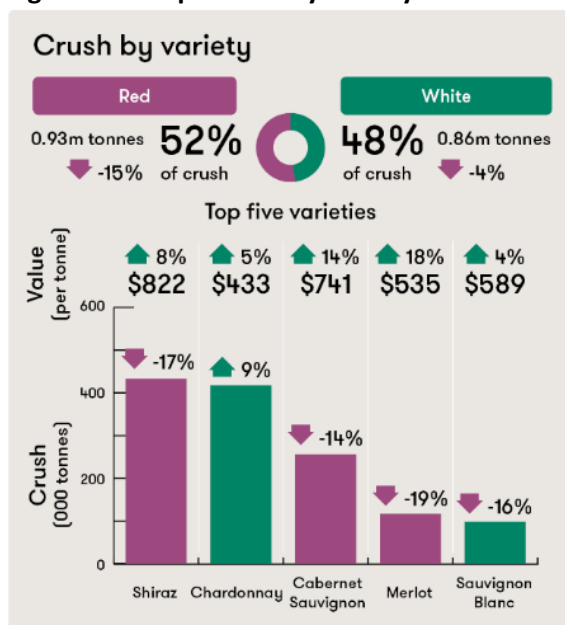


Source: ABS Statistical Area 4, 2016

Wine grape growing area underwent a rapid expansion in the 1990s increasing from 60,000 ha at the beginning of that decade to approximately 140,000 ha by 2000. In 2018, wine grape growing area is accurately estimated at 146,128 ha (Wine Australia, National Vineyard Scan, retrieved at <https://www.wineaustralia.com/news/media-releases/first-ever-clear-picture-of-australias-vineyards>)

Major grape varieties grown by the Australian industry include Shiraz (23% of total production), Chardonnay (22% of total production), Cabernet Sauvignon, Merlot, Sauvignon Blanc, Semillon, Pinot Noir, and Riesling. Grape crush for the 'Top 5' varieties in 2018 and their change compared to the 2017 harvest is shown in Figure 2.5.

Figure 2.5 Grape Crush by Variety 2018



Source: Wine Australia – Vintage Report 2018

2.3 Wine Making

There are estimated to be 2,468 wineries in Australia (Wine Australia – Australian Wine Sector 2018 at a Glance). Wine makers may grow their own grapes and/or purchase grapes from wine grape growers. Wine makers also sell grapes, bulk wine, and merchandise at the cellar door. Some wine makers contract crush and pack for other wineries. Benchmarking guides produced by Wine Australia and the Winemakers Federation of Australia (WFA) (2007) classify wine making businesses into small, medium and large enterprises on the following basis – Table 2.2.

Table 2.2 Characteristics of Wine Making Businesses – Small, Medium and Large

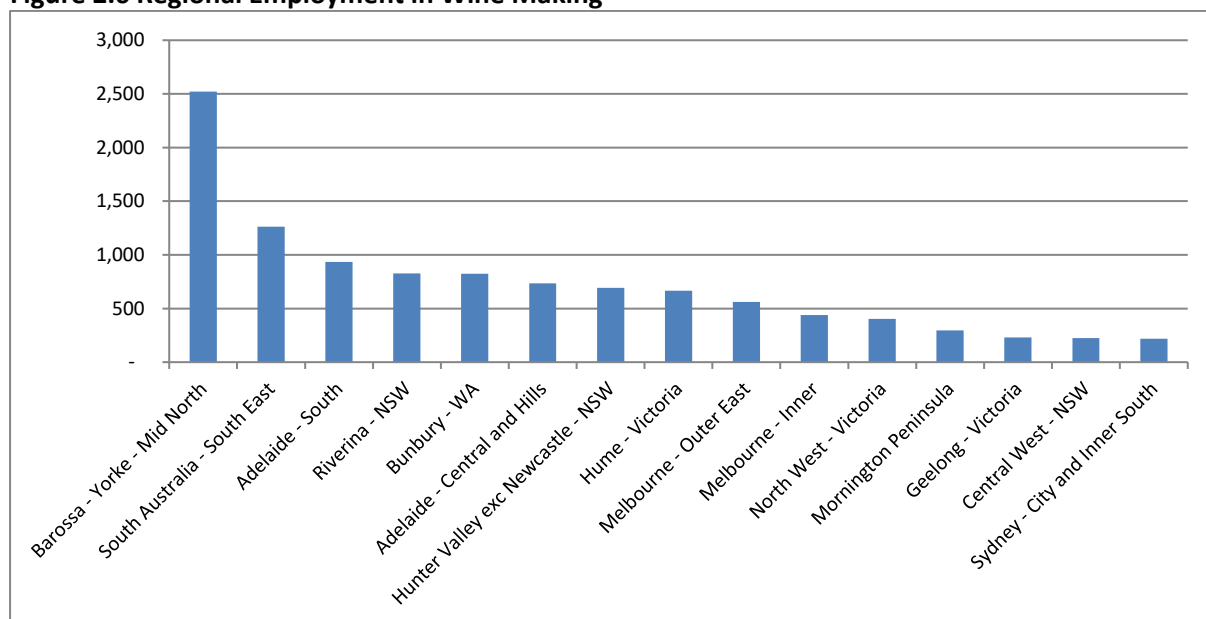
Criterion	Small (<50,000 cases)	Medium (50,000 - 350,000 cases)	Large (>200,000 cases)
Ownership	Typically an owner operated business	Predominantly owner operated. May have full time employees	Public or private ownership
Production facilities	Single production site producing branded product or uses another winery to process its grapes	The business owns / controls its wine making facility and has a combination of estate vineyards and contracted grape purchases	Single or multiple production sites, some contract crushing, mix between branded production and bulk wine production, mix between own and purchased grapes
Capacity	Annual processing capacity of less than 750 tonnes of wine grapes	Processing capacity is between 750 and 5,000 tonnes of wine grapes	Processing capacity exceeds 7,000 tonnes and may be in excess of 120,000 tonnes
Sales turnover	Wine sales of less than 50,000 cases and \$5 million in sales revenue. Does not incorporate revenue from cellar door merchandise, sale of grapes, bulk wine or processing and packaging	Wine sales of between 50,000 and 350,000 cases and between \$5 million and \$20 million in bottled wine sales revenue. May include income from merchandise, bulk wine, processing and packaging	Gross case sales revenue exceeding \$20 million and 200,000 cases. Extra-large wine makers may have sales of 500,000 cases or bulk wine sales in excess of 100 million litres
Market	Direct sales via cellar door, website and local restaurants	Sales targeted to a range of markets. Likely to have a 'marketing team'. Use additional income sources to supplement revenue and profitability	Predominantly a branded production business. Extra-large businesses include bulk wine sales
Processing cost (\$/litre)	\$3/litre, micro maker \$2/litre, small wine maker	\$1/litre medium sized wine maker	\$0.50/litre, large maker \$0.25/litre, extra-large wine making business

Source: Wine Australia & WFA (2007)

The winemaking sector is characterised by a large number of small businesses. For example, 310 from 424 responses to the Wine Australia, Winemakers' Federation of Australia (WFA) and Australian Vignerons 2018 Vintage Survey were from wineries that reported a total crush of less than 500 tonnes.

Wine making is a regionally significant industry. The top 15 regions in Australia for employment in Wine Making are shown in Figure 2.6.

Figure 2.6 Regional Employment in Wine Making



Source: ABS (Statistical Area 4, 2016)

Australia is the world's sixth largest producer of wine, with production at around 1.29 billion litres per annum (International Organisation of Vine and Wine (OIV) 2018). Australian wine sales have been on an upward trend since 2014 – Figure 2.7.

Figure 2.7 Australian Wine Sales (million litres)



Source: Wine Australia (Angelica Crabb, pers. comm, June 2019)

Wine sales, wine maker revenue and average price received by the wine maker are summarised in Table 2.3.

Table 2.3 Wine Maker Sales and Revenue 2017-18

	Export	Domestic	Total
Beverage wine sales (million L)#	852.0	496.0	1,348.0
Wine maker revenue (\$'million)	2,800.0	3,500.0	6,300.0
Average price per litre (\$/L)	3.29	7.06	4.67

Source: Wine Australia, Australian Wine Production, Sales and Inventory 2017-18

includes production and sales from inventory.

Domestic sales account for approximately 40% of wine industry production and 84% of the Australian wine market (Wine Australia, Australian Wine Sector at a Glance 2018). Domestic sales of imported wines are shown in Table 2.4.

Table 2.4 Australian Wine Imports – Top 6 Countries (twelve months to March 2019)

Import Country	Imports by Value (\$'million)	Imports by Volume (million L)
New Zealand	340.6	57.2
France	347.7	19.9
Italy	81.7	13.8
Spain	19.3	3.3
Portugal	5.7	1.1
Chile	4.0	1.0
Total (all countries)	850.3	100.7

Source: Wine Australia Import Monitor, March 2019 (wholesale value including cost, insurance freight).

The Australian wine making industry is export oriented. Major export markets include mainland China, North America and the United Kingdom – Table 2.5.

