COMMERCIAL IN CONFIDENCE

FINAL REPORT

Evaluation of Wine Australia's marketing activities

Cost benefit analysis

Prepared for
Wine Australia

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THE CENTRE FOR INTERNATIONAL ECONOMICS
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Key points

- **Using historical data on Wine Australia's marketing spending and wine exports for the top ten export markets, we find evidence of a positive relationship between export volumes and marketing spend.**
- **We estimate that for each dollar of marketing spend by Wine Australia, 0.51 additional litres of Australian wine is exported. That is, direct spending of $9.3 million in 2017-18 is estimated to be associated with 4.7 million additional litres of Australian wine being exported.**
- **However, there are limitations associated with the statistical modelling. Most importantly, the size of Wine Australia's marketing program is small relative to other influences on the market that we are unable to capture using available data. This includes marketing programs by the private sector or other countries, supply-side influences such as weather, and changing tastes and preferences for wine varieties.**
- **The economic benefits to Australian wine producers associated with a higher price and quantity is referred to as producer surplus. Producer surplus is roughly equal to profit, being the difference between the amount the producer is willing to supply goods for and the actual amount received once traded. Marketing activities increase the quantity of Australian wine demanded by consumers, which results in a subsequent increase in the price of Australian wine for supply and demand to remain in equilibrium. Given a price elasticity of supply of 1, and a change in export volumes of 0.6 per cent, this implies an increase in price of 0.6 per cent (from $4.26 to $4.29 per litre). The additional producer surplus associated with this change is $88.6 million over 5 years (in discounted terms).**
- **The discounted costs of the marketing program over five years are $40.9 million in direct costs and $14.8 million in operational costs. The discounted value of benefits is $88.6 million over this period. This implies net benefits of $32.9 million and a benefit-cost ratio (BCR) of 1.59. The BCR can be interpreted as saying that each $1 of marketing spend by Wine Australia is associated with economic benefits of $1.59 for Australian wine producers.**
- **For ongoing evaluation, it may be worthwhile considering combining statistical analysis with more targeted survey-based approaches to individual participants to assess their (dollar) valuation of the opportunities that Wine Australia sponsored events create.**

Summary

The CIE was commissioned by Wine Australia to conduct a cost benefit analysis of Wine Australia's marketing activities. Wine Australia organises and runs marketing events in wine export markets to increase awareness and demand for Australian wine. Broadly speaking, these marketing activities are intended to raise awareness of and demand for Australian wine in the international market.

Wine Australia's marketing activities

The marketing activities undertaken by Wine Australia can be categorised into tradeshows, masterclasses, awards[1] and visits. Awards and visits tend to target industry leaders, buyers/stockists and key opinion leaders while tradeshows and roadshows can extend directly to consumers.

During 2017-18, Wine Australia spent $9.3 million directly on marketing activities across seven countries, namely Canada, China, the UK, the United States, Germany, Japan and Hong Kong. These countries accounted for a combined 83 per cent of Australian wine exports by volume in 2018.

Wine Australia conducted marketing activities in countries that experienced growth in market share of Australian wines. For example, since 2015, Australia's market share of the wine market in China has grown by 7.4 percentage points. Between 2015-16 and 2018-19, Wine Australia has spent $3.9 million in direct spending relating to marketing activities in China (table 1). Wine Australia has also conducted marketing activities in countries that have experienced declining market shares for Australian wine. For example, market share in the United States has reduced by around 2 percentage points since 2015, while total spending in the USA since 2015-16 has been over $11 million.

The pattern of Wine Australia's spending in key export markets has varied significantly over time, with direct spending of $0.5 million in 2015-16 rising to $9.3 million in 2017-18.

This does not include operational spending, which was $3.4 million in 2017-18 across Canada, China, USA and UK and zero in other major export markets.

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1 For example, the Wine Australia 2019 China Awards recognise "wine trade professionals who have made outstanding contributions to promoting and raising awareness of Australian wine in China" (see https://www.wineaustralia.com/whats-happening/events/wine-australia-2019-china-awards). Awards such as this, and the events that go along with giving out an award, drive interest in Australian wines and engage key influencers.

1 Wine Australia's marketing spend in key export markets

Country	2015-16	2016-17	2017-18	2018-19	Total (2015-16 to 2018-19)
	$'000s	$'000s	$'000s	$'000s	$'000s
Direct spending					
Canada	75	30	186	320	**611**
China	49	470	1 656	1 724	**3 899**
Germany	13	6	102	93	**214**
Hong Kong	69	52	1 535	183	**1 839**
Japan	6	26	70	0	**102**
New Zealand	0	0	0	64	**64**
Singapore	0	0	0	47	**47**
UK	53	234	471	551	**1 308**
United States	280	144	5 309	5 607	**11 340**
Total	**545**	**961**	**9 329**	**8 589**	**19 425**

Note: Wine Australia also conducts marketing activities in other countries, such as Sweden and Norway, but spending in these markets is small and not included in the table above.

Source: Wine Australia, CIE.

Participant feedback from Wine Australia organised visits to Australia's wine regions and in-country events showcasing Australian wine is consistently positive. This supports the hypothesis that export demand may be correlated with marketing expenditure.

Conducting cost-benefit analysis of Wine Australia's marketing activities

Cost-benefit analysis is a tool for valuing all the gains and losses from regulatory changes, infrastructure, and other investments. It is commonly used to provide an objective framework for informing government decision-making.

For this project, we use cost-benefit analysis to measure the economic impacts of Wine Australia's marketing program, compared to a base case under which the marketing program is not pursued. If the benefits of the marketing program exceed the costs, this means that the program provides a net benefit, which is an improvement to social welfare.

This cost-benefit considers the impact of marketing activities in countries that are in the top ten wine export destinations *and* where Wine Australia undertakes marketing activities, namely Canada, China, Germany, Hong Kong, Japan, the UK, and the United States. In 2018, these seven countries represented 83 per cent of Australia's wine exports by volume. This limitation of scope is to maintain simplicity.

This cost-benefit analysis captures a range of benefit and costs, as summarised in table 2. The only benefit of the marketing program that we capture is the additional producer surplus associated with increased exports.

2 Costs and benefits of Wine Australia's marketing activities

Costs	Quantified	Benefits	Quantified
Direct cost of marketing spend	✓	Producer surplus associated with an increase in exports	✓
Operational costs for Wine Australia associated with marketing activities	✓	Consumer surplus associated with an increase in exports	×
Substitution away from other exports and associated loss of consumer and producer surplus	×	Consumer and producer surplus associated with increased exports of complementary good exports (e.g. Australian tourism).	×

Source: The CIE.

There are three steps to our approach for estimating the net economic benefits from Wine Australia's marketing activities:

1 Conduct statistical modelling of the historical relationship between marketing spend and demand for Australian wines. The statistical model allows us to estimate the demand for Australian wines with and without Wine Australia's marketing activities.

2 Based on the statistical modelling, quantify the economic benefit of additional exports that are attributable to Wine Australia's marketing. The economic benefit of additional exports is captured as additional profits for Australian wine producers.

3 Estimate net benefits and the Benefit-cost ratio (BCR) of marketing spend by comparing additional wine producer profits to the costs of Wine Australia's marketing activities.

Statistical analysis of wine exports and marketing spend

As mentioned above, Wine Australia conducts marketing activities in some countries that have experienced growing market share, and others that have experienced declining market share. This highlights that there are a range of factors that influence exports, and that Wine Australia's marketing program is a relatively smaller influence than, for example, population, economic activity, or exchange rates.

In order to estimate the impact of the marketing program on exports, we must disentangle the various factors that affect wine exports. Regression modelling is a type of statistical technique that allows us to estimate the historical relationship between:

- the volume (in litres) of wine exports for a country in each month, and
- a range of variables that are believed to affect wine exports, including population, Gross Domestic Product (GDP) and seasonal factors.

The key variable of interest that we include in this model is Wine Australia's marketing spend in a particular country in a particular month. The amount of marketing spend in dollars excludes operational expenses, and includes direct spending on the event by partner organisations. A dataset of wine exports has been provided by Wine Australia,

and includes all countries importing Australian wines,[2] and the volume (in litres) and value (in Australian dollars) of wine imports in each month. Datasets for GDP and population by country have been obtained from the World Bank.

Obtaining precise estimates of the effect is difficult in this case because there are many factors that we are unable to control for (e.g. changing preferences). Accordingly, the presence of a statistically significant effect despite these limitations is a significant finding.

Using a regression model, we estimate a positive relationship between export volumes[3] and the amount of marketing spend in a country. This magnitude of this relationship is that **for each additional dollar of marketing spend in a country, wine exports increase by 0.51 litres.** For example, if a marketing event were held in the USA in January, and this cost $200 000 to run, there would be 102 000 additional litres of wine exported to the USA in subsequent months in that year..

This estimated impact is statistically significant at the 10 per cent level of significance, but not at the more conventional 5 per cent level. Another way to represent the level of uncertainty around this estimate is a confidence interval. The 90 per cent confidence interval for the impact of an additional dollar of marketing spend is an increase in wine exports between 0.05 and 0.96 litres.

We believe the level of uncertainty around this estimated effect is attributable to data and modelling limitations rather than the lack of a real impact from the marketing. For example, there are major influences on wine exports that we are unable to measure using available data, such as

- weather or other shocks to the supply of Australian wine or competing wines (e.g. French wine),
- marketing activities by Australian brands or competing export countries, or
- shifting tastes and perceptions of Australian and other wines.

Spending data (by month) for Wine Australia's marketing activities were only able to be obtained between January 2015 and October 2019. The impacts of the marketing program could be short-term, long-term or have a complex and dynamic impact on wine markets that are hard to capture with statistical modelling.

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2 Note that while the cost-benefit analysis only includes impacts and spending in only Canada, China, Germany, Hong Kong, Japan, the UK, and the United States, the statistical modelling uses a dataset of all countries. This is because the volume of exports in each month to other countries is relevant and useful to estimate the relationship between factors such as population and GDP with exports, despite those other countries not providing information about how marketing spend relates to exports.

3 We have also conducted modelling of the relationship between the value and price of wine exports and Wine Australia's marketing. However, there is no evidence of a statistically significant relationship between either of these variables and the marketing program, using similar model specifications to the export volume model. We likewise attribute this to a lack of data about control variables (e.g. supply-side factors) and the relatively small size of the marketing program compared to private sector marketing.

Additional export volumes with Wine Australia's marketing compared to without Wine Australia's marketing

Based on the evidence from the statistical modelling, we assume that each additional dollar of marketing spend is associated with a 0.51 litre increase in wine. This is a key assumption for the cost-benefit analysis.

Based on the level of direct spending by Wine Australia in each export market throughout 2017-18, we estimate that 4.7 million litres of additional exports were attributable to the marketing program by Wine Australia in 2017-18 (table 3). This means that if Wine Australia had spent $0 on marketing activities in these countries in 2017-18, wine exports would have been 4.7 million litres lower than otherwise.

3 Additional exports associated with Wine Australia's direct spend on marketing

Export market	Spending	Additional exports attributable to marketing spend
	$'000s	'000s of litres
Canada	186	94
China	1 656	839
Germany	102	52
Hong Kong	1 535	778
Japan	70	36
Netherlands	0	0
New Zealand	0	0
Singapore	0	0
UK	471	239
United States	5 309	2 689
Total	**9 329**	**4 726**

Source: The CIE.

For the cost-benefit analysis, we are measuring the costs and benefits of a hypothetical 5-year spending program based on annual spending of $9.3 million per year. This equates to $46.6 million in undiscounted terms over 5 years. The impact of the 5-year program in terms of the change in volume of exports is simply the annual impact multiplied by five. This equates to an increase in exports of 23.6 million litres of 5 years. This is an increase in total wine exports to these countries of 0.6 per cent.

Economic benefits associated with the increase in exports

We estimate the increase in economic benefits from the 5-year spending program by Wine Australia. The economic benefits to Australian wine producers associated with this higher price and quantity is referred to as producer surplus. Producer surplus is the difference between the amount the producer is willing to supply goods for and the actual amount received once traded. Producer surplus is roughly equal to profit.

Marketing activities increase the quantity of Australian wine demanded by consumers, which results in a subsequent increase in the price of Australian wine for supply and demand to remain in equilibrium. Given a price elasticity of supply of 1, and a change in export volumes of 0.6 per cent, this implies an increase in price of 0.6 per cent (from $4.26 to $4.29 per litre). The additional producer surplus associated with this change is $88.6 million over 5 years (in discounted terms).

Cost-benefit analysis results

Estimating net benefits and a benefit-cost ratio requires comparing the costs of the program to the benefits of the program.[4] The costs of the five-year program include both $40.9 million (in present value terms) of direct costs and $14.8 million in operational costs, while the benefit of the program is a present value of $88.6 million in additional producer surplus (table 46.2). This implies a net benefit of $32.9 million in present value terms (i.e. discounted) and a benefit-cost ratio of 1.59. Because benefits and costs accrue simultaneously, there is no impact from the discount rate on the benefit-cost ratio.

The BCR of 1.59 can be interpreted as saying that each $1 of marketing spend by Wine Australia is associated with economic benefits of $1.59 for Australian wine producers.

4 Results of the cost benefit analysis

CBA item	Undiscounted	Discounted
	$m	$m
Costs	63.5	55.7
Marketing spend	46.6	40.9
Operational costs	16.9	14.8
Benefits – additional producer surplus	101.0	88.6
Net benefits	**37.5**	**32.9**
BCR	**1.59**	**1.59**

Note: Assuming a discount rate of 7 per cent; BCR= Benefit cost ratio

Source: The CIE.