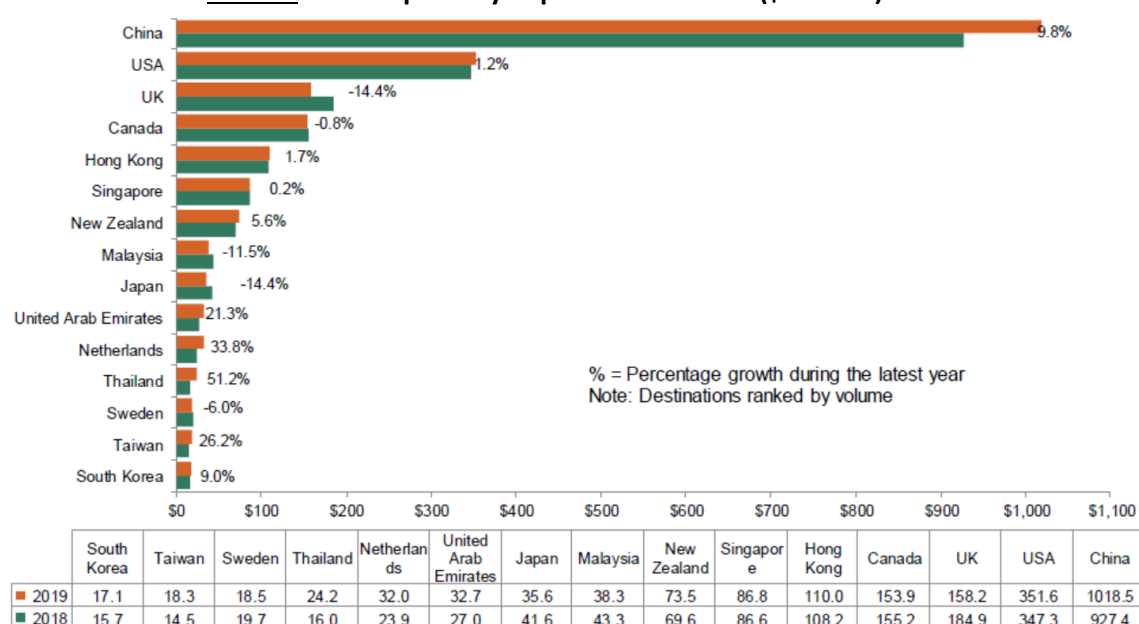
Table 2.5 Australian Wine Exports - Value and Volume (twelve months to June 2019)

Export Country and Share of Total Export Value	Value (\$'million)	Volume (L'million)
Mainland China (36%)	1,088	146
United States (15%)	432	153
United Kingdom (14%)	373	236
Canada (7%)	198	66
Hong Kong (4%)	112	8
Other (24%)	661	192
Total (all countries)	2,864	801

Source: Wine Australia, Export Report, June 2019

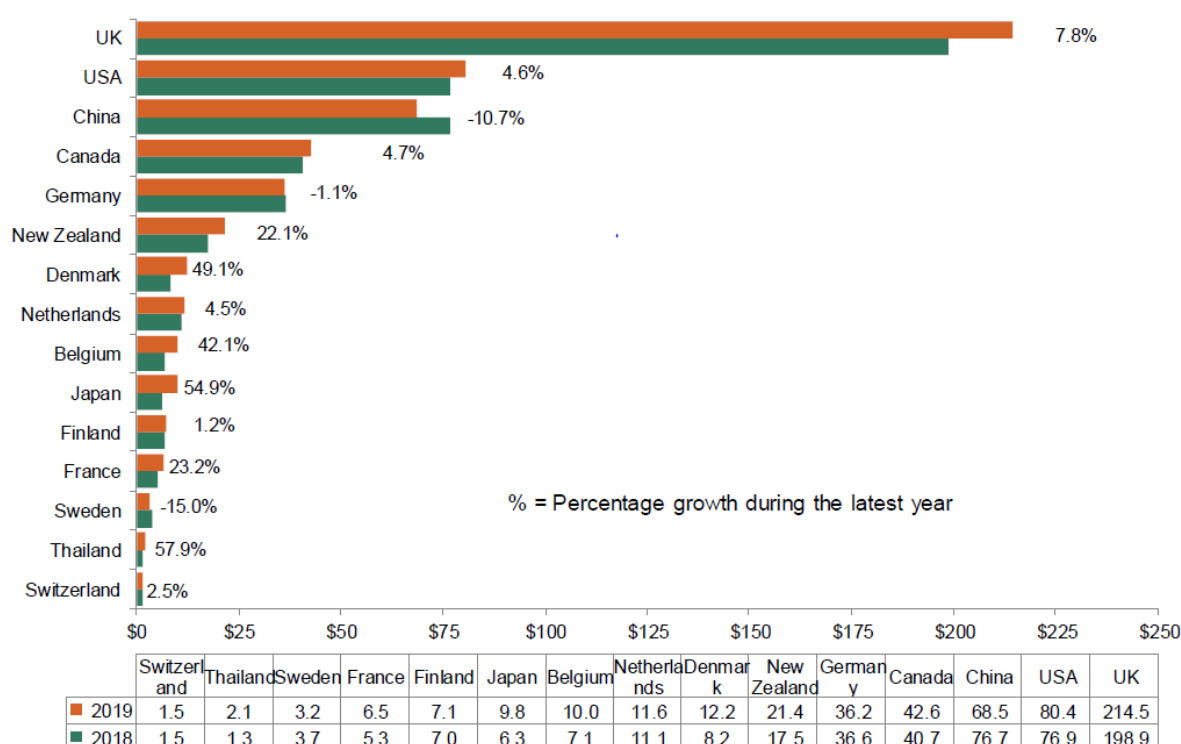
China has grown from Australia's fourth most important export market in 2015 to its most important market in 2019. The importance of individual export markets for bottled wine (China) is shown in Figure 2.8 and bulk wine (United Kingdom) is shown in Figure 2.9.

Figure 2.8 Australian Bottled Wine Exports by Top 15 Destinations (\$'million) for MAT# June 2019



Source: Wine Australia, Export Report, June 2019 # Moving Annual Total

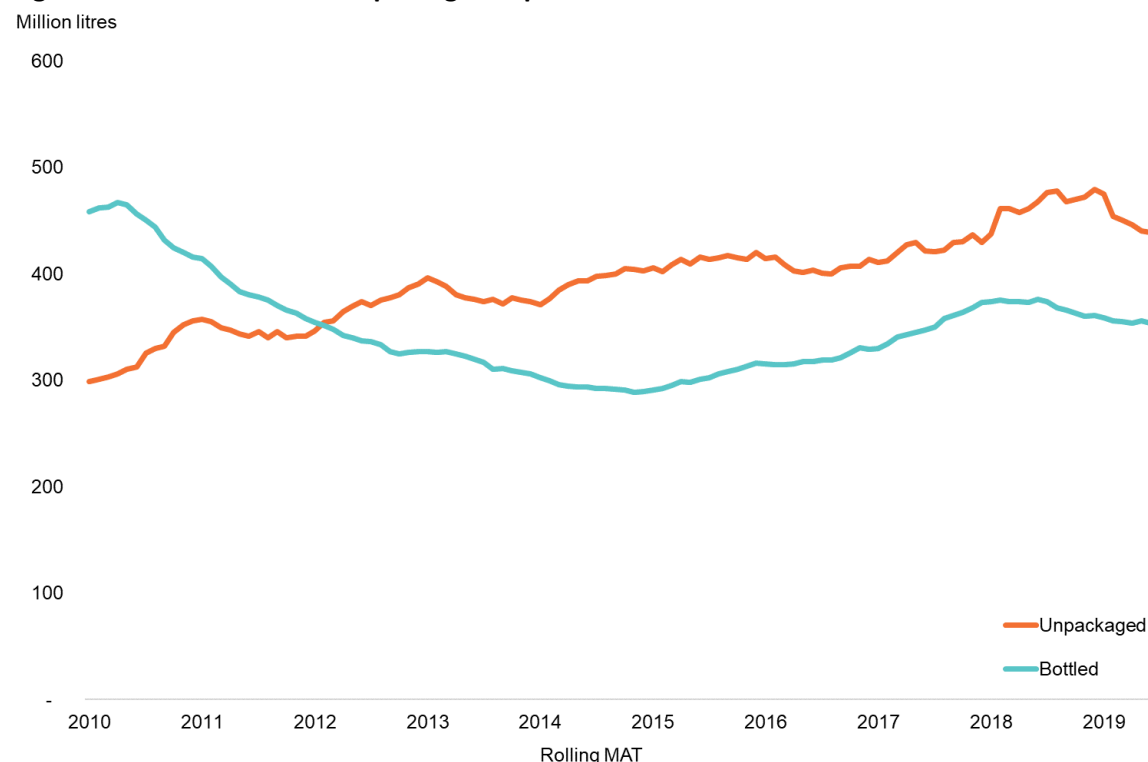
Figure 2.9 Australian Unpackaged Wine Exports by Top 15 Destinations (\$'million) for MAT# June 2019



Source: Wine Australia, Export Report, June 2019 # Moving Annual Total

More Australian wine is exported in bulk than in bottled form – Figure 2.10. Bulk wine exported overseas is packaged in market.

Figure 2.10 Bottled Versus Unpackaged Exports Over Time



Source: Wine Australia, Export Report, June 2019

Wine is Australia's 5th largest agricultural export industry in 2018-19 up from 6th in 2012-13 – Table 2.6.

Table 2.6 Australia's Top 10 Agricultural Exports* (by value) – 2018-19 Financial Year (forecast)

Agricultural Commodity	\$' million	%
Beef	7,550	24%
Wheat	5,462	18%
Wool	3,850	12%
Lamb and mutton	3,168	10%
Wine	2,796	9%
Cotton	2,400	8%
Barley	1,927	6%
Canola	1,697	5%
Sugar	1,663	5%
Milk and cream	689	2%
Total of Australian Agriculture exports	31,202	100%

* Based on the WTO definition of agriculture, which excludes fisheries, forestry and rubber.
Source: ABARES Agricultural Commodities, March Quarter 2018

2.4 Wine Tourism

Tourism Research Australia (TRA) estimated that there were 8.3 million visits to wineries from both domestic and international travellers in year ending March 2019. For those travellers that included a visit to a winery, they spent \$9.3 billion in Australia during their trip and are typically higher spenders with an average spend per trip of \$1,125.