Sensitivity analysis

Sensitivity analysis around this key CBA results (including accounting for statistical uncertainty) suggests overall benefits of between $9.6 million and $168.1 million, associated with a BCR of between 0.17 and 3.02.

4 Costs and benefits under the base case where there is no spending program are zero. Benefits estimated in previous chapters have been estimated as the incremental/additional benefit relative to the base case of no program.

1 Introduction

Wine Australia organises and runs marketing events in wine export markets to increase awareness and demand for Australian wine. Broadly speaking, these marketing activities are intended to raise awareness of and demand for Australian wine in the international market. The CIE was commissioned by Wine Australia to conduct a cost benefit analysis of Wine Australia's marketing activities.

Cost-benefit analysis is a tool for valuing all the gains and losses from regulatory changes, infrastructure, and other investments. It is commonly used to provide an objective framework for informing government decision-making.

For this project, we use cost-benefit analysis to measure the economic impacts of Wine Australia's marketing program, compared to a base case under which the marketing program is not pursued. If the benefits of the marketing program exceed the costs, this means that the program provides a net benefit, which is an improvement to social welfare.

Structure of this report

The remainder of this report is structured as follows:

- Chapter 2 –Australia's wine export markets
- Chapter 3 – Wine Australia's marketing program
- Chapter 4 – Cost-benefit analysis methodology
- Chapter 5 – The impact of Wine Australia marketing on wine exports
- Chapter 6 – Cost-benefit analysis results
- Appendices covering additional information about Wine Australia's marketing activities and spending

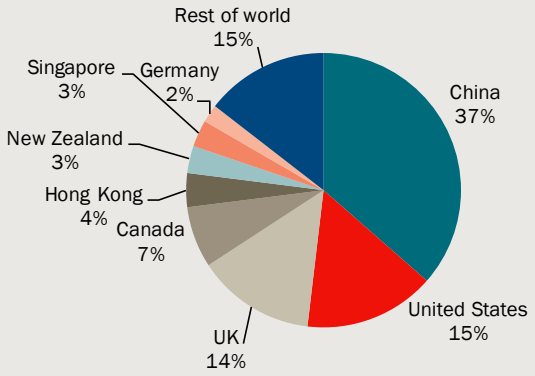
2 *Australia's wine export markets and Wine Australia's marketing program*

In 2017-18 three quarters of Australian wine exports were to China, the UK, the United States and Canada, with the value of Australian wine exported to China the highest it has been for any country in any year at AUD$1 005 million.

Australian wine export markets

In 2017-18 the largest wine export market by value was China, followed by the United States, UK and Canada. Between them, these four countries accounted for three quarters (73 per cent) of all Australian wine exports (chart 2.1).

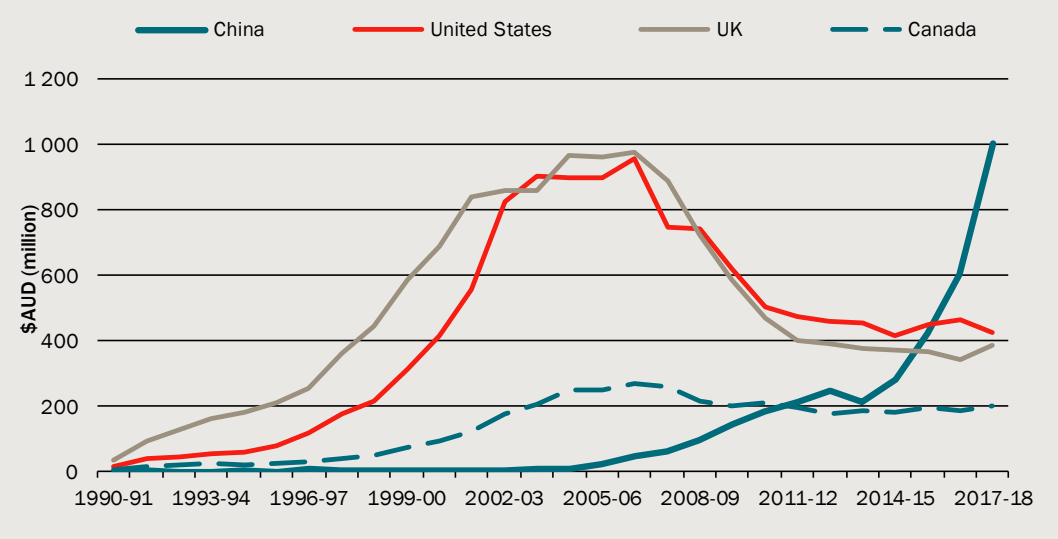
2.1 Australian wine export markets, by value for 2017-18



Data source: Wine Australia.

In 2017-18, the value of Australian wine exported to China was the highest it has been for any country in any year at AUD$1 005 million. The value of wine exported to the other three major markets has been declining since peaking over ten years ago in 2006/07 (chart 2.2).

2.2 Value of Australian wine exports for 2017-18 top 4 markets

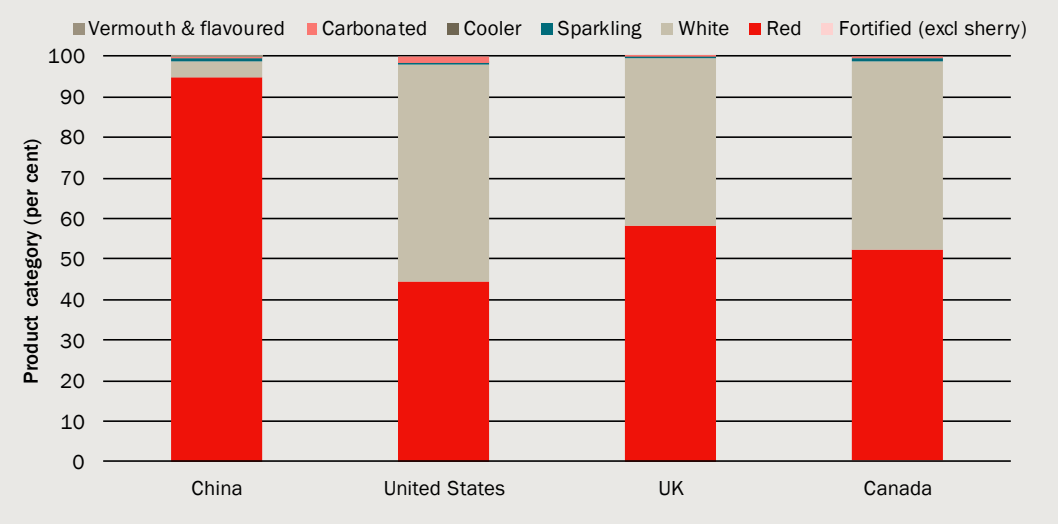


Data source: Wine Australia.

The type of wine demanded differs across markets

The majority of wine exported to the top 4 markets is still table wine. In 2017-18, red wine accounted for 95 per cent of wine exported to China, 58 per cent of wine exported to the UK, 52 per cent of wine exported to Canada and 44 per cent of wine exported to the United States. White wine accounted for 4 per cent of wine exported to China, 41 per cent of wine exported to the UK, 46 per cent of wine exported to Canada and 54 per cent of wine exported to the US. Sparkling wine comprised 1 per cent or less across all four markets (chart 2.3).

2.3 Product type for 2017-18 top 4 markets, by volume



Data source: Wine Australia.

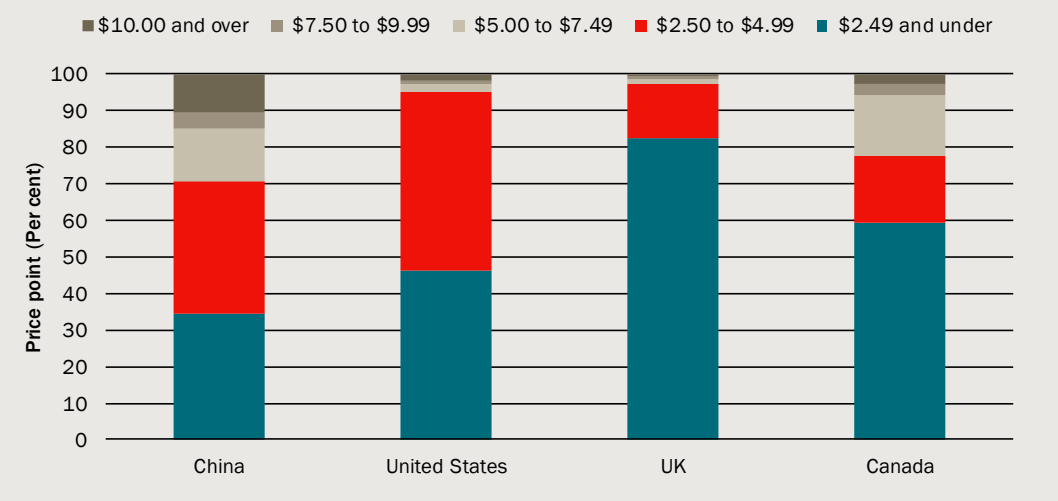
China demands higher value products

There are observed discrepancies between the volume and the value of wine exported. For instance, in 2017-18 the volume of wine exported to the UK was 1.5 times greater

than that exported to China. However, the value of wine exported to China was 2.5 times greater than that exported to the UK. This can be accounted for by differences in the price point of the products purchased.

The Chinese market purchases higher value products with 11 per cent of exports at the $10.00 and over per litre price point in 2017-18. In contrast, this price point represented less than 3 per cent of exports in the United States, UK and Canadian markers. Moreover, just over 80 per cent of wine exported to the UK was at the $2.49 and under per litre price point, which is substantially higher than in China where this price point accounted for ~25 per cent (chart 2.4).

2.4 Volume of Australian wine exports for 2017-18 top 4 markets, by price point

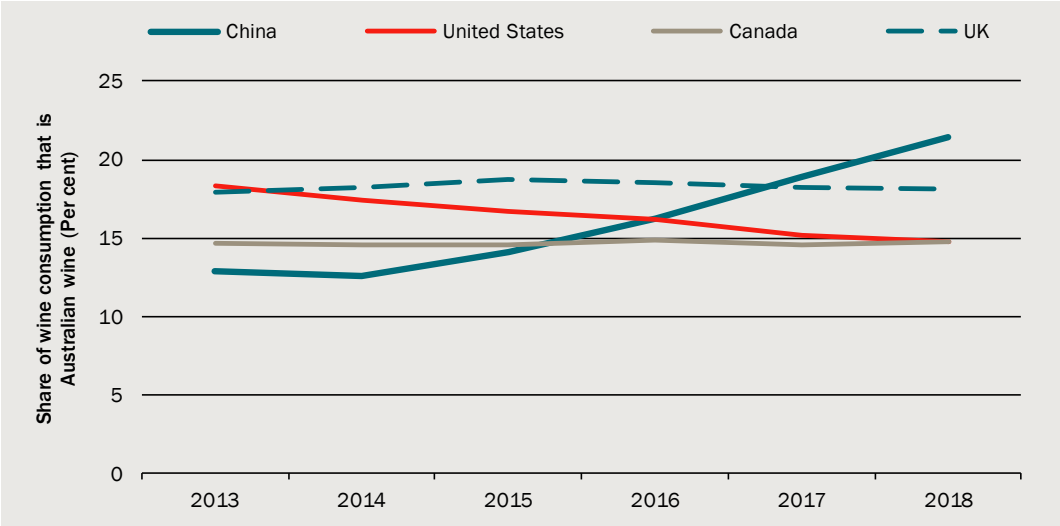


Data source: Wine Australia.

Australia's market share is growing in China but declining in the United States

Since 2015, Australia's market share of the wine market in the United States has reduced by 2.0 per centage points. In Canada and the UK, Australia's market share has remained relatively stable while in China market share has grown by 7.4 percentage points (chart 2.5).

2.5 Market share of Australian wine relative to all wine consumption for 2017-18 top 4 markets



Data source: IWSR, Wine Australia.

Relative interest in Australian wine on the Google search engine

Google trends analysis provides an indication of the popularity of a search term over time using a scale of 0 to 100. A value of 100 is the peak popularity for a term (or the most popular term if more than one term is analysed simultaneously). A value of 50 means that the term is half as popular as when the term (or most popular term in an analysis) was most popular. A score of 0 means there was not enough data to ascertain interest in a given term.[5]

In keeping with the dynamic nature of wine marketing we would expect to see interest in specific major Australian wine brands such as Yellow Tail, Penfolds and Jacob's Creek, particularly as these brands independently undertake their own marketing initiatives.

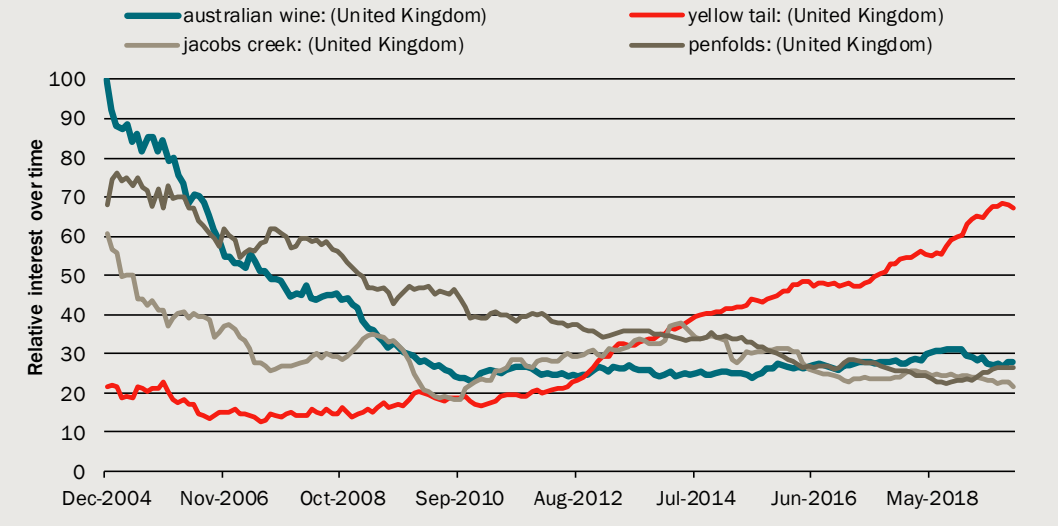
Interest in 'Yellow Tail' in both the UK and United States

In the UK, frequency of use of the search term 'Australian wine' declined significantly from 2004 and began to plateau from 2011 onwards at around a third of the interest observed in 2004 (charts 2.6). In contrast, interest in 'Yellow Tail' has more than tripled since 2012, before which interest was moderately stable.

There has been a similar amount of interest in the search terms 'Australian wine', 'Jacob's Creek' and 'Penfolds' since mid-2016.

5 Google Trends; January 2004 is the earliest time point for which data is available

2.6 Google trends analysis: UK

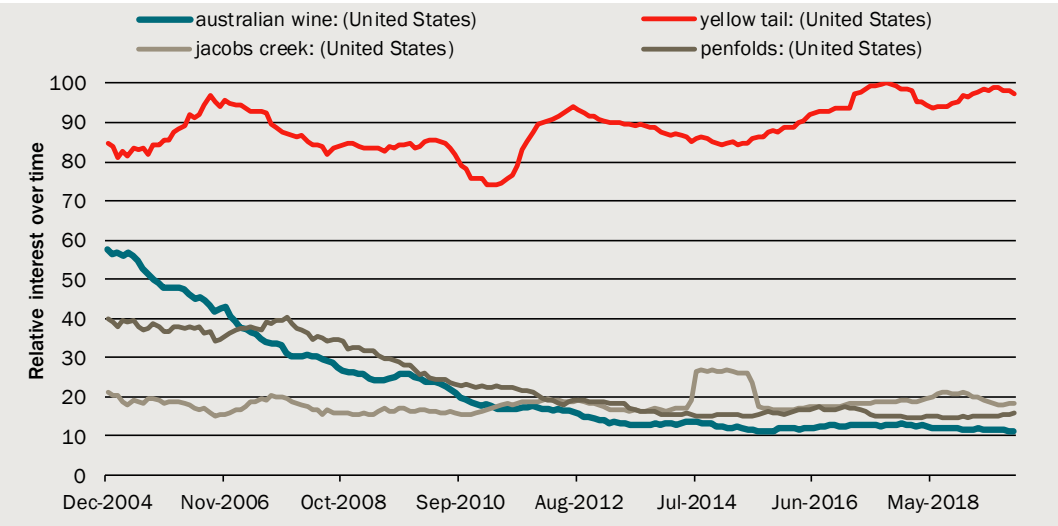


Note: data transformed to a 12-month moving average and re-scaled to be relative to 100

Data source: Google Trends.

In the United States, interest in the search term 'Australian wine' declined from 2004 and began to plateau from 2013 onwards (chart 2.7). In contrast, interest in 'Yellow Tail' has remained strong, outstripping interest in the search terms 'Australian wine', 'Jacob's Creek' and 'Penfolds'. Interest in 'Jacob's Creek' has remained stable, with the exception of increased interest in 2014 which coincided with the company undergoing a major rebrand.

2.7 Google trends analysis: United States



Note: data transformed to a 12-month moving average and re-scaled to be relative to 100

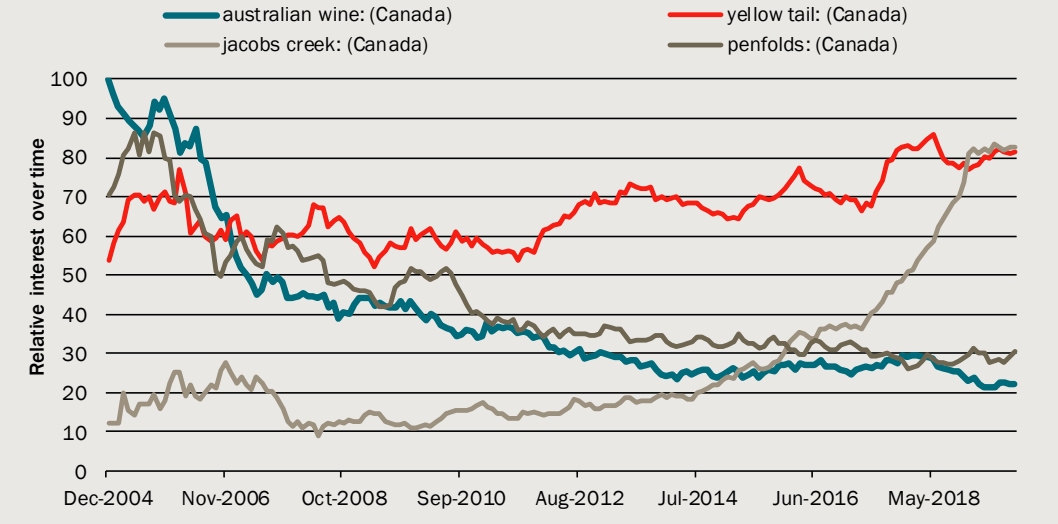
Data source: Google Trends.

Interest in Jacob's Creek and Yellow Tail in Canada

In Canada, interest in the search term 'Australian wine' declined between 2004 and 2013 and has since remained moderately stable. A similar trend is observed for 'Penfolds'. In

the two years to 2019, interest in 'Jacob's Creek' increased rapidly, reaching similar levels to the already strong interest in 'Yellow' Tail (chart 2.8).

2.8 Google trends analysis: Canada



Note: data transformed to a 12-month moving average and re-scaled to be relative to 100

Data source: Google Trends.

Interest in Penfolds in China and Hong Kong

In contrast to the UK, United States and Canadian markets, interest in 'Penfolds' as a Google search term has been growing in the Chinese province of Guangdong. The search terms 'Australian wine', 'Yellow Tail' and 'Jacob's Creek' did not have enough entries to generate results (chart 2.9). It is important to note that due to incomplete data these findings are limited to Guangdong Province which borders with Hong Kong. Relative interest in 'Penfolds' is also stronger than 'Australian wine', 'Yellow Tail' and 'Jacob's Creek' in the Hong Kong market. However, interest has been declining since peaking in 2006 (chart 2.10).

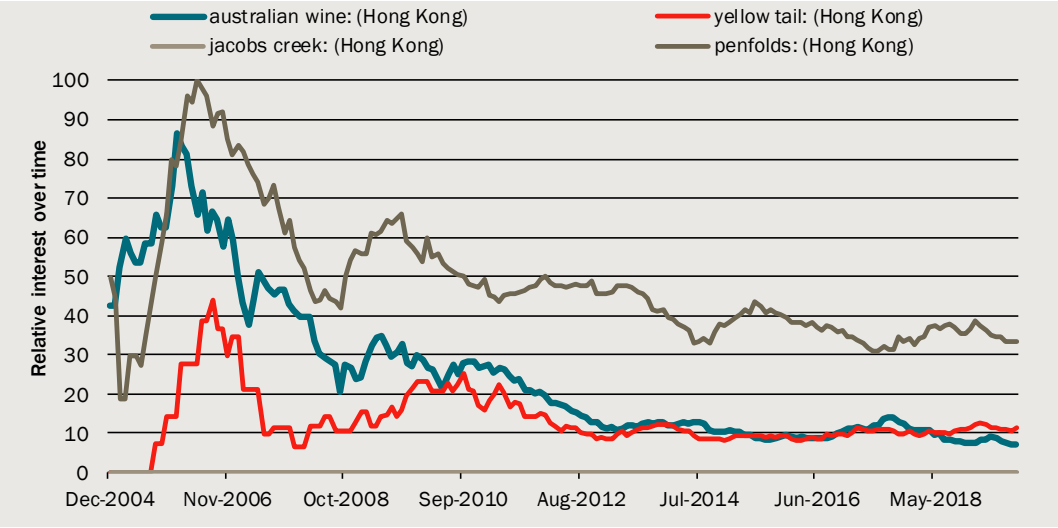
2.9 Google trends analysis: China



Note: data transformed to a 12-month moving average and re-scaled to be relative to 100

Data source: Google Trends.

2.10 Google trends analysis: Hong Kong



Note: data transformed to a 12-month moving average and re-scaled to be relative to 100

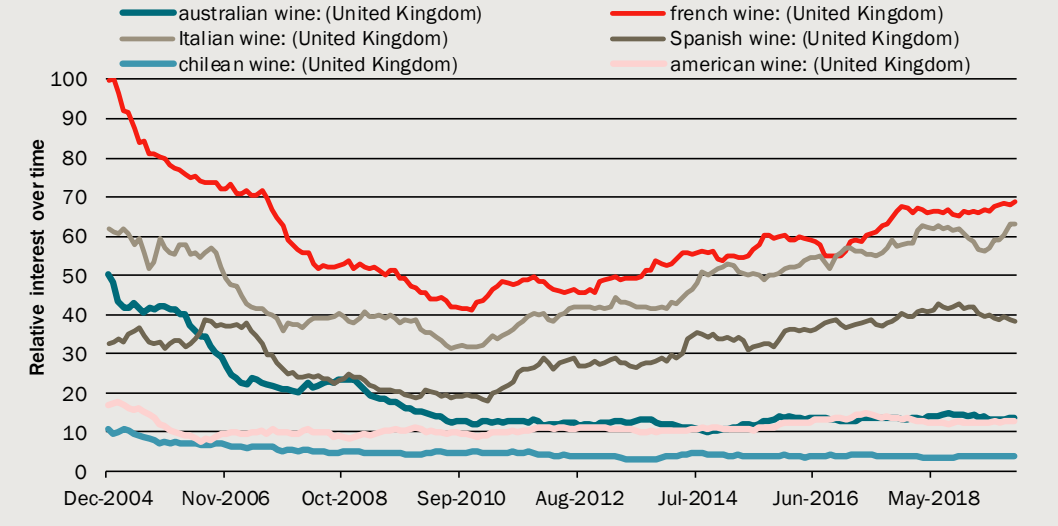
Data source: Google Trends.

Interest in Australian wine relative to other key markets

In the UK, United States and Canada interest has been strongest for the search terms 'Italian wine' and 'French wine' (charts 2.11, 2.12 and 2.13).

Over the past ten years relative interest in the search term 'Australian wine' is similar to 'American wine' in both the UK and Canada. Since 2009, relative interest in 'Australian wine' in the United States has been similar to that of 'Chilean wine'.

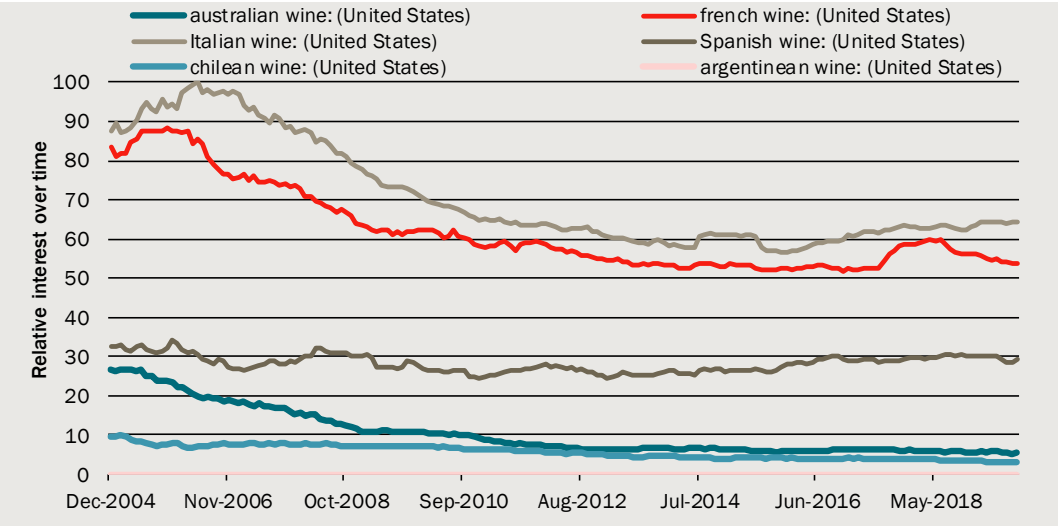
2.11 Google trends analysis: relative popularity of Australian wine in the UK



Note: data transformed to a 12-month moving average and re-scaled to be relative to 100

Data source: Google Trends.