Table 2.7 Wine Tourism Visits and Spend (year ending March 2019)

	Domestic Day	Domestic Overnight	International	Total
Visitors (million)	3.5	3.8	1.0	8.3
Visitor nights (million)	N/a	17.0	42.0	59.0
Spend in Australia (\$'billion)	0.7	4.0	4.7	9.3
Average stay (nights)	N/a	5.0	42.0	7.0
Average spend per trip (\$)	193	1,045	4,614	1,125

Source: TRA <https://www.tra.gov.au/>

While domestic travellers made up the majority (88%) of visits to wineries, internationals contributed to half of the spend in Australia and on average spent \$4,614 during their trip. China is the largest market that visits wineries with 154,000 visitors in year ending March 2019. They are also much higher spenders compared to other markets, however only one in ten include a visit to a winery. One in five visitors from the United Kingdom includes a visit to a winery. The table below provides a profile of international visitors to Australian wineries for the year ending March 2019.

Table 2.8 Profile of International Visitors to Australian Wineries (year ending March 2019)

Year ending March 2019	Winery Visitors (000)	*Proportion of winery visitors (%)	Average Stay (nights)	**Expenditure per trip (\$)
Total	1,013	12%	42	4,614
China	154	12%	49	7,796
United Kingdom	140	21%	42	3,768
United States of America	83	11%	28	3,771
Korea	69	26%	28	3,840
Singapore	68	17%	21	3,820
Malaysia	64	18%	27	3,692
Other Asia	44	11%	58	4,322
Other Countries	35	7%	60	4,595
Other Europe	32	13%	62	4,740
Taiwan	32	18%	76	4,813
Japan	34	8%	46	3,912
Hong Kong	37	14%	22	3,566
Germany	23	12%	62	4,869
Canada	26	15%	37	4,185
New Zealand	57	5%	14	2,046
France	18	13%	87	6,437
India	26	8%	58	4,655
Indonesia	22	12%	38	5,192
Scandinavia	17	16%	48	5,251
Switzerland	8	15%	53	7,112
Italy	10	14%	62	4,521
Netherlands	8	14%	58	5,980
Thailand	7	7%	41	3,730

Source: TRA <https://www.tra.gov.au/>

In the last twelve months to March 2019, there has been a decline in international visitors to Australian wineries, falling 4.8 per cent to 1.013 million visitors. This was the largely the result of fewer visitors from the United Kingdom and the United States of America. Chinese visitors, on the other hand, grew, but not enough to offset the decline.

2.5 Industry Status and Outlook

From the 1990s Australia led a wave of wine exporters who transformed world wine markets. Australia produced and delivered well priced wine of consistent quality. In so doing Australia secured its place as a major wine exporter. New world countries, especially those in the southern hemisphere adopted the 'Australian model', the European Union expanded production and the world wine supply grew.

In the new century a series of shocks hit the Australian wine sector. Anderson (2015) identified these shocks as including:

- A decade long, mining induced appreciation of the Australian dollar – making Australian wine relatively expensive in export markets
- A multi-year drought with severe consequences for the availability and cost of essential irrigation water
- The global financial crisis that began in 2008 and curtailed export demand
- The tightening of wine distribution regulations in Canada, the United States and Scandinavia
- The launch of an austerity and anti-corruption drive in 2012 by a new Chinese Government that effectively reduced government-funded banqueting and gifting of wine
- The rise of supermarket retailing of wine and their preference for bulk purchased and 'own brand' labelled wine
- Wine fashion swings that worked against Australian wine in United Kingdom and United States markets and for New Zealand Sauvignon Blanc in the domestic market.

As a consequence of these shocks, the Australian wine sector experienced large declines in the prices paid to grape growers for their wine grapes, cuts in wine making profits and an exchange rate induced contraction in wine tourism.

By 2010 the industry had begun to change. Conversations shifted to Australia's often overlooked cool climate wine regions. Whole bunch fermentation, lower alcohol, earlier picking, brighter red wine styles and a knack for seeking out the best from old vines, unique sites, unsung regions and a mesh of new, interesting grape varieties outside the noble varieties emerged (Wine Australia, January 2018).

A new generation of experimental wine makers began to gain favour, with artisan production and organic/biodynamic credentials being explored. Current Australian wine making styles focus on freshness, natural acidity and regional distinction (Wine Australia, January 2018).

The result has been a rebound in export sales and the unit price paid for Australian wine in export markets has been on the increase. Both the volume and value of Australian wine sales has increased but the value has increased at a significantly higher rate (Wine Australia, State of Play, June 2019). Grape growers and wine makers are focussed on wines that are an authentic representation of their place. The Australian dollar is forecast to remain relatively low and perceptions of Australian wine amongst the trade and consumers are improving (Figure 2.11). The outlook for Australia's premium wines is particularly encouraging (Wine Australia, January 2018).

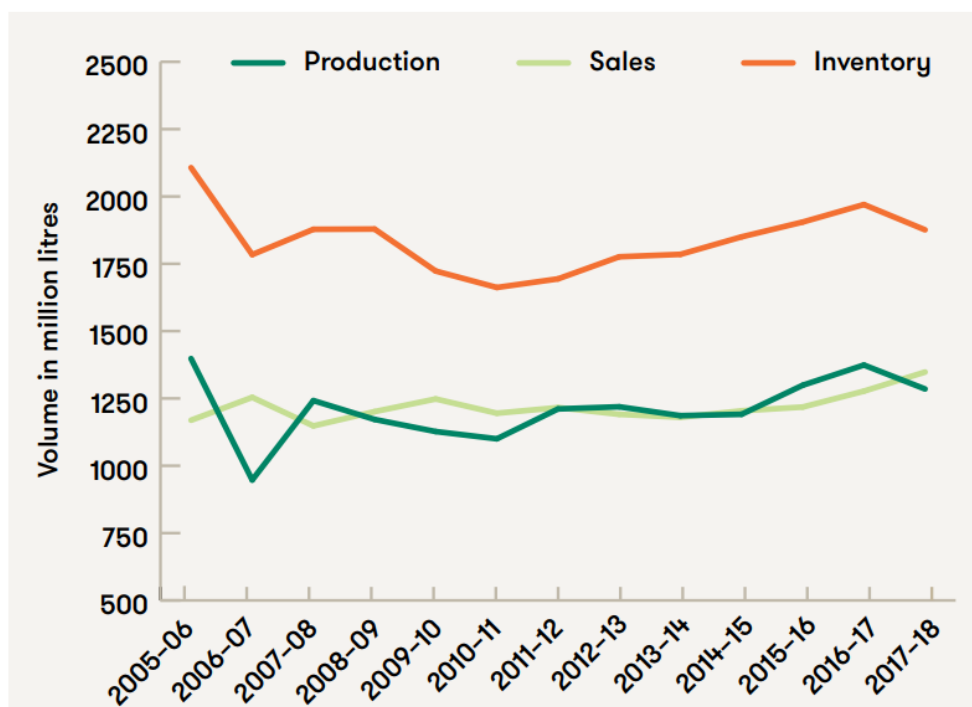
Figure 2.11 Average quality perception score of Australia wine (rated from 0 to 10)



Source: Wine Intelligence

Australian wine production is on the rise providing an opportunity for Australian wine to support the increasing global demand for premium wines. Australia has reasonably high inventory with which to support increased demand (Figure 2.12) and an established path to market in the world's four largest wine importing countries – the United Kingdom, China, Germany and the United States.

Figure 2.12 Australian Wine Stocks, Production and Sales Over Time

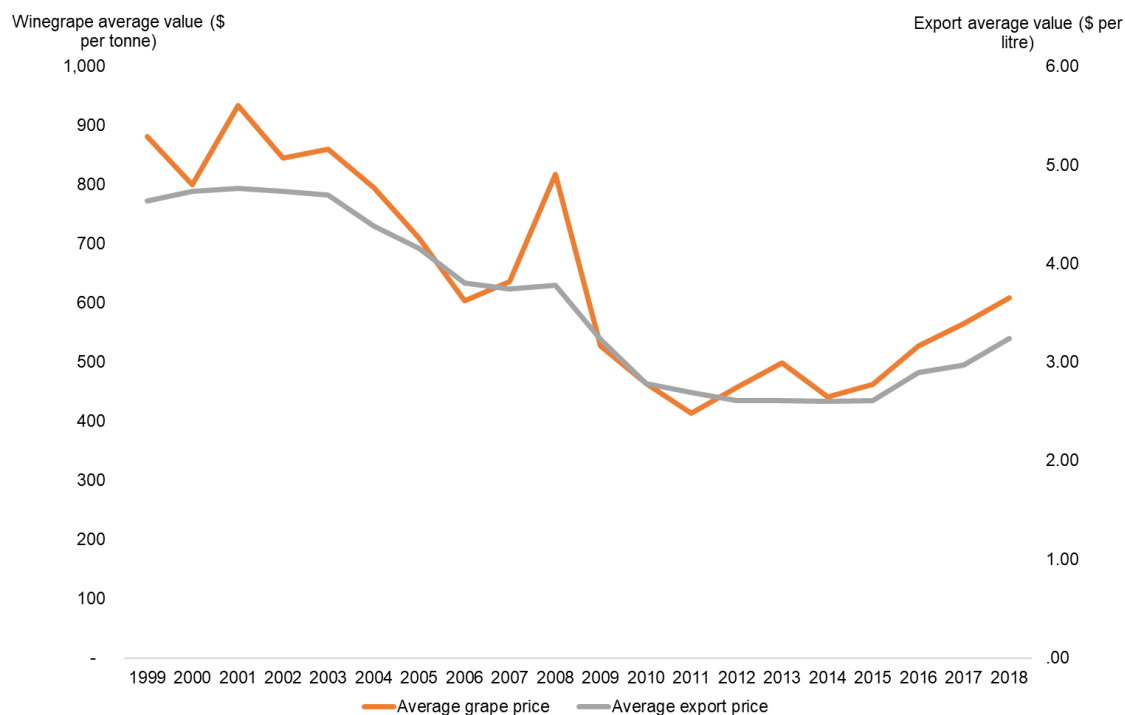


Source: Wine Australia, Australian Wine Production, Sales and Inventory 2017-18

Australian production growth has been matched by sales growth over the last four years. The Australian Government's \$50 million Export and Regional Wine Support Package will further enhance the sector's ability to develop new export opportunities.

Figure 2.13 shows that wine grape prices have been on an upward trend since 2011. Prior to that, grape prices were on a downward trend from 1999.

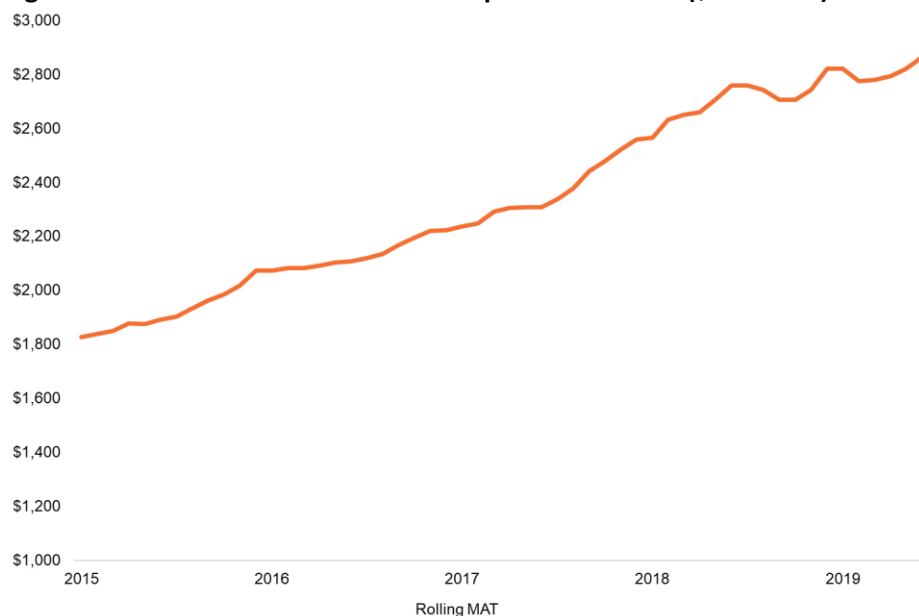
Figure 2.13 Average Export Price and Average Wine Grape Purchase Price Trends 1999-2018



Source: Wine Australia – Vintage Report 2018

Improved market access has also been a critical factor for the Australian wine sector. Since the beginning of 2015, Free Trade Agreements with China, Japan and South Korea have improved market access and helped increase the competitiveness of Australian wine exporters. Sales of Australian wine to China have increased almost three-fold since 2015 (Wine Australia, State of Play, June 2019). Overall growth in Australian wine exports since 2015 is shown in Figure 2.14.

Figure 2.14 Value of Australian Wine Exports Over Time (\$A'million)



Source: Wine Australia, Export Report, June 2019

The outlook for the domestic market where approximately 40% of Australian wine is sold, is optimistic, with many positive signs for wine makers after a long period of flat sales and strong competition from imports. Australians are buying higher priced wines and Chardonnay is back in favour.

Total wine maker revenue is forecast to increase from \$6.3 billion in 2017-18 to \$8.2 billion by 2023-24 (IBIS World, 2019).

The outlook for wine tourism is also positive. A favourable exchange rate and wealthy young adult and retiree markets in Asia will see growth in inbound tourist numbers in excess of the long term average.

2.6 Industry Statistics

Key Australian wine industry statistics assembled with the assistance of Wine Australia are summarised in Table 2.9.

Table 2.9 - Australian Wine Sector Statistics

Measure	Year	Quantity	Unit
Wine Grape Growing			
Wine grape growers	2018	6,251	number
Wine grape vineyard area	2018	146,128	hectares
Wine grape crush	2018	1,790,000	tonnes
Gross value of wine grape sales	2018	1,110,000,000	\$
Direct employment in grape growing	2016	5,626	number
Wine Making			
Wine making enterprises	2018	2,468	number
Wine production	2018	1,290,000,000	litres
Domestic sales of Australian wine	2018	3,500,000,000	\$
Domestic sales of imported wine	2018	850,300,000	\$
Export sales of Australian wine	2018	2,800,000,000	\$
Direct employment in wine making	2016	13,563	number
Wine Tourism			
Domestic visitor day trips	2019	3,500,000	number
Domestic day trip expenditure	2019	700,000,000	\$
Domestic overnight visitors	2019	3,800,000	number
Domestic visitor nights	2019	17,000,000	number
Domestic overnight expenditure	2019	4,000,000,000	\$
International visitors	2019	1,000,000	number
International visitor nights	2019	42,000,000	number
International visitor expenditure	2019	4,700,000,000	\$

Source: various

Summary statistics provide a foundation for analysis of the economic contribution of the Australian wine sector.

3. Input Output Modelling

There are two main methods that can be used to analyse the economic contribution of an industry, they are:

- Input-output (IO) analysis; and
- Computable general equilibrium (CGE) analysis.

However, the most appropriate method to use depends on what type of impact is being examined.

IO analysis can be used to:

- Develop a snapshot of an existing industry in a particular year including its direct and indirect linkages; or
- Assess the effects of a change or shock to the economy e.g. an expansion or contraction or a new activity.

CGE analysis is unsuitable for providing a snapshot of an existing industry and its inter-sectoral linkages and is more applicable to assessing the effects of a change or shock to the economy. For instance, NZIER (2014) 'The economic contribution of the New Zealand wine sector, the impact of growth since 2008', used CGE to examine the impact of growth in the wine and grape industry in New Zealand compared to if growth had stagnated at 2008 levels. Consequently, for this Australian study which is focused on providing a snapshot of the sector at a point in time, IO analysis is used.

IO is primarily concerned with the effect of an impacting agent e.g. an individual business or sector, on an economy in terms of a number of specific economic activity indicators, such as gross regional output, value-added, income and employment.

These indicators can be defined as follows:

- **Gross regional output** – the gross value of business turnover;
- **Value-added** (gross regional product) – the difference between the gross value of business turnover and the costs of the inputs of raw materials, components and services bought in to produce the gross regional output;
- **Income** – the wages paid to employees including imputed wages for self-employed and business owners; and
- **Employment** – the number of people employed (including full-time and part-time).

An impacting agent may be an existing activity within an economy e.g. an ongoing tourism venture, or may be a change to a local economy e.g. a new tourism development. In this study the impacting agent is the existing grape growing, wine making and wine tourism sectors.

The economy on which the impact is measured can range from a township to the entire nation (Powell *et al.*, 1985). This study is concerned with examining the impacts of the grape growing, wine making and wine tourism sectors on the Australian economy.

Input-output analysis essentially involves two steps:

- Construction of an appropriate IO table (regional transaction table) that can be used to identify the economic structure of a defined region and multipliers for each sector of the economy; and

- Identification of the initial impact or stimulus of an industry in a form that is compatible with the IO equations so that the IO multipliers and flow-on effects can then be estimated (Jensen and West, 1986).

For this study, the latest National IO Table produced by the Australian Bureau of Statistics for 2016-17, adjusted to 2019 values, was used.

Identification of the initial impact of the wine sector in a form compatible with the IO table required the development of a specific aggregate employment, revenue and expenditure profile for the grape growing sector, wine making sector and wine tourism sector, based on available industry information. For each of the grape growing sector and wine making sectors a specific intermediate IO sector was developed where:

- The estimated gross annual revenue was allocated to the output row;
- The estimated wage bill of employees (including imputed wages for the self-employed) was allocated to the household wages row;
- Non-wage local expenditure was initially allocated across the relevant 114 intermediate sectors in the economy - for the wine making sector the expenditure on grapes was equal to the sale value of the grape sector;
- Purchaser prices for expenditure in each sector in the economies were adjusted to basic values and margins and taxes and allocated to appropriate sectors using relationships in the National Input-Output Tables;
- Allocation was then made between intermediate sectors and imports based on the percentage of imports in each sector of the National IO table;
- The difference between total revenue and total costs was allocated to the other value-added row; and
- Direct employment was allocated to the employment row.

These sectors were inserted into the IO table to facilitate impact assessment.

As identified above, there is no intermediate sector in the IO table for tourism. Tourism relates to final demand expenditure on a range of goods and services across the 114 intermediate sectors of the national economy. An expenditure profile for this final demand expenditure was developed based on the estimated total expenditure of domestic and international tourists, and the main categories of tourism expenditure. Purchaser prices for tourism expenditure in the economies were adjusted to basic values and margins and taxes and allocated to appropriate sectors using relationships in the National Input-Output Tables.

With new intermediate sectors for grape growing and wine making inserted into the IO table and a final demand expenditure for wine tourism developed, the computer program IO7 (Input-Output Analysis Version 7.1) was used to estimate the average annual direct and indirect output, value-added, income and employment⁷ impacts for each of the wine sector components.

Indirect impacts are disaggregated into:

- Production-induced effects - economic activity from the purchase of goods and services that are used as an input into production or the wine tourism experience; and

⁷ It is important to understand that the focus of IO analysis is on the economic stimulus provided by wine sector and not on the economic costs and benefits of the wine sector. Consideration of the economic costs and benefits of wine sector would require the undertaking of a benefit cost analysis.

- Consumption-induced effects - economic activity from the spending of employees of the wine sector and employees of those supplying inputs into production or the wine tourism experience.

In both cases, in addition to first-round purchases, there will be a series of indirect purchases as waves of second, third and subsequent-round effects make their way throughout the economy.