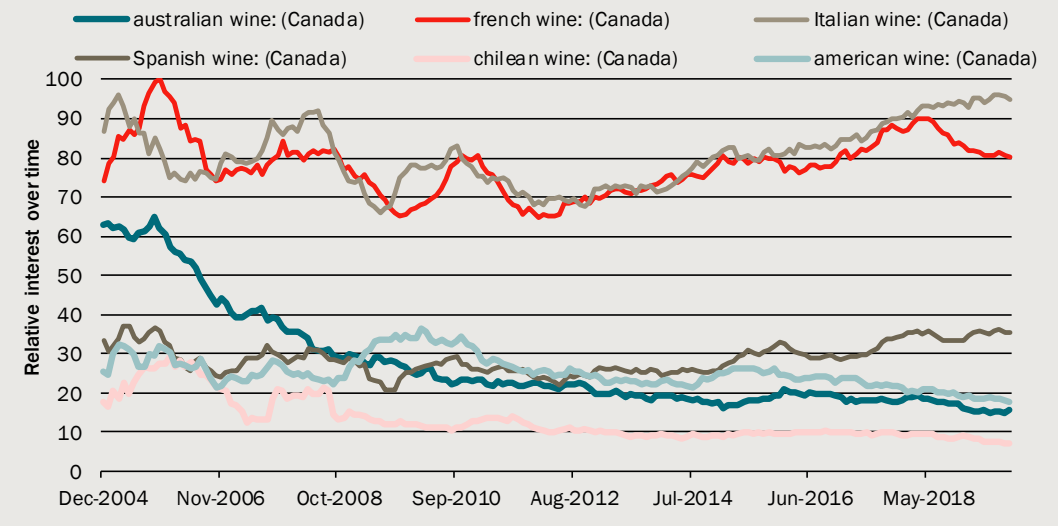
2.12 Google trends analysis: relative popularity of Australian wine in the United States



Note: data transformed to a 12-month moving average and re-scaled to be relative to 100

Data source: Google Trends.

2.13 Google trends analysis: relative popularity of Australian wine in Canada



Note: data transformed to a 12-month moving average and re-scaled to be relative to 100

Data source: Google Trends.

3 Wine Australia's marketing activities

- **During 2017-18, the most recent year of finalised financial data, Wine Australia spent $9.3 million directly on marketing activities across seven countries, namely Canada, China, the UK, the United States, Germany, Japan and Hong Kong. These countries accounted for a combined 83 per cent of Australian wine exports by volume in 2018.**
- **Participant feedback from Wine Australia organised visits to Australia's wine regions and in-country events showcasing Australian wine are well received by participants, with Net Promoter Scores ranging from 38 in Hong Kong to 67 in the United States. This supports the hypothesis that export demand may be correlated with marketing expenditure.**

The marketing activities undertaken by Wine Australia can be categorised into tradeshows, masterclasses, awards[6] and visits. Awards and visits tend to target industry leaders, buyers/stockists and key opinion leaders while tradeshows and roadshows can extend directly to consumers.

Wine Australia conducted marketing activities in countries that experienced growth in market share of Australian wines. For example, since 2015, Australia's market share of the wine market in China has grown by 7.4 percentage points. Between 2015-16 and 2018-19, Wine Australia has directly[7] spent $3.9 million on marketing activities in China. Wine Australia has also conducted marketing activities in countries that have experienced declining market shares for Australian wine. For example, market share in the United States has reduced by 2 percentage points since 2015, while total spending in the USA since 2015-16 has been over $11 million.

The pattern of Wine Australia's spending in key export markets has varied significantly over time, with spending of $0.5 million in 2015-16 rising to $9.3 million in 2017-18 (table 3.1).

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6 For example, the Wine Australia 2019 China Awards recognise "wine trade professionals who have made outstanding contributions to promoting and raising awareness of Australian wine in China" (see https://www.wineaustralia.com/whats-happening/events/wine-australia-2019-china-awards). Awards such as this, and the events that go along with giving out an award, drive interest in Australian wines and engage key influencers.

7 'Direct' spending refers to money spent on particular events such as trade expos, and excludes 'operational' spending which relates to a particular export market but not particular events.

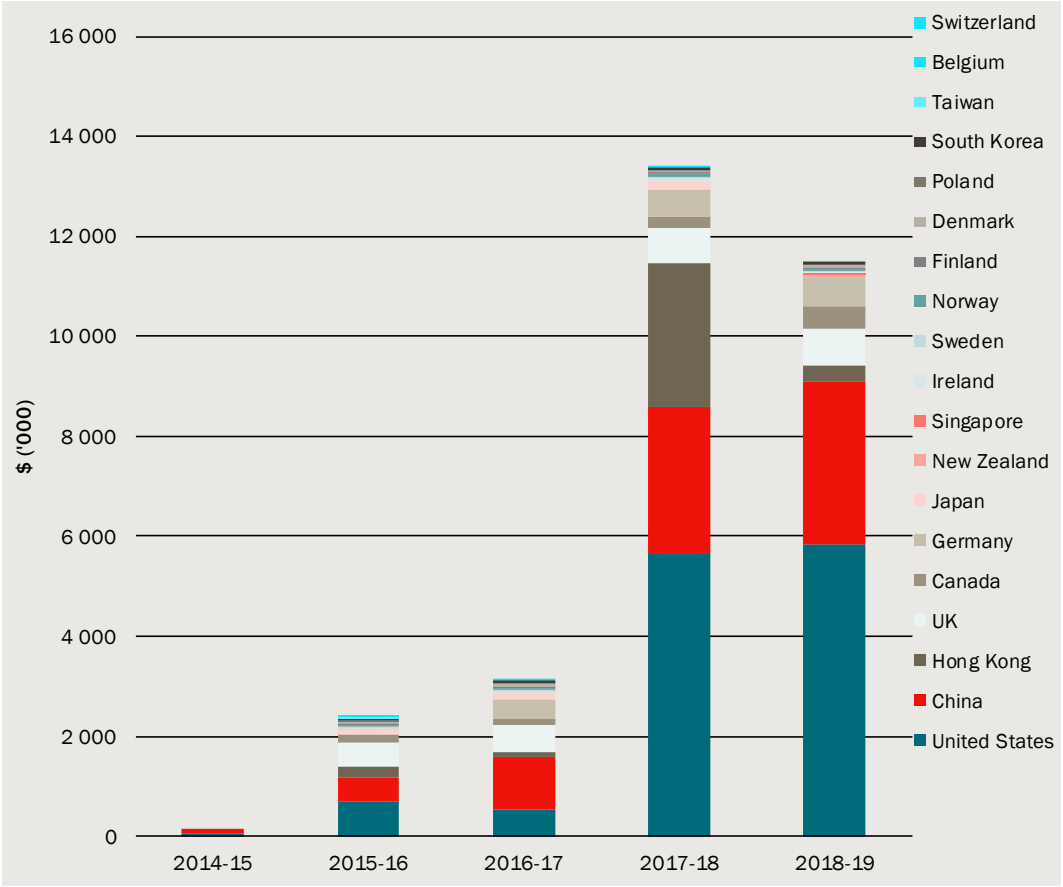
3.1 Wine Australia's direct marketing spend in key export markets, by financial year

Country	2015-16	2016-17	2017-18	2018-19	Total (2015-16 to 2018-19)
	$'000s	$'000s	$'000s	$'000s	$'000s
Canada	75	30	186	320	**611**
China	49	470	1 656	1 724	**3 899**
Germany	13	6	102	93	**214**
Hong Kong	69	52	1 535	183	**1 839**
Japan	6	26	70	0	**102**
New Zealand	0	0	0	64	**64**
Singapore	0	0	0	47	**47**
UK	53	234	471	551	**1 308**
United States	280	144	5 309	5 607	**11 340**
Total	**545**	**961**	**9 329**	**8 589**	**19 425**

Source: Wine Australia, CIE.

Wine Australia also conducts marketing activities in other countries, such as Ireland and Norway, but expenses are small. Chart 3.2 shows the cost of Wine Australia's marketing activities in all markets including spending by partner organisations.

3.2 Wine Australia's marketing activities in all markets



Data source: Wine Australia, CIE.

This spending doesn't include operational expenses of $3.4 million across these countries since 2015-16. Operational costs by year are shown in table 3.3.

3.3 Wine Australia's operational costs in key export markets, by financial year

Country	2015-16	2016-17	2017-18	2018-19	Total (2015-16 to 2018-19)
	$'000s	$'000s	$'000s	$'000s	$'000s
Canada	199	198	234	221	851
China	447	564	799	738	2 548
Germany	0	0	0	0	0
Hong Kong	0	0	0	0	0
Japan	0	0	0	0	0
New Zealand	0	0	0	0	0
Singapore	0	0	0	0	0
UK	810	766	792	880	3 247
United States	1 485	1 762	1 548	2 124	6 919
Total	**2 941**	**3 290**	**3 373**	**3 963**	**13 566**

Source: Wine Australia.

Marketing activity reach

Marketing reach (i.e. number of attendees or audience) varies substantially by event. For instance, in China the annual China Roadshow attracted the largest volume of patrons (2 827 in May 2017 and 4 088 in June 2018). In contrast, tours of Australia's wine regions target a small number of Key Opinion Leaders (KOLs), and a social media campaign with the Chufei Churan Twins (influencers with over 1 million social media followers) attracted around a quarter of a million live stream views.

In the UK, the annual Australia Day Tasting attracts the largest number of trade representatives compared to other events in the UK, while marketing activities in Canada predominantly target influencers such as buyers and sommeliers. In the United States the most well attended event is Vinexpo New York. The events with the largest number of attendees at the European events are ProWein and the Nordic Roadshow.

A detailed breakdown of reach per event (where available) by country is presented in Appendix A.

Event participant feedback

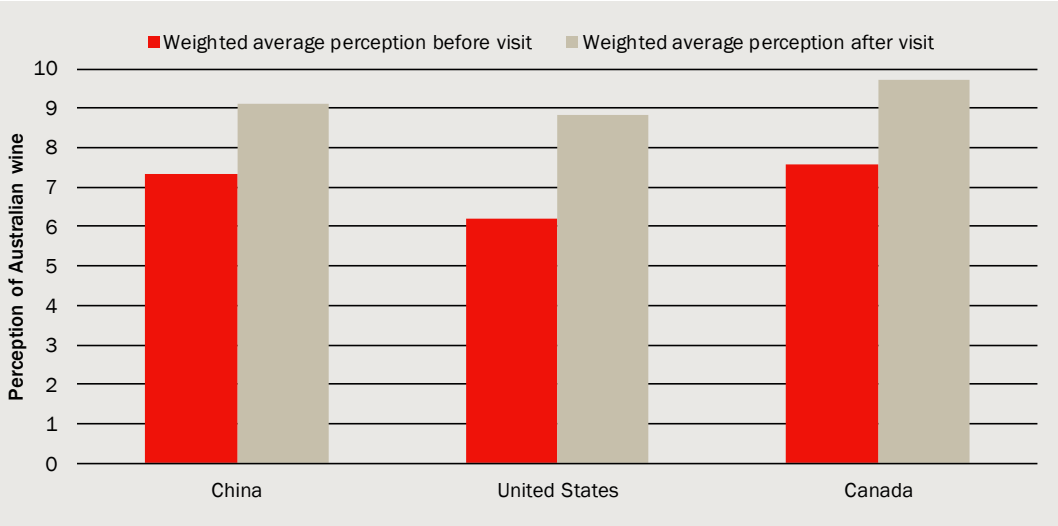
Visits to Australia's wine regions

Wine Australia has undertaken surveys of wine tour participants to evaluate how perceptions of Australian wine changed following a tour of Australia's wine producing regions. Participants were asked to provide a score between 1 and 10 indicating their

perception of Australian wine both before and after the visit. A score of 1 indicates low perception and 10 indicates high perception.

Overall, participant perceptions improved following the visits (chart 3.4). The United States had the lowest weighted average perception before the visit but also had the greatest improvement in score following the visit (weighted average change in score of 2.6).

3.4 Perceptions of Australian wine before and after visits



Note: number of visits surveyed= 5 China, 6 for the United States and 3 for Canada

Data source: CIE analysis of Wine Australia data.

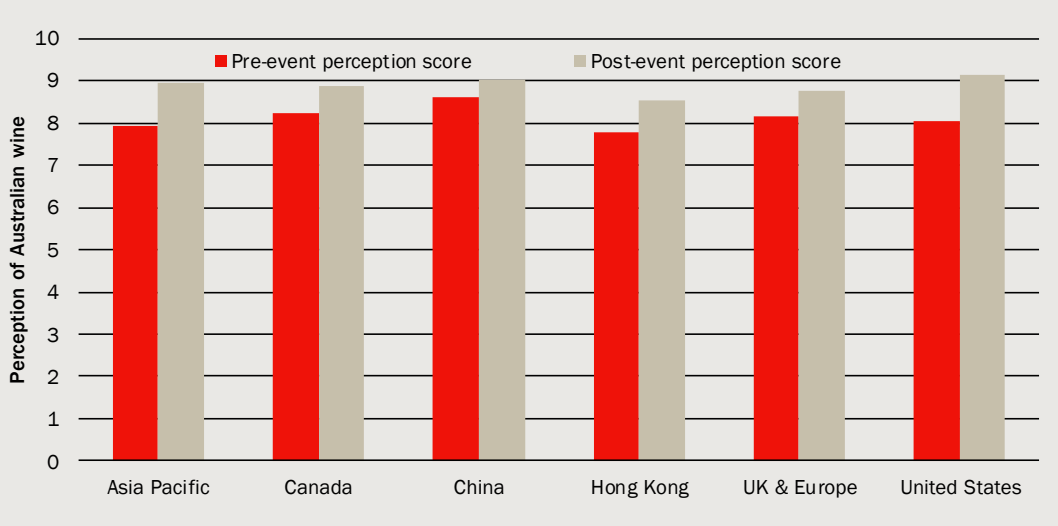
Events showcasing Australian wine

Perceptions of Australian Wine

As with visits, Wine Australia has undertaken surveys of wine event attendees to evaluate how perceptions of Australian wine changed following an event. Participants were asked to provide a score between 1 and 10 indicating their perception of Australian wine both before and after the visit. A score of 1 indicates low perception and 10 indicates high perception.