Ratio multipliers are reported in Section 5 for each of the components of the wine sector. These provide summary measures used for predicting the total impact on all industries in an economy from changes in the demand for the output of any one industry. They express indirect impacts or flow-ons in terms of the initial own sector effects e.g. employment flow-ons in relation to direct employment effects, output flow-ons in relation to direct output etc. Refer to Attachment 1 for a discussion of multipliers and the assumptions underpinning IO analysis.

Consideration is also given to aggregation of the impacts of each component being careful to avoid double counting. IO analysis examines backward linkages only. Consequently, because expenditure by tourists would include some expenditure on wine at the cellar door and expenditure by wine manufacturers would include expenditure on grapes there would be double counting if the economic activity from each of the components of the wine sector were simply added together. Adjustment is required to expenditure profiles to remove double counting if the components of the wine sector are to be aggregated.

Because IO only examines backward linkages, this analysis does not capture margins on wine sales through wholesale and retail outlets. Values for wine sales and grape sales are at the farmgate or winery door.

4. Revenue, Expenditure and Employment Profiles of the Wine Sector

Section 4 develops revenue, expenditure and employment profiles for each of the components of the wine sector to enable the subsequent estimation of their direct and indirect impacts on the national economy.

4.1 Wine Grape Growing

Wine grape growing total revenue 2017-18 was \$1,110,000,000 (Wine Australia – National Vintage Report 2018) with a wine grape growing area of 146,128 ha (Wine Australia, National Vineyard Scan) creating an average gross revenue of \$7,596/ha.

The gross revenue estimate of \$7,596/ha was aligned to the expenditure profile prepared in 2015 (AgEconPlus and Gillespie Economics, 2015) and updated using grape growing cost structure benchmarks for 2018 (IBIS World, 2018)⁸ to provide an average gross margin for the industry. Total industry revenue and expenditure was aggregated from the average gross margin using the industry gross value estimate of \$1,110,000,000. Results are shown in Table 4.1.

Table 4.1 Wine Grape Growing Revenue and Expenditure Profile 2018

	Average Gross Margin (\$/ha)	Wine Grape Growing Industry Total Revenue and Expenditure (\$'million)
Revenue (A)	7,596	1,110.0
Expenditure		
Farm labour	847	123.7
Contract labour	794	116.1
Fruit transport	570	83.3
Levies	130	19.0
Chemicals	640	93.6
Nutrition/fertiliser	271	39.5
Vineyard floor /canopy management	125	18.3
Sundry materials/supplies	128	18.6
Machinery expenses	299	43.7
Machinery fuel	337	49.2
Machinery hire	417	60.9
Water and drainage costs	1,535	224.2
Repairs and maintenance - vineyard	110	16.1
Total expenditure (B)	6,202	906.3
Net Revenue (A) less (B)	1,394	203.7
Employment		5,626*

* ABS 4 digit census data for grape growing 2016 of 6,251 less 10% associated with table grape and dried grape growing (IBIS World, November 2018 report table and dried grapes account for 10% of total grape growing industry production).

Wine grape growing industry employment was estimated using the following data:

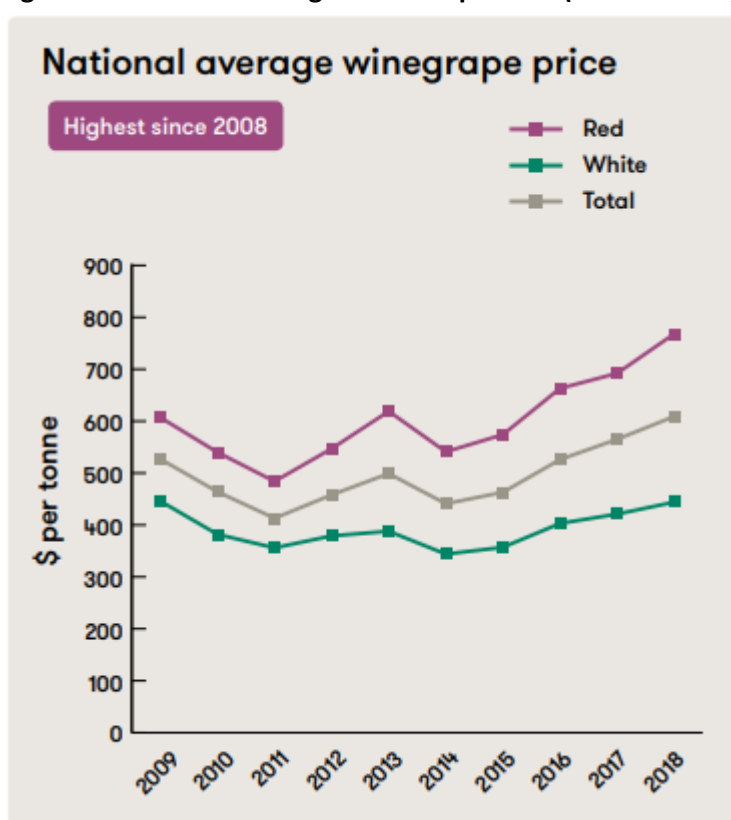
- 6,251 employed in all types of grape growing (ABS 2016, Census Employment by Industry 4 digit level) less 10% associated with table and dried grape production i.e. 5,626 jobs.
- Total wages that exclude contract labour – recorded in the input-output model as ‘services to agriculture’. Employment associated with contract labour recorded as a ‘multiplier’.

⁸ Data was also cross checked with best available primary sources including gross margins for Tasmania and the Murray Valley.

- Total wages that include Table 4.1 – ‘farm labour’ and part of ‘net revenue’ to reflect imputed wages from farm owners. Total wages are estimated at \$286.9 million (\$123.7 million farm labour plus \$163.2 million net revenue).
- Average grape growing industry wage is therefore \$51,000 per annum (total wages of \$286.9 million divided by 5,626 jobs).

The 2018, estimate for grape growing industry wage is considerable higher than estimated by AgEconPlus and Gillespie Economics in 2015 and reflects the large increase in net revenue / returns to owner labour associated with a more profitable grape growing industry in 2018. In 2015, there was very little profit in grape growing (\$125/ha in 2015 compared to \$1,394/ha in 2018). This conclusion was supported by Retallack (2012) that showed that there was no profit in growing wine grapes in the Murray Valley. In 2018, wine grape purchase prices were at a ten year high – Figure 4.1.

Figure 4.1 National Average Wine Grape Price (2009 to 2018)



Source: Wine Australia – Vintage Report 2018

4.2 Wine Making

Wine making total revenue was reported at \$6.3 billion from sales of 1.29 billion litres in 2017-18 creating an average wine maker sale price of \$4.88/litre (Wine Australia, Australian Wine Production, Sales and Inventory 2017-18).

The gross revenue estimate of \$4.88/litre was aligned to the expenditure profile prepared in 2015 (AgEconPlus and Gillespie Economics, 2015) and updated using wine maker production cost benchmarks for 2018 (IBIS World, 2019)⁹ to provide an average gross margin for the industry. Total

⁹ The Wine Australia wine benchmark calculator was consulted to cross check these data but was found to be too product specific to provide a balanced industry-wide estimate e.g. the user needs to stipulate state, region,

industry revenue and expenditure was aggregated from the average gross margin using the industry gross value estimate of \$6.3 billion. Results are shown in Table 4.2.

Table 4.2 Wine Making Revenue and Expenditure Profile 2017-18

	Average Revenue and Expenditure (\$/litre)	Wine Making Industry Total Revenue and Expenditure (\$'million)
Revenue (sale price packaged)	4.88	6,300
Cost of packaging [#]	1.48	1,911
Revenue after packaging (A)	3.40	4,389
Expenditure		
Winery labour	0.74	955
Grapes	0.86	1,110
Wine loss / waste treatment	0.10	129
Depreciation	0.20	258
Electricity / gas	0.10	129
Repairs and maintenance	0.10	129
Water	0.08	103
Total cost (excluding packaging) (B)	2.18	2,813
Net revenue (A) less (B)	1.22	1,576
Employment		13,563*

[#] note large share of production is shipped overseas unpackaged therefore cost estimate is average across packaged and unpackaged production.

* ABS 4 digit census data for wine and other alcoholic beverage manufacturing less 7.5% associated with cider and other alcoholic beverage manufacture (IBIS World, April 2019 report cider and other alcoholic beverages at 7.5% of Australian and New Zealand Standard Industrial Classification total).

Wine making industry employment was estimated using the following data:

- 14,663 employed in the wine and other alcoholic beverage manufacturing sector (ABS 2016, Census Employment by Industry 4 digit level) less 7.5% associated with cider and other alcoholic beverage making i.e. 13,563 jobs.
- Total wages that include the self-employed shown in Table 4.2 as \$955 million.
- Average wine making industry wage is therefore \$70,412 (total wages of \$955 million divided by 13,563 jobs). This estimate is consistent with IBIS World (April, 2019) which estimated average wine making wages for 2017-18 at \$70,224.

4.3 Wine Tourism

Wine tourism revenue and expenditure data was sourced from Tourism Research Australia's, National and International Visitor Surveys (TRA). Separate estimates are provided for domestic day and overnight expenditure as well as for international visitation. Data is summarised in Table 4.3.

variety, export date, market destination, route to market, retail price point, foreign exchange rate, maturation tank capacity, maturation period, alcohol content, etc. for each analysis and then balance each analysis by the production profile of the Australian industry. This knowledge was not available to the consulting team.

Table 4.3 Wine Tourism Expenditure (\$' million spent in Australia, year ending March 2019)

	Domestic Wine Tourism – Day Trips	Domestic Wine Tourism – Overnight Trips	International Wine Tourism	Total
Expenditure Item				
Airfares	0	397.8	84.6	482.5
Tours	8.0	150.4	410.0	568.4
Transportation	100.4	472.0	366.7	939.0
Food, drink and accommodation [#]	400.9	2,527.1	2,138.7	5,066.7
Shopping	131.2	293.7	688.8	1,113.7
Entertainment	26.2	133.0	109.3	268.6
Education	0	0.3	736.1	736.4
Other	2.1	18.6	139.9	160.6
Total	668.9	3,993.0	4,674.1	9,335.9
Visits ('000)	3,462	3,823	1,013	8,298
Visitor nights ('000)	-	17,233	42,068	59,301

note it is assumed that 3% of total wine sales is at the cellar door to wine tourists (Cellar Door and Direct to Consumer Survey Report, 2018).

No ABS employment data is available for wine tourism because there is no specific tourism industry sector in the Australian and New Zealand Standard Industrial Classification. While TRA's satellite account (<https://www.tra.gov.au/Economic-analysis/economic-value>) and report on tourism businesses (<https://www.tra.gov.au/Economic-analysis/tourism-businesses>) provide useful overview data, this analysis has been reliant on employment data generated by the wine tourism expenditure profile using the IO7 software.

5. Direct and Indirect Impacts of the Wine Sector on the Australian Economy

5.1 Grape Growing Sector

Economic Activity

The total and disaggregated impact of grape growing on the Australian economy (in 2019 dollars) is shown in Table 5.1.

Table 5.1 Direct and Indirect Impact of the Grape Growing Sector

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT
OUTPUT (\$M)	1,110	1,437	1,360	2,797	3,907
<i>Type 11A Ratio</i>	1.00	1.29	1.23	2.52	3.52
VALUE-ADDED (\$M)	337	674	749	1,423	1,760
<i>Type 11A Ratio</i>	1.00	2.00	2.23	4.23	5.23
INCOME (\$M)	287	344	363	707	994
<i>Type 11A Ratio</i>	1.00	1.20	1.27	2.47	3.47
EMPLOYMENT (No.)	5,626	3,328	4,569	7,897	13,523
<i>Type 11A Ratio</i>	1.00	0.59	0.81	1.40	2.40

The Australian grape growing sector is estimated to make up to the following total annual contribution to the national economy:

- \$3,907M in annual direct and indirect regional output or business turnover;
- \$1,760M in annual direct and indirect regional value added;
- \$994M in annual direct and indirect household income; and
- 13,523 direct and indirect jobs.

Multipliers

Ratio multipliers provide a summary measure of the direct and indirect economic activity relative to the direct economic activity for a particular indicator. The Type 11A ratio multipliers for the grape growing sector range from 2.40 for employment up to 5.23 for value added.

The low ratio multiplier for employment is a reflection of the relatively labour intensive nature of the grape growing sector compared to the sectors that experience flow-on employment. The higher income ratio multiplier reflects the higher wages of those experiencing flow-on employment relative to the low wage in the grape growing sector. The very high value-added multiplier reflects low wages and low profits in grape growing relative to the sectors that experience flow-on effects.

Main Sectors Affected

Flow-on impacts from the grape growing sector impact a number of different sectors of the national economy. The sectors most impacted by output, value-added and income flow-ons are the:

- Water Supply, Sewerage and Drainage Services;
- Ownership of Dwellings;
- Agriculture, Forestry and Fishing Support Services;
- Road Transport;
- Wholesale Trade;
- Basic Chemical Manufacturing;
- Finance;

- Retail Trade;
- Professional, Scientific and Technical Services.

Examination of the estimated direct and flow-on employment impacts gives an indication of the aggregated sectors with employment linkages to the grape growing sector (Figure 5.1).

Figure 5.1 Sectoral Distribution of Grape Growing Employment Impacts on the National Economy

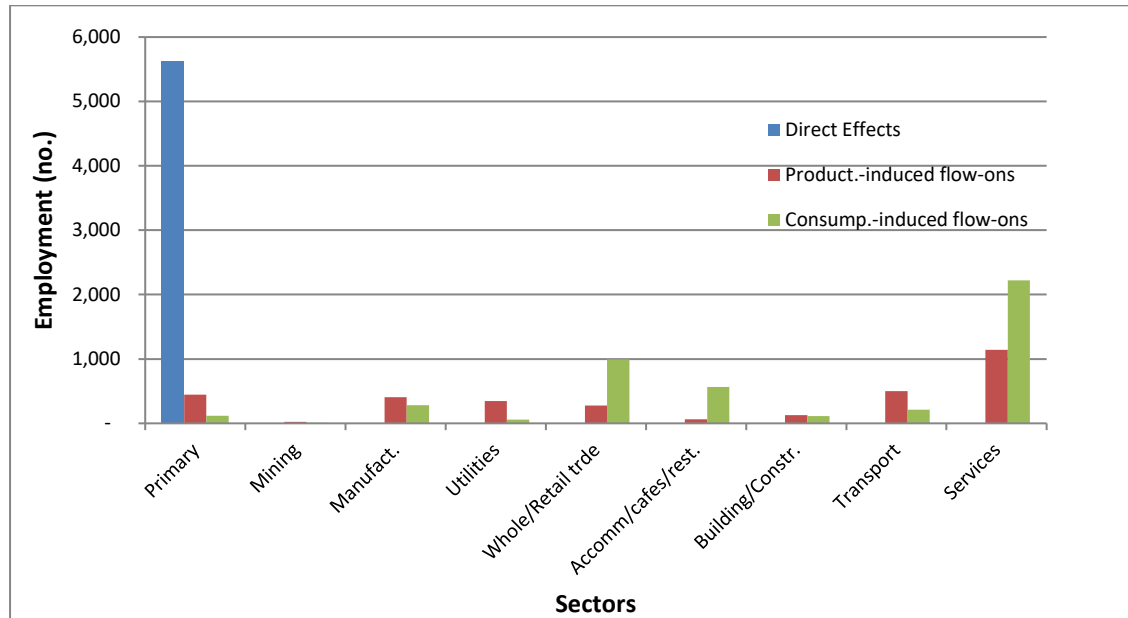


Figure 5.1 indicates that direct, production-induced and consumption-induced employment linkages of the grape growing sector on the national economy are likely to have different distributions across sectors. Production-induced flow-on employment occur mainly in services sectors, transport sectors, utilities sectors, wholesale/retail trade sectors, manufacturing sectors, and primary industry sectors while consumption induced flow-on employment are mainly in services sectors, wholesale/retail trade sectors and accommodation/cafes/restaurants sectors.

5.2 Wine Making Sector

Economic Activity

The total and disaggregated annual impacts of the wine making sector on the Australian economy (in 2019 dollars) are shown in Table 5.2.

Table 5.2 Direct and Indirect Impact of the Wine Manufacturing Sector

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT
OUTPUT (\$M)	6,300	6,585	5,694	12,279	18,579
<i>Type 11A Ratio</i>	1.00	1.05	0.90	1.95	2.95
VALUE-ADDED (\$M)	2,794	2,853	3,136	5,989	8,783
<i>Type 11A Ratio</i>	1.00	1.02	1.12	2.14	3.14
INCOME (\$M)	955	1,688	1,520	3,208	4,163
<i>Type 11A Ratio</i>	1.00	1.77	1.59	3.36	4.36
EMPLOYMENT (No.)	13,563	18,584	19,133	37,717	51,280
<i>Type 11A Ratio</i>	1.00	1.37	1.41	2.78	3.78

The Australian wine making sector is estimated to make up to the following total annual contribution to the national economy:

- \$18,579M in annual direct and indirect regional output or business turnover;
- \$8,783M in annual direct and indirect regional value added;
- \$4,163M in annual direct and indirect household income; and
- 51,280 direct and indirect jobs.

Multipliers

Ratio multipliers provide a summary measure of the direct and indirect economic activity relative to the direct economic activity for a particular indicator. The Type 11A ratio multipliers for the wine manufacturing sector range from 3.14 for value-added to 4.36 for employment.

The high ratio multiplier for income (and employment) is a reflection of the flow-on income (and employment) including all direct and indirect employment associated with relatively labour intensive grape growing sector and the winemaking itself being relatively capital intensive and hence have relatively low levels of employment (and income) for the value of product produced.

Main Sectors Affected

Flow-on impacts from the wine manufacturing sector impact a number of different sectors of the national economy. The sectors most impacted by output, value-added and income flow-ons are:

- Grape growing;
- Glass and Glass Product Manufacturing;
- Ownership of Dwellings;
- Wholesale Trade;
- Retail Trade;
- Finance;
- Professional, Scientific and Technical Services ;
- Electricity Transmission, Distribution, On Selling and Electricity Market Operation;
- Road Transport;
- Water Supply, Sewerage and Drainage Services ;
- Employment, travel agency and other administration services;
- Health Care Services; and
- Public Order and Safety.

Examination of the estimated direct and flow-on employment impacts gives an indication of the aggregated sectors with employment linkages to the wine making sector (Figure 5.2).