Across all regions, participant perceptions improved following the events (chart 3.5). The smallest improvement in perception was observed in China (score change of 0.4), however China also had the highest pre-event perception score. The largest improvement in perception was observed in the United States (change in score of 1.1), this was followed by Hong Kong and the Asia Pacific which had the lowest and second lowest pre-event perception scores, respectively.

3.5 Perceptions of Australian wine before and after events



Note: number of events= 6 Asia Pacific, 10 Canada, 10 China, 5 Hong Kong, 32 UK & Europe and 12 for the United States; due to missing data (number of respondents), the raw average has been presented instead of a weighted average (weighted by number of respondents per event)

Data source: CIE analysis of Wine Australia data.

Net Promoter Score

Wine Australia collects post event survey data from event attendees. The survey data is used to categorise attendees into 'Promoters', 'Neutral attendees' or 'Detractors':

- Promoter refers to an attendee who is likely to recommend Australian wine
- Neutral attendee refers to an attendee who neither intends nor doesn't intend to recommend Australian wine, and
- Detractors refer to an attendee who is unlikely to recommend Australian wine.

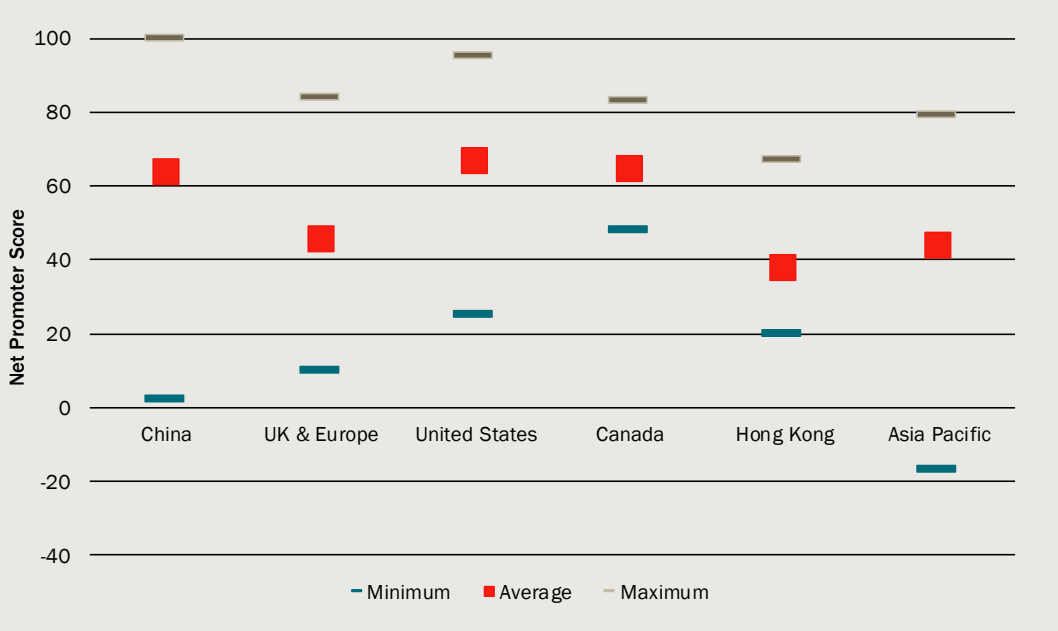
The number of promoters, neutral attendees and detractors are used to calculate a Net Promoter Score (NPS) for each event. An NPS is an index ranging from -100 to 100 that measures willingness of customers to recommend a certain product or service to others.[8] A score of 100 indicates that all attendees are likely to recommend Australian wine, while a score of -100 indicates no attendees are likely to recommend Australian wine. In this case, it captures attendee's willingness to recommend Australian wine. The NPS is calculated as follows:

$$NPS = \left(\frac{No.of\ promoters}{Total\ no.of\ survey\ respondents} - \frac{Number\ of\ detractors}{Total\ no.of\ survey\ respondents}\right) \times 100$$

All markets perform well in terms of NPS with average scores particularly high in China, the United States and Canada (chart 3.6). A detailed breakdown of NPS scores is presented in Appendix B.

8 Note: NPS is a measure of intention, not of actual behaviour.

3.6 Average NPS by market



Data source: Wine Australia.

4 Cost-benefit analysis methodology

There are three steps to our approach for estimating the net economic benefits from Wine Australia's marketing activities:

1 Conduct statistical modelling of the historical relationship between marketing spend and demand for Australian wines. The statistical model allows us to estimate the demand for Australian wines with and without Wine Australia's marketing activities.

2 Based on the statistical modelling, quantify the economic benefit of additional exports that are attributable to Wine Australia's marketing. The economic benefit of additional exports is captured as additional profits for Australian wine producers.

3 Estimate net benefits and the Benefit-cost ratio (BCR) of marketing spend by comparing additional wine producer profits to the costs of Wine Australia's marketing activities.

Undertaking cost benefit analysis

Cost-benefit analysis is a useful tool for assessing the relative merits of competing options for government policy. It compares projects in terms of their net benefits, which is total benefits minus costs.

The steps in cost-benefit analysis do not only include estimation of monetary costs and benefits. Rather, there are a wider set of steps that are important, including identifying the set of options and deciding whose costs and benefits count. Table 4.1 summarises the steps for cost-benefit analysis, and the approach we have taken for this analysis.

A key assumption is that the costs and benefits of non-Australians are not included. This means that the benefits to overseas consumers from purchasing Australian wine are not included.

4.1 Steps in preparing a full cost-benefit analysis and our approach

Step	Action	Approach for this analysis
1	Specify the set of options.	We only assess two options: ▪ The base case: no spending on marketing Australian wine by Wine Australia ▪ The Project case: spending in 2017-18 is maintained at the same level over a further 5-year period. The effects of this spending are predicted/estimated over a 10-year evaluation period

Step	Action	Approach for this analysis
2	Decide whose costs and benefits count.	Only national costs and benefits are included. Importantly this excludes benefits that may accrue to consumers in countries that import Australian wine
3	Identify the impacts and select measurement indicators.	The key impact of spending that we measure is an increase in demand for Australian wine in the top 7 wine export markets where Wine Australia conducts marketing activities. This is measured in terms of the proportional change in litres exported to each market, and benefits are measured in terms of dollars of producer surplus associated with the increase in demand.
4	Predict the impacts over the life of the proposed government action.	The impacts of wine marketing in export markets could be temporary or permanent. Evidence from the statistical modelling suggests the effects are temporary and immediate. While long-run effects may be expected, given there is no evidence of this from the statistical modelling we have not estimated any long-run changes in exports.
5	Monetise (attach dollar values to) impacts.	Producer surplus is monetised based on an assumed price elasticity of supply from the literature. Given the uncertainty around this assumption, we test how sensitive the results are to alternative elasticity assumptions.
6	Discount future costs and benefits to obtain present values.	A discount rate of 7 per cent is assumed, and we perform sensitivity testing using alternative rates of 3 per cent and 10 per cent.
7	Compute the net present value of each option.	The net present value of each option is calculated over an evaluation period of 10 years, and is the present value of future cashflows including costs and producer surplus.
8	Perform sensitivity analysis.	As above, we test the sensitivity of the results to major assumptions including the price elasticity of supply, the assumed impact of the marking activities on quantity of Australian wine purchased, and alternative discount rates.
9	Reach a conclusion.	The key conclusion for this analysis is whether the policy option (the marketing activities) have net benefits relative to a base case.

Source: Derived from Department of the Prime Minister and Cabinet, Office of Best Practice Regulation (available at: https://www.pmc.gov.au/sites/default/files/publications/cosst-benefit-analysis.docx), The CIE.

Discounting

Cost-benefit analysis requires that future costs and benefits should be discounted to obtain present values. This reflects two reasons:

- Individuals prefer a dollar today to a dollar in the future, so future cash flows must be discounted to be comparable to current dollar terms
- Flows of costs and benefits have an opportunity cost for investment. That is, the costs of the marketing program need to be funded, and this funding either requires interest payments to borrow it, or other returns on that funding are forgone.

Discounting future cashflows involves applying a 'discount rate' to scale down cashflow that occurs further in the future. For example, given a discount rate of 7 per cent, a cashflow benefit occurring one year from now is discounted by 7 per cent. That means the discounted value of the cashflow is 93 per cent of the undiscounted value.

As mentioned in table 4.1 above, we assume a discount rate of 7 per cent and test alternative discount rates of 3 and 10 per cent as part of sensitivity analysis.

Costs and benefits that we quantify

The costs and benefits considered in the analysis are presented in table 4.2.

- The cost considered is the direct cost of marketing spend, this includes Wine Australia's expenditure on individual events as well as ongoing country-specific operational costs incurred by Wine Australia in maintaining a presence in market – i.e. salaries, office accommodation etc. (where applicable).
- The benefit considered is the increase in producer surplus associated with an increase in demand for Australian wine. Producer surplus is the difference between the amount the producer is willing to supply goods for and the actual amount received once traded. Producer surplus is roughly equal to profit.

Other costs and benefits are considered out of scope for this analysis, particularly given that Wine Australia is interested in how spending on marketing events benefits levy payers (i.e. wine producers). To this end, the following costs and benefits are noted as likely to be impacted by marketing activities but are not considered in the analysis:

- Costs and benefits of marketing expenditure by Australian wine companies other than user pays contributions to Wine Australia activities.
- Substitution away from other exports and associated loss of consumer and producer surplus — this cost will not impact levy payers.
- Consumer surplus associated with increase in exports — this benefit will be accrued by consumers in other countries and is therefore not a benefit to Australia or wine sector levy payers.

We are unable to quantify additional consumer surplus associated with increased exports of complementary good exports such as Australian tourism. This benefit may accrue to levy-payers if Wine Australia's marketing increases tourism to vineyards. However, we have not been able to obtain any data about the impact of Wine Australia's marketing on tourism to Australia. Given the limitations of the statistical modelling using the export dataset mentioned in the following chapter, we do not believe data is available that could support robust quantification of these benefits.

4.2 Costs and benefits of Wine Australia's marketing activities

Costs	Quantified	Benefits	Quantified
Direct cost of marketing spend	✓	Producer surplus associated with increase in exports	✓
Substitution away from other exports and associated loss of consumer and producer surplus	×	Consumer surplus associated with increase in exports	×
		Consumer and producer surplus associated with increased exports of complementary good exports (e.g. Australian tourism).	×

Source: The CIE.

For simplicity, we only consider exports of Australian wine to countries that are in the top ten export destinations. Of the ten countries which are included in the analysis, Wine Australia only conducts marketing activities in seven, namely:

- Canada
- China
- Germany
- Hong Kong
- Japan
- UK, and
- United States

In 2018, these seven countries represented 83 per cent of Australia's wine exports by volume.

An economic framework for benefits from export promotion

A Supply-and-Demand model is a useful framework for illustrating the benefits of marketing for wine producers. Below we explain a framework for estimating economic benefits of export promotion. This framework considers the benefits from export promotion that increases the **volume** of exports, which aligns to the statistical evidence provided in the following chapter.[9]

Suppose that before any marketing activities Australian wine is exported at price P_0 and quantity Q_0 (chart 4.3).

If, following marketing activities, there is an increase in the quantity of Australian wine demanded by consumers (shift from Q_0 to Q_1) there will be a subsequent increase in the price of Australian wine for supply and demand to remain in equilibrium (price shifts upward from P_0 to the new higher price of P_1). This change in price may occur with a time lag.

The economic benefits to Australian wine producers associated with this higher price and quantity is referred to as producer surplus. Producer surplus is the difference between the amount the producer is willing to supply goods for and the actual amount received once traded. Producer surplus is roughly equal to profit.

Producer surplus is calculated using the following equation:

$$Producer\ surplus = \frac{1}{2} \times \Delta Q \times \Delta P$$

where

- ΔQ is the total change in exports of Australian wine across all ten major export markets, and
- ΔP is the weighted average price change across all ten major export markets.