Figure 5.2 Sectoral Distribution of Wine Making Employment Impacts on the National Economy

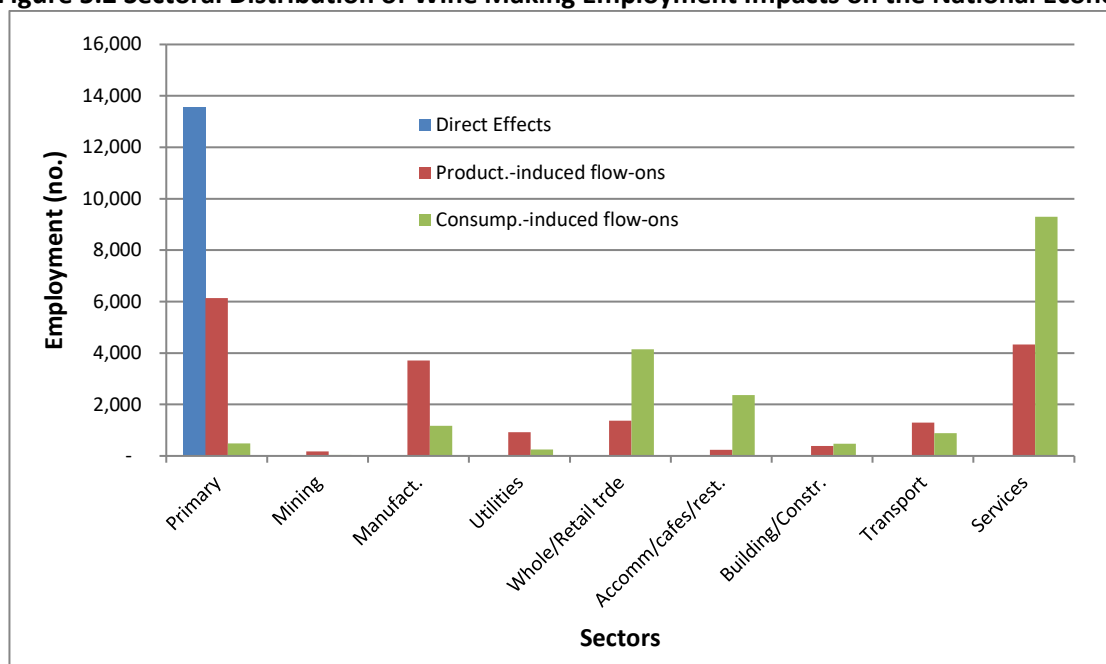


Figure 5.2 indicates that direct, production-induced and consumption-induced employment linkages of the wine making sector on the national economy are likely to have different distributions across sectors. Production-induced flow-on employment occur mainly in the primary industries sector, services sectors and manufacturing sectors while consumption induced flow-on employment are mainly in services sectors, wholesale/retail trade sectors and accommodation/cafes/restaurants sectors.

5.3 Wine Tourism

Economic Activity

The total and disaggregated annual impacts of the wine tourism sector on the Australian economy (in 2019 dollars) are shown in Table 5.3.

Table 5.3 Direct and Indirect Impact of the Wine Tourism Sector

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT
OUTPUT (\$M)	8,927	7,719	10,879	18,598	27,525
<i>Type 11A Ratio</i>	1.00	0.87	1.22	2.08	3.08
VALUE-ADDED (\$M)	4,365	3,657	5,991	9,649	14,013
<i>Type 11A Ratio</i>	1.00	0.84	1.37	2.21	3.21
INCOME (\$M)	2,912	2,138	2,903	5,041	7,953
<i>Type 11A Ratio</i>	1.00	0.73	1.00	1.73	2.73
EMPLOYMENT (No.)	55,885	21,610	36,554	58,164	114,049
<i>Type 11A Ratio</i>	1.00	0.39	0.65	1.04	2.04

The Australian wine tourism sector is estimated to make up to the following total annual contribution to the national economy:

- \$27,525M in annual direct and indirect regional output or business turnover;
- \$14,013M in annual direct and indirect regional value added;

- \$7,953M in annual direct and indirect household income; and
- 114,049 direct and indirect jobs.

Multipliers

The Type 11A ratio multipliers for the wine tourism sector range from 2.04 for employment to 3.21 for value-added.

Main Sectors Affected

Impacts from the wine tourism sector impact a number of different sectors of the national economy. The sectors most impacted in terms of output, value-added and income are:

- Accommodation;
- Food and Beverage Services;
- Road Transport;
- Ownership of Dwellings;
- Retail Trade;
- Finance;
- Wholesale Trade;
- Professional, Scientific and Technical Services;
- Non-Residential Property Operators and Real Estate Services;
- Arts, Sports, Adult and Other Education Services (including Community Education);
- Employment, travel agency and other administrative services; and
- Health Care Services.

Examination of the estimated direct and flow-on employment impacts gives an indication of the aggregated sectors with employment linkages to the wine tourism sector (Figure 5.3).

Figure 5.3 Sectoral Distribution of Wine Tourism Employment Impacts on the National Economy

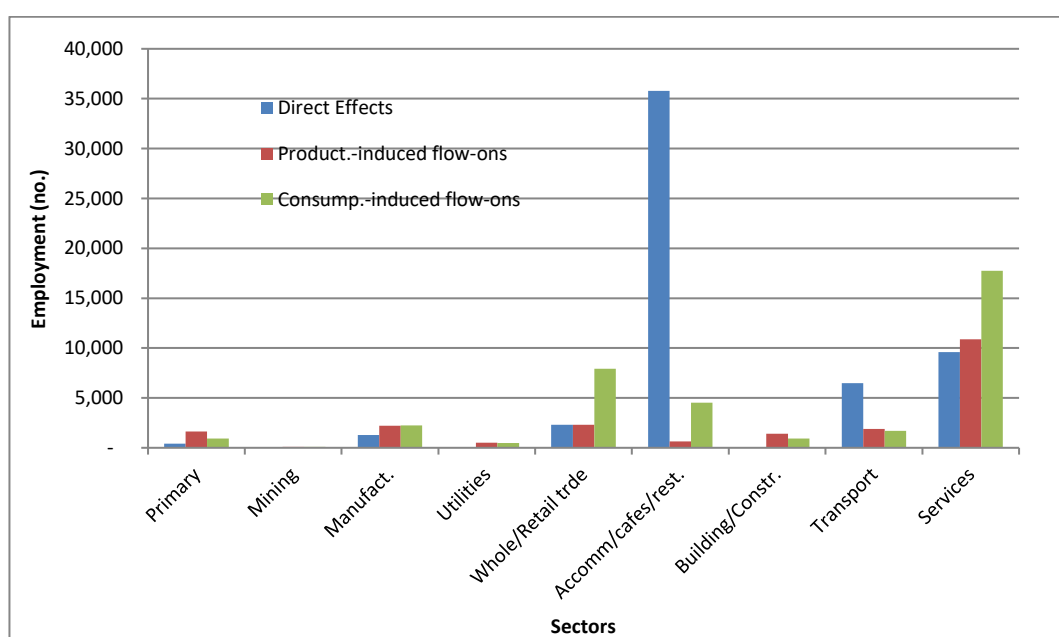


Figure 5.3 indicates that direct, production-induced and consumption-induced employment linkages of the wine tourism sector on the national economy are likely to have different distributions across sectors. Direct employment mainly occurs in the accommodation/cafes/restaurants sectors, services

sectors and transport sectors. Production-induced flow-on employment occur mainly in the services sectors while consumption induced flow-on employment are mainly in services sectors, wholesale / retail trade sectors and accommodation/cafes/restaurants sectors.

5.4 Total Wine Sector

Economic Activity

It is not possible to simply add the economic activity from grape growing, wine manufacturing and wine tourism to give the total economic activity from the wine sectors. This is because IO analysis captures backward linkages and so the economic activity impacts from the wine manufacturing sector already captures the backward linkages to the grape growing sector. Similarly, the economic activity impacts from the wine tourism sector captures backward linkages to the wine making sector.

To estimate the economic activity for the total wine sector, comprising grape growing, wine making and wine tourism, additional IO analysis was undertaken for the wine tourism sector net of expenditure at the cellar door of wineries. This was added to the economic activity impacts of the wine making sector (which already captures backward linkages to the grape growing sector). So direct effects include wine making plus final demand expenditure on wine tourism related goods and services (net of cellar door sales to wine tourists). All other effects are reported in production and consumptions induced flow-on effects.

Using this approach the total and disaggregated annual impacts of the total wine sector on the Australian economy (in 2019 dollars) are shown in Table 5.4.

Table 5.4 Direct and Indirect Impact of the Total Wine Sector

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT
OUTPUT (\$M)	15,038	14,106	16,403	30,509	45,547
<i>Type 11A Ratio</i>	1.00	0.94	1.09	2.03	3.03
VALUE-ADDED (\$M)	7,075	6,424	9,033	15,458	22,533
<i>Type 11A Ratio</i>	1.00	0.91	1.28	2.18	3.18
INCOME (\$M)	3,839	3,775	4,377	8,153	11,991
<i>Type 11A Ratio</i>	1.00	0.98	1.14	2.12	3.12
EMPLOYMENT (No.)	69,041	39,637	55,112	94,749	163,790
<i>Type 11A Ratio</i>	1.00	0.57	0.80	1.37	2.37

The Australian wine sector is estimated to make the following total annual contribution to the National economy:

- \$45,547M in annual direct and indirect regional output or business turnover;
- \$22,533M in annual direct and indirect regional value added;
- \$11,991M in annual direct and indirect household income; and
- 163,790 direct and indirect jobs.

Multipliers

The Type 11A ratio multipliers for the wine sector range from 2.37 for employment to 3.18 for value-added.

Main Sectors Affected

Impacts from the wine sector occur in a number of different sectors of the National economy. The sectors most impacted in terms of output, value-added and income are:

- Wine Manufacturing;
- Accommodation;
- Ownership of Dwellings;
- Food and Beverage Services;
- Road Transport;
- Retail Trade;
- Wholesale Trade;
- Finance;
- Professional, Scientific and Technical Services;
- Non-Residential Property Operators and Real Estate Services
- Grape Growing.
- Employment, Travel Agency and Other Administrative Services;
- Arts, Sports, Adult and Other Education Services (including Community Education); and
- Health Care Services

Examination of the estimated direct and flow-on employment impacts gives an indication of the aggregated sectors with employment linkages to the wine sector (Figure 5.4).