Initially, producer surplus is represented by the blue shaded area in chart 4.3. That is:

9 However, such a change in export volumes involves a movement along the supply curve, and therefore an increase in price and total value of exports.

$$Producer\ surplus = \frac{1}{2} \times (Q_0 - 0) \times (P_0 - 0)$$

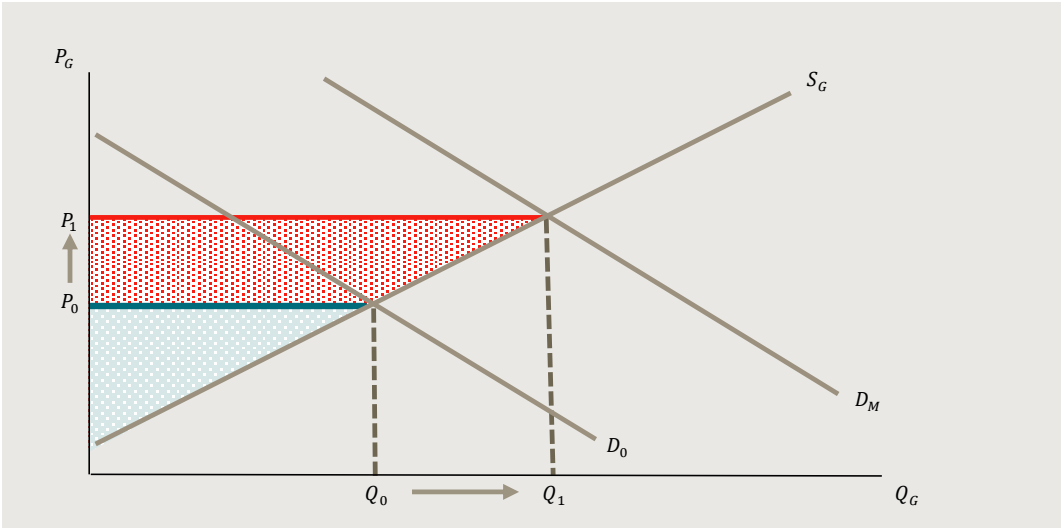
Following the increase in price, producer surplus is now represented by the blue shaded area plus the red shaded area. That is:

$$Producer\ surplus = \frac{1}{2} \times (Q_1 - 0) \times (P_1 - 0)$$

The increase in producer surplus attributable to the marketing activities is the difference between the initial producer surplus and the new producer surplus associated with the price increase. Hence, the increase in producer surplus is represented by the red shaded area and can be calculated as follows:

$$Increase\ in\ producer\ surplus = ((P_1 - P_0) \times Q_0) + (\frac{1}{2} \times (Q_1 - Q_0) \times (P_1 - P_0))$$

4.3 Economic framework for estimating the benefits attributable to export promotion



Data source: The CIE.

Estimates of the price elasticity of supply for Australian wine

This analysis assumes that the supply curve is linear which means that the cost of additional production increases at a constant rate. The slope of the curve is estimated using the elasticity of supply.

There are a limited number of publications that report the elasticity of supply for wine. We have identified two studies that report relevant elasticity estimates (table 4.4). One study looks at the elasticity of supply of Australian agricultural supply more broadly, while another is specific to high quality white wine in the Czech Republic. These studies were deemed the most appropriate for the analysis because one is wine-specific and current, while the other older study is Australian-specific. However, neither is sufficiently relevant to provide a robust assumption for the price elasticity of supply for Australian wine in 2019.

In the absence of an appropriate estimate of the price elasticity of supply for Australian wines, we assume the elasticity is equal to one. A price elasticity of supply for Australian wine of one can be interpreted as saying if the price of wine increases by 10 per cent, producers would *increase* supply by 10 per cent. Using an elasticity approach assumes that there is no supply cap/constraint on the quantity of Australian wine that can be produced.

This assumed elasticity of one is slightly lower than the average of the two estimates in the literature. The supply elasticity of wine is likely to be high (one or more) when prices of wine are increasing, but likely to be a lot lower when prices are falling. This is because the fixed costs associated with land, equipment (and also contracting arrangements) make it costly to scale down production when prices fall. Given this uncertainty, and that the impact of Wine Australia's marketing program is to increase prices, we believe an elasticity of one is appropriate.

Further in this report, we conduct sensitivity analysis to test the impacts of alternative assumptions for this parameter.

4.4 Elasticity of supply of Australian wine

Source	Description	Price elasticity of supply of Australian wine
		No.
Syrovatka, P. & Zufan, P. 2014, 'Price elasticity of supply of bottled quality white wine in the Czech Republic', Review of Agricultural and Applied Economics, vol. 17, no. 2 pp 32-37	Elasticity of supply of bottled quality white wine (wine produced without the addition of sugar) in the Czech Republic was estimated using monthly time series data of prices and sales for the period 2004-2012.	2.28459
Pandey, S., Piggot, R. & MacAulay, T. 1982, 'The elasticity of aggregated Australian agricultural supply: estimates and policy implications', Australian Journal of Agricultural Economics, vol. 26, no. 3, pp 202-219.	Aggregate Australian agricultural supply elasticity was estimated using regression analysis of annual time series data for the period 1950-51 to 1975-76.	0.800
Average of the two studies		**1.542**

Source: The CIE.

5 The impact of Wine Australia marketing on wine exports

Modelling approach

Wine Australia conducts marketing activities in some countries that have experienced growing market share, and others that have experienced declining market share. This highlights that there are a range of factors that influence exports, and that Wine Australia's marketing program is a relatively smaller influence than, for example, population, economic activity, or exchange rates. In order to estimate the impact of the marketing program on exports, we must disentangle the various factors that affect wine exports.

Regression modelling is a type of statistical technique that allows us to estimate the historical relationship between:

- the volume (in litres) of wine exports for a country in each month, and
- a range of variables that are believed to affect wine exports, including population, Gross Domestic Product (GDP) and seasonal factors.

The key variable of interest that we include in this model is Wine Australia's marketing spend in a particular country in a particular month. The amount of marketing spend in dollars excludes operational expenses, and includes direct spending on the event by partner organisations.

All marketing activities are expected to have a demand side impact, including wine tours where guests may be importers and therefore the first purchasers of exports, with their decisions around purchasing based on expected consumer demand.

Essentially, the impact of Wine Australia's marketing activities on export volumes is established through estimating the following (stylised) equation:

$$Exports_{cm} = constant + \alpha Market_{cm} + \beta Controls_{m} + \gamma Marketing$$

where:

- Impact = the effect (unit price or quantity) in primary market c
- Market = the range of occurrences in that primary market impacting on wine imports (e.g. rising local incomes)
- Controls = the range of factors across all primary markets that impact on wine imports (e.g. seasonality)

- Marketing = the range of marketing initiatives carried out by Wine Australia in that primary market place.

Before describing the statistical model specifications that we have used, some key issues that inform the choice of specification are discussed in the sections below.

Correlation vs causation

We are interested in the **causal** effect of Wine Australia's marketing spending on wine exports. This is because we are interested in measuring the effect of Wine Australia's marketing on wine exports, relative to Wine Australia not spending on marketing (the base case).

Importantly, a multiple regression model will identify controlled correlations between explanatory variables and the dependent variable. In this case, that means that econometric modelling will identify the correlation between wine exports to a particular market and marketing spend, holding other factors constant. By controlling for other factors that affect exports, these models provide some evidence of a causal link between the marketing program and exports.

However, a multiple regression model that finds a significant relationship between two variables will not necessarily imply that this is a causal relationship. Causality is difficult to define and may run in both directions between two variables. Consider if Wine Australia spends more in markets that are growing. A regression model may identify a correlation between spending on growth in an export market, but it was growth that caused spending, not the other way around.

There are particular features of regression model design that can improve the evidence for a causal relationship, such as controlling for relevant factors that also affect the dependent variable.

However, there are also other types of evidence that would provide a stronger justification for this link being causal. For example, a Randomised Controlled Trial (RCT) would involve market spend in a random selection of markets (potentially at random points in time). This sort of experiment would provide more convincing evidence of a causal link between marketing and export growth. This is because the random assignment of marketing spend would mean that other factors that tend to be correlated with marketing spend would not be correlated with marketing spend in this experiment.

Size of marketing program impacts relative to other market shocks

Wine Australia's marketing spending is small in the context of other influences on wine export markets. The Wine Australia marketing program involved approximately $33 million in spending since the beginning of 2015-16, of which around $14 million was operational expenses not connected to particular events. By comparison, Treasury Wine Estates spent around $115 million in 2016-17 on marketing. Further, the impacts of winegrowing conditions in Australia (e.g. droughts), changing tastes and preferences overseas, and shifts in demand and supply of competing wines will likely dwarf the effects of Wine Australia's marketing.

In this context, it is difficult to disentangle the effect of Wine Australia's marketing program from all the other factors shifting Australian wine exports.

This suggests that econometric modelling may struggle to identify statistically significant effects of Wine Australia's marketing on exports.

Dynamics in the impact of marketing on exports

It is uncertain over what time frames marketing activities would have an impact on demand. For example, a wine event may have an impact in the short term of increasing interest in wines, which then gradually reduces over time. Or, a wine event may not have an impact for some time until there are changes to supply arrangements.

Therefore, we must lean towards being agnostic about the timing of impacts from marketing. A number of specifications have been tested based on cumulative measures of spending over multiple months, dynamic responses to marketing over the course of a year, and impacts from changes in marketing spending (rather than the level of spending) over time.

Differences in effects between countries

The effect of a marketing event that costs $1 million would differ by country for a number of reasons. For example, costs may be higher in certain countries, meaning that running an event for 1 000 attendees may have significantly different costs depending on what country is hosting the event.

Further, some markets import a relatively higher share of premium wines (e.g. Hong Kong and Singapore), while others are more focussed towards less expensive wine (e.g. USA). Accordingly, the same marketing event may have different impacts depending on the tastes and preferences of the particular wine market.

There is insufficient variation in Wine Australia's marketing spend across time and between countries to allow for different effects to be robustly estimated for different export markets. However, alternative approaches are available. For example, measuring the impact of $1 of spending per $1 of GDP of an export market will account for wine events having a larger proportional impact on wine exports in countries with smaller economies. This is intuitively true, in that a wine event in China (a very large economy) would be expected to have a smaller impact that a wine event of the same magnitude in New Zealand (a smaller economy).

Statistical modelling approach

Regression modelling is a type of statistical technique that allows us to estimate the historical relationship between:

- the volume (in litres) of wine exports for a country in each month, and
- a range of variables that are believed to affect wine exports, including population, Gross Domestic Product (GDP) and seasonal factors.

In this section we present the key statistical model specification used to estimate the effect of marketing on exports in the cost-benefit benefit analysis.

The key variable of interest that we include in this model is Wine Australia's marketing spend in a particular country in a particular month.

The model we estimate is a fixed effects model, which is a type of panel data model. Panel data is a structure of datasets where observations are present over time and for individual entities. In this case, our time variable is months and the panel variable is country. The fixed effects model is a consistent estimator in the presence of unobserved differences in exports between countries. This is clearly the case for this data, since there are many factors affecting exports for a country that we cannot control for using the variables available for the model (e.g. weather or preference differences across countries).

Our model specification is as follows:

$$volume_{ct} = \beta_0 + \beta_1 spend_{c,t} + \beta_2 spend_{c,t-1} + \beta_3 Population_{ct} + \beta_4 GDP\ per\ capita_{ct} + \sum_{1}^{12} \gamma_{12} month_t + \delta Year_t + \alpha_c + \varepsilon_{ct}$$

where,

- $volume_{ct}$ is the volume of wine exported to country *c* in time period *t*. Time periods are monthly.
- β_0 is a constant term.
- $spend_{c,t}$ is marketing spend on events Wine Australia marketing events at time period *t*. This includes other funding sources, such as contributions from partner organisations. It only includes direct event spending, and therefore excludes operational spending, which is not believed to have a direct impact on wine exports.[10]
- $spend_{c,t-1}$ is marketing spend on events Wine Australia marketing events at time period *t – 1*, i.e. spending in the previous month. This variable is only included in an alternative model specification (see table 5.2 below).
- $Population_{ct}$ and $GDP\ per\ capita_{ct}$ are measured for each country on an annual basis, and then linearly interpolated to a monthly basis.
- $month_t$ is the month at time period *t*.
- $Year_t$ is a variable taking value equal to the year of the observation, with the coefficient on this variable (δ) being interpretable as an annual time trend.
- α_c is a fixed effects term.[11] This can be interpreted as a country-specific constant term. This will account for variation between countries that is fixed over time.

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10 That is, operational spending only has an impact on wine exports in that it facilitates direct spending on events. If no events took place in a given month/year, then there would be no impact from the operational spending on Australian wine exports.

11 We use the Hausman test to determine whether to use the fixed effects estimator, which we know to be consistent, or the random effects estimator, which is more efficient but not necessarily consistent. The results of this test across the main and alternative model specifications are such that we reject the null hypothesis that the random effects estimator is consistent. Therefore, we use the fixed effects estimator for all models.

- ε_{ct} is a random error term.

Standard errors are clustered by country, which is a standard approach to deal with a situation where errors (i.e. ε_{ct}) within each panel (i.e. country) are not independent. That can include serial correlation of residuals within panels.

Data sources

The following datasets were used to estimate the regression model.

- Australian wine export data, which includes volume and value of litres exported by year and calendar month for the period January 1991 to June 2019. This has been provided by Wine Australia. This dataset has been aggregated across different types (e.g. red and white) of wine into a single observed wine export volume for each export market in each month.
- Global wine export data including country of origin and destination, value, month and year for the period January 2015 to June 2019.
- Marketing reports for 58 Wine Australia events and visits. Each report includes a description of the event, budget, funding source, feedback (e.g. participant, exhibitor) and post-event evaluation. This has been collated into a single database for the analysis.
- World Bank annual data including GDP per capita, population and exchange rates for each country for the time period 1990 to 2018.

Statistical model results

Table 5.1 presents the estimated coefficients of our main statistical model described by the equation above. The key coefficient of interest is the 'current marketing spend' coefficient, which has a value of 0.51. This magnitude of this coefficient means that **for each additional dollar of marketing spend in a country, wine exports increase by 0.51 litres.** For example, if a marketing event were held in the USA in January, and this cost $200 000 to run, there would be 102 000 litres of wine exported to USA in January.

This estimated impact is statistically significant at the 10 per cent level of significance, but not at the more conventional 5 per cent level (given the p-value is 0.065). The 90 per cent confidence interval for the estimate is 0.05 – 0.96.

The sign and magnitude of other coefficients appear reasonable, but overall model fit is low, in that the model only explains 11 per cent of variation in monthly exports to each country. Note that this doesn't include the variation explained by the fixed effects terms for each country.

5.1 Main statistical model results – relationship between volume and marketing in the current month

Variable	Coefficient estimate	P-value
Current marketing spend	0.51	0.065

Variable	Coefficient estimate	P-value
Population	0.07	0.318
GDP per capita	2.66	0.276
Monthly indicator variables (month indicated below).		
2	91 042	0.017
3	81 522	0.087
4	70 075	0.029
5	53 574	0.216
6	72 497	0.140
7	60 099	0.202
8	110 008	0.052
9	128 976	0.063
10	137 502	0.044
11	75 052	0.046
12	147 208	0.037
Annual time trend	- 14 502	0.423
Constant	2.66E+07	0.431
Other statistical outputs		
Number of observations	7 776	
R-squared	0.110	
F-stat	0.0002	

[a] The variable for 'January' (i.e. month = 1) is omitted because it is a linear combination of the other month indicator variables.

Source: CIE.

An alternative model specification including lagged marketing spend

We have also tested a number of model specifications with different lag structure. Coefficient estimates on the key variable of interest (marketing spend) and lags of this variable vary significantly with changes in lag structure. We do not present the results of all alternative models, because more complex lag structures are likely to over-fit the data. That is, statistically significant relationships are likely to be spurious is more complex model structures, given that the amount of unobserved factors affecting exports is high, and that we expect the effects of marketing spend to be small relative to these other factors.

Table 5.2 presents one alternative model structure which includes marketing spend from the previous month for that country in the model. The coefficient on this variable has the expected sign (positive) but the coefficient estimate is highly uncertain (as shown by the high p-value). That is, the confidence intervals on this estimate are wide, and either side of zero. However, the coefficient estimate for current marketing spend is similar to the main model, supporting that after controlling for marketing spend in the previous month, there is an effect from current marketing spend on the volume of exports.

5.2 Alternative statistical model results – relationship between volume and marketing in the current and past month

Variable	Coefficient estimate	P-value
Current marketing spend	0.49	0.046
Previous month's marketing spend	0.18	0.755
Population	0.18	0.755
GDP per capita	0.0	0.000
Monthly indicator variables		
2	0	0.000
3	0	0.316
4	2	0.302
5	0	0.000
6	0	0.000
7	137 971	0.016
8	99 098	0.089
9	94 597	0.025
10	79 129	0.141
11	97 118	0.089
12	83 765	0.145
Annual time trend	150 584	0.062
Constant	1.61E+05	0.038
Other statistical outputs		
Number of observations	7 776	
R-squared	0.288	
F-stat	0.0000	

[a] The variable for 'January' (i.e. month = 1) is omitted because it is a linear combination of the other month indicator variables.

Source: CIE.

Alternative model specifications with the value of exports as the dependent variable

We also tested statistical models using the total value of exports as the dependent variable. These models consistently found no evidence of a relationship between the value of exports and marketing spend. Different models were estimated using lagged values of spending, difference-in-difference models, and other specifications, with none providing robust evidence of a relationship. We believe that the results were less convincing for the value regressions not because there is no relationship between these variables, but because the value of exports fluctuates due to the pricing factors, and we are not able to observe many influences on prices (except exchange rates and population/GDP per capita). Exchange rates are not included in the model below because they were consistently found not to have a statistically significant relationship with value.

An example of a regression model with the value of exports as a dependent variable is presented below. This model has the same structure as the main statistical model (shown

in table 5.1), except the dependent variable is the value (in AUD) of wine exports by month and by country. The coefficient on current marketing spend has the expected sign, but the coefficient estimates have wide confidence intervals as shown by the high p-value.

5.3 Alternative statistical model results – relationship between value and marketing in the current

Variable	Coefficient estimate	P-value
Current marketing spend	2.87	0.401
Population	0.46	0.332
GDP per capita	16.56	0.299
Monthly indicator variables		
2	310 548	0.023
3	303 518	0.033
4	270 856	0.008
5	275 707	0.032
6	345 627	0.008
7	232 803	0.039
8	390 629	0.021
9	504 414	0.017
10	420 610	0.016
11	437 836	0.049
12	628 222	0.046
Annual time trend	- 90 921	0.458
Constant	1.64E+08	0.470
Other statistical outputs		
Number of observations	7 776	
R-squared	0.288	
F-stat	0	

[a] The variable for 'January' (i.e. month = 1) is omitted because it is a linear combination of the other month indicator variables.

Source: CIE.

Conclusions based on the statistical modelling

Based on the results from the regression model, we find a positive relationship between export volumes[12] and the amount of marketing spend in a country. This magnitude of this relationship is that **for each additional dollar of marketing spend in a country, wine exports increase by 0.51 litres.**

12 We have also conducted modelling of the relationship between the value and price of wine exports and Wine Australia's marketing. However, there is no evidence of a statistically significant relationship between either of these variables and the marketing program, using similar model specifications to the export volume model. We likewise attribute this to a lack of data about control variables (e.g. supply-side factors) and the relatively small size of the marketing program compared to private sector marketing.

This estimated impact is statistically significant at the 10 per cent level of significance, but not at the more conventional 5 per cent level.

We believe that the uncertainty around the magnitude of the estimated effect is attributable to data and modelling limitations rather than the lack of a real impact from the marketing. For example, there are major influences on wine exports that we are unable to measure using available data, such as

- weather or other shocks to the supply of Australian wine or competing wines (e.g. French wine),
- marketing activities by Australian brands or competing export countries, or
- shifting tastes and perceptions of Australian and other wines.

Spending data (by month) for Wine Australia's marketing activities were only able to be obtained between January 2015 and October 2019. The impacts of the marketing program could be short-term, long-term or have a complex and dynamic impact on wine markets that are hard to capture with statistical modelling.

Additional export volumes with Wine Australia's marketing compared to without Wine Australia's marketing

Considering the evidence from the statistical modelling, the limitations underlying that modelling, and the high level of satisfaction reported by attendees to Wine Australia events, we conclude that it is reasonable to assume that each additional dollar of marketing spend is associated with a 0.51 litre increase in wine. This is a key assumption for the cost-benefit analysis.

Based on the level of spending direct spending by Wine Australia in each export market throughout 2017-18, we estimate that 4.7 million litres of additional exports were attributable to the marketing program by Wine Australia in 2017-18 (table 5.4). This means that if Wine Australia had spent $0 on marketing activities in these countries in 2017-18, wine exports would have been 4.7 million litres lower than otherwise.

5.4 Additional exports associated with Wine Australia's direct spend on marketing in 2017-18

Export market	Spending	Additional exports attributable to marketing spend
	$'000s	'000s of litres
Canada	186	94
China	1 656	839
Germany	102	52
Hong Kong	1 535	778
Japan	70	36
Netherlands	0	0
New Zealand	0	0
Singapore	0	0

UK	471	239
United States	5 309	2 689
Total	**9 329**	**4 726**

Source: The CIE.

Estimated impact of a 5-year spending program on exports

For the cost-benefit analysis presented in the following chapter, we are measuring the costs and benefits of a hypothetical 5-year spending program based on annual spending of $9.3 million per year. This equates to $46.6 million in undiscounted terms over 5 years.

The impacts of this spending program are shown in table 5.5. The impact of the 5-year program in terms of the change in volume of exports is simply the annual impact multiplied by five.

5.5 Additional exports associated with a five-year spending program

Time period	Spending by WA (undiscounted)	Implied change in quantity
	$million	Millions of litres
Annual	9.3	4.7
5-yearly program	46.6	23.6

Source: CIE.

6 Cost-benefit analysis results

- **The discounted costs of the marketing program over five years are $40.9 million in direct costs and $14.8 million in operational costs. The discounted value of benefits are $88.6 million over this period. This implies net benefits of $32.9 million and a benefit-cost ratio of 1.59.**
- **The finding that the benefits of the marketing program exceeds the costs is robust to alternative discount rates and alternative assumptions about the price elasticity of supply. However, the conclusion depends critically on the size of the increase in exports for each dollar of marketing spend. If, for each dollar of marketing spend, the increase in exports is at least 0.32 litres, then the program would still have a net benefit.**

Monetising the impact of marketing on exports

Using the approach described in chapter 4 for quantifying producer surplus, we estimate the increase in economic benefits from the 5-year spending program by Wine Australia.

Spending in this program is $46.6 million in undiscounted terms, which converts to $40.9 million in present value terms (i.e. discounted using a discount rate of 7 per cent).

As discussed in chapter 4, if marketing activities increase in the quantity of Australian wine demanded by consumers there will be a subsequent increase in the price of Australian wine for supply and demand to remain in equilibrium. Given a price elasticity of supply of 1, a change in export volumes of 0.6 per cent, this implies an increase in price of 0.6 per cent (from $4.26 to $4.29 per litre).

6.1 Additional producer surplus associated with increased quantity of exports

Time period	Spending by Wine Australia	Change in export volumes	Additional producer surplus
	$million	Millions of litres	$million
Undiscounted	46.6	23.6	101.0
Discounted	40.9	23.6	88.6

Source: CIE.

This shows that the increase in wine exports caused by marketing spend is the key driver of benefits from the market activities, and, therefore, this estimated impact is a key driver of the CBA results we present. If the increase in quantity is small, then the increase in price will be small, and the change in producer surplus will be small.

Net benefits and the benefit-cost ratio

Estimating net benefits and a benefit-cost ratio requires comparing the costs of the program to the benefits of the program.[13] The costs of the five-year program include both $40.9 million (in present value terms) of direct costs and $14.8 million in operational costs, while the benefit of the program is a present value of $88.6 million in additional producer surplus (table 6.2). This implies a net benefit of $32.9 million in present value terms (i.e. discounted) and a benefit-cost ratio of 1.59. Because benefits and costs accrue simultaneously, there is no impact from the discount rate on the benefit-cost ratio.

The BCR of 1.59 can be interpreted as saying that each $1 of marketing spend by Wine Australia is associated with economic benefits of $1.59 for Australian wine producers.

6.2 Results of the cost benefit analysis

CBA item	Undiscounted	Discounted
	$m	$m
Costs	63.5	55.7
Marketing spend	46.6	40.9
Operational costs	16.9	14.8
Benefits – additional producer surplus	101.0	88.6
Net benefits	**37.5**	**32.9**
BCR	**1.59**	**1.59**

Note: Assuming a discount rate of 7 per cent; BCR= Benefit cost ratio

Source: The CIE.

Sensitivity analysis

Most importantly, the estimated size of the effect of a dollar of marketing spending on the volume of exports is a highly important assumption. The central assumption underlying the results presented earlier in this chapter is an increase in 0.51 litres of exports for each dollar of marketing spend. This implies a BCR of 1.59. However, if this increase was less than 0.32 per dollar of marketing spend, then the BCR would fall below one.

Sensitivity analysis using alternative discount rates (low of 3 per cent and high of 10 per cent) indicates that the discount rate has no to little impact on the BCR (table 6.3). However, the size of net benefits ranges from $31.3 million (discount rate of 10 per cent) to $37.5 million (discount rate of 0 per cent, i.e. undiscounted).

13 Costs and benefits under the base case where there is no spending program are zero. Benefits estimated in previous chapters have been estimated as the incremental/additional benefit relative to the base case of no program.

6.3 Sensitivity analysis: alternative discount rates

CBA item	Undiscounted	Discounted		
		Central	Low	High
	$m	$m	$m	$m
Costs	63.5	55.7	59.9	53.0
Marketing spend	46.6	40.9	44.0	38.9
Operational costs	16.9	14.8	15.9	14.1
Benefits	101.0	88.6	95.3	84.3
Net benefits	**37.5**	**32.9**	**35.4**	**31.3**
BCR	**1.59**	**1.59**	**1.59**	**1.59**

Note Central= 7 per cent; Low=4 per cent; High= 10 per cent.

Source: The CIE.

Sensitivity analysis using alternative elasticity of supply of Australian wine indicates that the BCR is highly sensitive to the elasticity of supply (i.e. how costly it is for wine businesses to increase their production of wine). The BCR ranges from a low of 1.19 at an supply elasticity of 2 to a BCR of 2.39 at an arbitrary elasticity of 0.5 (table 6.4). Notably, across all alternative supply elasticities the BCR was greater than 1, indicating that the benefits always outweighed the costs.

6.4 Sensitivity analysis: alternative elasticity of supply of Australian wine

CBA item	Low	Moderate	High
	$m	$m	$m
Costs	55.7	55.7	55.7
Benefits	133.1	88.6	66.4
Net benefits	**77.4**	**32.9**	**10.7**
BCR	**2.39**	**1.59**	**1.19**

Note: Low= 0.5; Moderate= 1, High= 2.

Source: The CIE.

We have conducted sensitivity analysis using the lower and upper bounds of the confidence intervals for the estimated marketing-to-exports relationship. That is, while under the central case we assumed that $1 of spending is associated with 0.51 litres of additional wine exports, here we assume instead that $1 of spending is associated with 0.05 litres under the lower bound and 0.96 litres under the upper bound assumption.