Figure 5.4 Sectoral Distribution of Wine Sector Employment Impacts on the National Economy

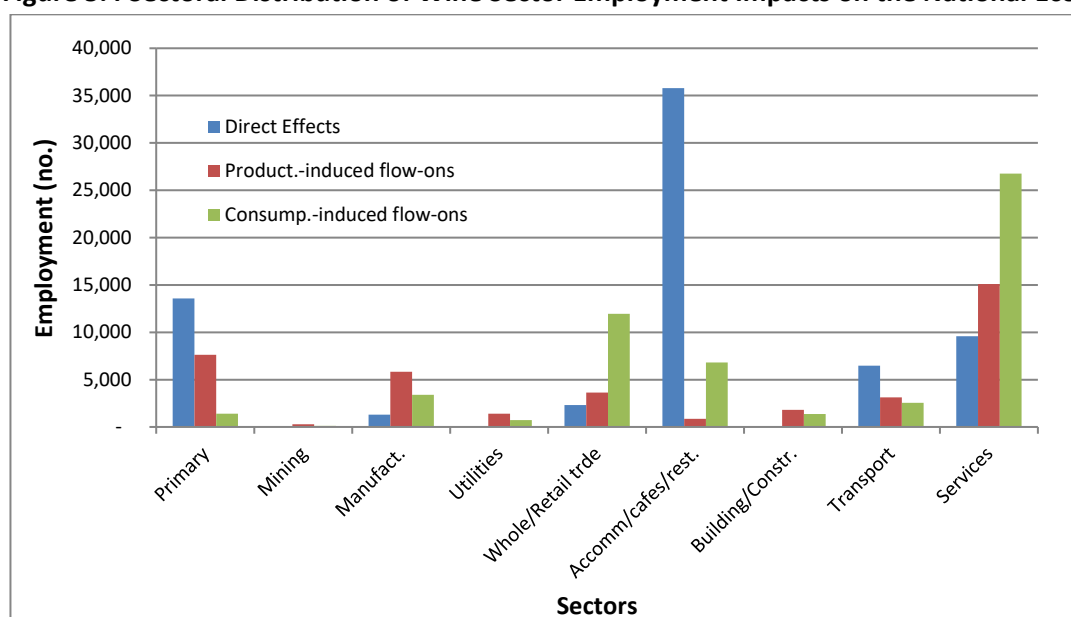


Figure 5.4 indicates that direct, production-induced and consumption-induced employment linkages of the wine sector on the national economy are likely to have different distributions across sectors. Direct employment mainly occurs in the accommodation/cafes/restaurants sectors, services sectors, primary industries sectors and transport sectors. Production-induced flow-on employment occur mainly in the services sectors, primary industries sectors and manufacturing sectors while consumption induced flow-on employment are mainly in services sectors, wholesale/retail trade sectors and accommodation/cafes/restaurants sectors.

5.5 Contribution to Tax Receipts

Wine grape growing, wine making and wine tourism businesses operate in an environment of multiple and complex taxation regulations particularly wine makers dealing with multiple export jurisdictions. Examples of taxes that a wine maker is subject to and must actively manage are:

- Wine Equalisation Tax (WET)
- Goods and Services Tax (GST)
- Stamp duty
- Income tax
- Capital gains tax
- Fringe Benefits Tax (FBT)
- Payroll tax
- Customs and import duties
- Overseas taxes and duties for exporters
- Employee superannuation.

Unlike Computable General Equilibrium modelling, Input-Output analysis does not generate taxation indicators. Input-Output analysis accounts for tax paid on inputs purchased by grape growers, wine makers and the wine tourism sector and this tax paid is captured in estimates of value-added.

6. Conclusions

The research has quantified the direct and flow-on effects of the Australian wine sector. The key results from the analysis are as follows.

The Australian wine sector defined as wine grape growing, wine making and wine related tourism:

- Supports 163,790 direct and indirect full and part-time jobs, most of which are located in regional Australia, including 5,626 directly in grape growing, 13,563 directly in wine manufacturing and 55,885 directly associated with wine tourism.
- Generates income from both direct and flow-on employment in the wine sector of \$12.0 billion
- Contributes \$45.5 billion to the value of gross output for Australia.
- Adds \$22.5 billion in value-added to the Australian economy.

A comparison of indicators derived in 2015 with current results is provided in Table 6.1 – the industry has experienced strong growth over the last four years.

Table 6.1 Comparison of Headline Indicators 2015 and 2019

Wine Sector Contribution	2015	2019	% Change	Compounded Annual Growth Rate
Employment	172,736	163,790 [#]	-5%	-1%
Income	\$10.4 billion	\$12.0 billion	15%	4%
Gross Output	\$40.2 billion	\$45.5 billion	13%	3%
Value Added	\$19.7 billion	\$22.5 billion	14%	3%

[#] decrease in employment reflects ongoing mechanisation especially in the grape growing and wine making subsectors.

The average effects of a contraction or expansion within the wine sector suggests:

- The wider economy would gain an extra 1.37 jobs for every job gained in the wine sector.
- The economy would gain an extra \$2.03 million for every additional \$1 million of gross output generated by the wine sector.
- The economy would gain an extra \$2.18 million in contribution to value-added for every additional \$1 million of value-added generated by the wine sector.

Industry forecasts suggest ongoing growth in the wine sector economic contributions described in this report.

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Attachment 1 Assumptions and Interpretations, Input-Output Analysis and Multipliers

1. “The *basic assumptions* in IO analysis include the following:

- there is a fixed input structure in each industry, described by fixed technological coefficients (evidence from comparisons between IO tables for the same country over time have indicated that material input requirements tend to be stable and change but slowly; however, requirements for primary factors of production, that is labour and capital, are probably less constant);
- all products of an industry are identical or are made in fixed proportions to each other;
- each industry exhibits constant returns to scale in production;
- unlimited labour and capital are available at fixed prices; that is, any change in the demand for productive factors will not induce any change in their cost (in reality, constraints such as limited skilled labour or investment funds lead to competition for resources among industries, which in turn raises the prices of these scarce factors of production and of industry output generally in the face of strong demand); and
- there are no other constraints, such as the balance of payments or the actions of government, on the response of each industry to a stimulus.

2. The multipliers therefore describe *average effects*, *not marginal effects*, and thus do not take account of economies of scale, unused capacity or technological change. Generally, average effects are expected to be higher than the marginal effects.

3. The IO tables underlying multiplier analysis only take account of one form of *interdependence*, namely the sales and purchase links between industries. Other interdependence such as collective competition for factors of production, changes in commodity prices which induce producers and consumers to alter the mix of their purchases and other constraints which operate on the economy as a whole are not generally taken into account.

4. The combination of the assumptions used and the excluded interdependence means that IO multipliers are higher than would realistically be the case. In other words, they tend to *overstate* the potential impact of final demand stimulus. The overstatement is potentially more serious when large changes in demand and production are considered.

5. The multipliers also do not account for some important pre-existing conditions. This is especially true of Type II multipliers, in which employment generated and income earned induce further increases in demand. The implicit assumption is that those taken into employment were previously unemployed and were previously consuming nothing. In reality, however, not all 'new' employment would be drawn from the ranks of the unemployed; and to the extent that it was, those previously unemployed would presumably have consumed out of income support measures and personal savings. Employment, output and income responses are therefore overstated by the multipliers for these additional reasons.

6. The most *appropriate interpretation* of multipliers is that they provide a relative measure (to be compared with other industries) of the interdependence between one industry and the rest of the

economy which arises solely from purchases and sales of industry output based on estimates of transactions occurring over a (recent) historical period. Progressive departure from these conditions would progressively reduce the precision of multipliers as predictive device” (ABS 1995, p.24).

Multipliers indicate the total impact of changes in demand for the output of any one industry on all industries in an economy (ABS, 1995). Conventional output, employment, value-added and income multipliers show the output, employment, value-added and income responses to an initial output stimulus (Jensen and West, 1986).

Components of the conventional output multiplier are as follows:

Initial effect - which is the initial output stimulus, usually a \$1 change in output from a particular industry (Powell and Chalmers, 1995; ABS, 1995).

First round effects - the amount of output from all intermediate sectors of the economy required to produce the initial \$1 change in output from the particular industry (Powell and Chalmers, 1995; ABS, 1995).

Industrial support effects - the subsequent or induced extra output from intermediate sectors arising from the first round effects (Powell and Chalmers, 1995; ABS, 1995).

Production induced effects - the sum of the first round effects and industrial support effects (i.e. the total amount of output from all industries in the economy required to produce the initial \$1 change in output) (Powell and Chalmers, 1995; ABS, 1995).

Consumption induced effects - the spending by households of the extra income they derive from the production of the extra \$1 of output and production induced effects. This spending in turn generates further production by industries (Powell and Chalmers, 1995; ABS, 1995).

The *simple multiplier* is the initial effect plus the production induced effects.

The *total multiplier* is the sum of the initial effect plus the production-induced effect and consumption-induced effect.

Conventional employment, value-added and income multipliers have similar components to the output multiplier, however, through conversion using the respective coefficients show the employment, value-added and income responses to an initial output stimulus (Jensen and West, 1986).

For employment, value-added and income, it is also possible to derive relationships between the initial or own sector effect and flow-on effects. For example, the flow-on income effects from an initial income effect or the flow-on employment effects from an initial employment effect, etc. These own sector relationships are referred to as ratio multipliers, although they are not technically multipliers because there is no direct line of causation between the elements of the multiplier. For instance, it is not the initial change in income that leads to income flow-on effects, both are the result of an output stimulus (Jensen and West, 1986).

A description of the different ratio multipliers is given below.

Type 1A Ratio Multiplier = $\frac{\text{Initial} + \text{First Round Effects}}{\text{Initial Effects}}$

Type 1B Ratio Multiplier = $\frac{\text{Initial} + \text{Production Induced Effects}}{\text{Initial Effects}}$

Type 11A Ratio Multiplier = $\frac{\text{Initial} + \text{Production Induced} + \text{Consumption Induced Effects}}{\text{Initial Effects}}$

Type 11B Ratio Multiplier = $\frac{\text{Flow-on Effects}}{\text{Initial Effects}}$

Source: Centre for Farm Planning and Land Management (1989).

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