These alternate assumptions imply a BCR of 0.17 under the lower bound and 3.02 under the upper bound (table 6.5). While this range isn't the same as the confidence interval around the BCR considering all factors (since other variables are also uncertain e.g. elasticity of supply), it does suggest the level of uncertainty that is associated with the effect of marketing on exports.

6.5 Sensitivity analysis: alternative effects of marketing on exports

CBA item	Central	Lower	Upper
	$m	$m	$m
Costs	55.7	55.7	55.7
Marketing spend	40.9	40.9	40.9
Operational costs	14.8	14.8	14.8
Benefits	88.6	9.6	168.1
Net benefits	32.9	-46.1	112.4
BCR	1.59	0.17	3.02

Note: Central corresponds to a coefficient estimate of 0.51, lower = 0.05 and upper = 0.96.

Source: The CIE.

7 Conclusion

The key approach taken in this report is to use statistical analysis to assess the increment in wine exports attributable to Wine Australia's activities and then to estimate the increase in producer surplus associated with this increase in exports. This increase in producer surplus (roughly the same as profits from exporting) is used as the measure of economic benefits which are compared against Wine Australia's costs.

The statistical analysis used to assess the increase in wine exports undertaken in this report provides plausible evidence of the impact of Wine Australia's marketing activities. However, statistical analysis can never be definitive, especially given the nature of Wine Australia's marketing (essentially providing a public good platform for producers by targeting key buyers and opinion leaders through tradeshows and visits) and given the environment within which it operates (changing markets with substantial individual marketing activities by particular brands and producers).

For ongoing evaluation, it may be worthwhile considering combining statistical analysis with more targeted survey-based approaches to individual participants to assess their (dollar) valuation of the opportunities that Wine Australia sponsored events create. For example, the current post event surveys (used to create net promoter scores and so on) could also be used to assess producer valuation of the opportunities created. In essence, this involves assessing 'willingness to pay' for Wine Australia's activities and would provide an economic valuation from a producer perspective. Of course, this willingness to pay would not necessarily capture all the relevant economic values (it would not necessarily include the full value chain for wine production) but it could be used to complement the statistical analysis of changes in export volumes.

A Marketing activity reach

Marketing activity reach (number of attendees), by event for China, the UK, United States, Canada, Europe and the Asia Pacific is presented in the tables below.

A.1 Reach of Wine Australia's marketing activities in China

Name	Date	Description	Reach
			Persons
China Roadshow	May-2017	Roadshow comprising 55 exhibitors, representing 30+ regions, held in Beijing, Fuzhou, Chongqing and Zhengzhou. Total of 19 events across the four cities including Masterclasses, tastings and networking dinner. Total of 642 guests in Fuzhou, 576 in Chongqing, 527 in Zhengzhou, 1082 in Beijing	2 827
China Awards & Australian Wine Fair	Oct-2017	Recurring annual exhibition/trade show campaign targeting importers, distributors, buyers, on and off premise, online sales and educators. Included a wine fair with masterclasses, gala dinner and media lunch	517
Beyond Busby	Feb-2018	Wine Australia funded tour of alumni of James Busby Travel wine tours (run by Tim Wildman)	11
China Food and Drinks Fair	Mar-2018	Comprising the IWSS Shangri-La Hotel Trade Show, exhibition, industry seminar, master classes and a trade media networking event	Varied by event
China Vintage Trip	Apr-2018	Visit (in its seventh year) takes the winners of the Trade Specialist Program and China Awards (education, sales and media) on a tour of Hunter, Yarra, McLaren Vale and Barossa	13
China Roadshow	Jun-2018	Program of 28 events in Shenyang, Jinan, Wuhan and Shanghai targeting buyers (on and off premise), importers, distributors, merchants, wholesalers, retailers, educators, sommeliers, restaurant and bar managers, VIPs, trade and consumer, media and social media influencers	4 088

Name	Date	Description	Reach
			Persons
Tmall 9:9 Wine & Spirits Festival	Sep-2018	Wine Australia partnered with Alibaba Group to drive sales of Australian wine during the annual online 9.9 Tmall Global Wine and Spirits Festival in China, through Alibaba's business-to-consumer marketplace Tmall.com. During the festival the Chufei Churan Twins (influencers with over 1 million social media followers) visited Australia and presented five live streams in Sydney to showcase wine, food and tourism to generate web traffic and sales for Wine Australia's Flagship Tmall Online Store and those of its partner Australian wine Tmall stores. Live streams attracted 224 733 views	0[a]
China Awards	Nov-2018	Annual award to recognise companies and individuals in the mainland Chinese wine sector that have contributed to demand, sales growth, education and marketing of Australian wine.	Varied by event
ProWine China	Nov-2018	3-day trade fair for wines and spirits	Varied by event
China Trade Key Opinion Leader Visit	Feb-2019	Visits to wine regions including Hunter Valley, Clare Valley, Mornington Peninsula and Yarra Valley	8
China Food and Drinks Fair & International Wine and Spirits Hotel Tradeshow	Mar-2019	Exhibitions to further Chinese trade and consumer's knowledge of the premium wine category and encourage demand for Australian wine. Targeting importers, distributors, buyers, media, trade and key opinion leaders.	Varied by event
China Vintage Visit	Apr-2019	Visits to wine regions including Barossa, McLaren Vale, Coonawarra and Yarra Valley	13
Australian Wine month	May-2019	Retail promotion, food and beverage education, Tmall priority sampling, Wine Australia Flagship store. Retail promotion: 1800 consumers engaged, 500 new consumer followers of the Wine Australia Official WeChat account, 300 qualified lucky draw entries, 26,850 bottles sold compared to 12,092 bottles last year. Flagship store: 22,045 consumers active on the store, 59,918 product views. TMall Priority promotion: 97% samples sold	Varied by event
China Roadshow	May-2019	A free-pour tasting series tour hosted in 5-star hotels in Tianjin, Hangzhou, Kunming and Shenzen over 6 days with 23 events. Events targeted influential buyers, importers, distributors, merchants, sommeliers, media and key opinion leaders	Varied by event
China Sommelier Visit	May-2019	Visit to Barossa, McLaren Vale, Adelaide Hills and Yarra Valley	9
Wine and Spirit Education Trust Scholarship visit	Aug-2019	Wine influencer visit to Barossa, Adelaide Hills, McLaren Vale and Macedon Ranges	4

[a] Live streams attracted 224 733 views

Source: Wine Australia

A.2 Reach of Wine Australia's marketing activities in the UK

Name	Date	Description	Reach
			Persons
Premium Australian Tasting	Sep-2015	Showcase of wines priced over £10	227
Australia Day Tasting's London and Edinburgh	Jan-2016	Exhibition/trade show attracting attendees from the UK and Europe (press/media, off-trade, on-trade, educators, distributers/wineries. London=1232 across all sectors of the trade; Edinburgh=120+ across all sectors of the trade	Varied by event
Artisans of Australian Wine	Sep-2016	Exhibition comprising 43 wineries, 23 attending winemakers, 15 importers	296
Australia Day Tasting	Jan-2017	Event targeting press/media, off-trade, on-trade, educators and distributors/wineries	900
Women in Wine	Sep-2017	Event for trade and consumers comprising awards ceremony for the Australian Women in Wine Awards, trade tasting, trade seminar and consumer tasting	344
Beyond Busby	Feb-2018	Wine Australia funded tour of alumni of James Busby Travel wine tours (run by Tim Wildman)	11
Off the Vine, London	Sep-2018	Invitations distributed to media, on-trade, off-trade, sommeliers, educators and importers/agents	288
Wine and Spirit Education Trust Scholarship visit	Oct-2018	Wine influencer visit to Adelaide Hills, Barossa, Tasmania and Yarra Valley	7
Europe Middle East and Africa Media Visit	Dec-2018	Visits to wine regions including Canberra, Barossa, McLaren Vale, Adelaide Hills and Margaret River	9
Australia Day Tastings	Jan-2019	Largest annual event in the UK for Australian wine (London, Edinburgh, Dublin). Comprises over 1000 wines and 245 wineries and attracts UK trade as well as visitors from across Europe. Across all three events attendees included 88 media, 288 on-trade, 182 off trade, 67 educators, 164 importers, 172 'other'. Masterclass attendance: 122 London, 26 Edinburgh, 17 Dublin	700
Wine and Spirit Education Trust Scholarship visit	Aug-2019	Wine influencer visit to Barossa, Adelaide Hills, McLaren Vale and Macedon Ranges	4

Source: Wine Australia

A.3 Reach of Wine Australia's marketing activities in the United States

Name	Date	Description	Reach
			Persons
Winter Trade Tasting, San Francisco	Feb-2018	Recurring annual trade fair for invited trade and media	164
Christina Pickard, Wine Enthusiast Magazine contributing editor visit	Feb-2018	Wine tour of Victoria, South Australia and Western Australia and delivery of two stories on Wine in the Wine Enthusiast magazine	1
Lawrence d'Almeida, Silversea Cruises	Feb-2018	Wine tour of Yarra, Eden Valley, Barossa and Adelaide Hills by Lawrence d'Almeida (a buyer, wine consultant, wine program manager and wine lecturer for Silversea Cruises)	1
Beyond Busby	Feb-2018	Wine Australia funded tour of alumni of James Busby Travel wine tours (run by Tim Wildman)	11
Vinexpo, New York	Mar-2018	Two-day wine trade fair, absence of 10 years, online news coverage	<3500
Australia decanted	Jul-2018	A three-day program targeting of key influencers to drive desire, credibility and awareness of premium Australian wine. Influencers included top independent retail buyers, a small number of chain buyers/category managers, top 10 national wine media, and influential figures in wine education (distributor and scholarly)	100
Aussie Wine Week	Sep-2018	Comprising the 'Made our way trade testing and seminar', 'Taste around retailer initiative', Late night trade testing at Terroir, 'Australian Wine- masterfully experimental consumer tasting at Corkbuzz Union Square', Distributor brunch/sneak peal at Aussie Wine Month, Wines featured in restaurants and retail stores, PR/social media campaign	Varied by event
Wine and Spirit Education Trust Scholarship visit	Oct-2018	Wine influencer visit to Adelaide Hills, Barossa, Tasmania and Yarra Valley	7
Winter Trade Tasting, San Francisco	Feb-2019	One day event, run for the past three years attracting 149 Bay Area trade and media attendees	149
US Sommeliers Visit	Apr-2019	United State's based sommeliers with buying power visited wineries in Clare Valley, Barossa and Eden Valleys, McLaren Vale, Adelaide Hills, Macedon Ranges and Yarra Valley	7
US Group Media Visit	May-2019	Freelance US writers visited wineries in the Adelaide Hills, McLaren Vale, Mornington Peninsula and Yarra Valley	5
US Retailer Visit	May-2019	Representatives from retailers Bottle King, Wine.com, Binny's and Wally's visited wineries in Barossa, McLaren Vale, Strathbogie Ranges and Yarra Valley	4

Source: Wine Australia

A.4 Reach of Wine Australia's marketing activities in Canada

Name	Date	Description	Reach
			Persons
Canada Sommeliers Visit	Nov-2018	Visit to regions of McLaren Vale, Adelaide Hills, Barossa, Mornington Peninsula, Yarra Valley	6
Canada British Columbia Liquor Distribution Branch	Feb-2019	Visit to wine regions including Hunter Valley, Margaret River, McLaren Vale, Adelaide Hills, Barossa Valley, Eden Valley, Yarra Valley	1
Wine and Spirit Education Trust Scholarship visit	Aug-2019	Wine influencer visit to Barossa, Adelaide Hills, McLaren Vale and Macedon Ranges	4

Source: Wine Australia

A.5 Reach of Wine Australia's marketing activities in Europe

Name	Date	Description	Reach
			Persons
Nordic Roadshow	Oct-2015	Opportunity for networking amongst wineries, monopolies, trade and consumers and subsequently increase Australian wine presence and demand	388
Nordic Roadshow	Oct-2016	Event in multiple cities comprising market update/Q&A with the monopoly, trade master class in the morning, trade tasting in the afternoon, consumer tasting in the evening (2 included guided wine walk)	547
Australia Day Tasting	Jan-2017	Wine trade and media attendees tasted more than 250 wines from across 21 Australian wine regions, Ireland	118
ProWein	Mar-2017	World's largest annual wine trade fair. Australia was represented by 76 wineries and brands from the regions of McLaren Vale, Riverland and Margaret River	Varied by event
Nordic Roadshow	Oct-2017	Series of tastings in its fourth year of running. One day event repeated in four Nordic countries. Comprises local market update/Q&A with monopoly buyers, trade master class, trade tasting and consumer tasting for paying guests and wine clubs in the evening.	980
Master classes and free pour tasting	Nov-2017	Two masterclasses, one in Hamburg, one in Koln	56
ProWein	Mar-2018	World's largest annual wine trade fair. Australia was represented by 75 wineries and brands. Events included meetings, on-stand feature tastings, master classes and free-pour on-stand tastings	Varied by event
Made our Way, Copenhagen	Sep-2018	Invitations distributed to media, on-trade, off-trade, sommeliers, educators and importers/agents	288

Name	Date	Description	Reach
			Persons
Master classes and free pour tasting	Oct-2018	Master class in two cities (Munich and Frankfurt). Guests included media/influencers, on-trade, off-trade, educators and importers	58
Nordic Roadshow	Oct-2018	Local market update, trade master class, trade tasting, monopoly workshop, consumer tasting. Attendees included distributers, media, monopoly and on-trade	495
Europe Middle East and Africa Media Visit	Dec-2018	Visits to wine regions including Canberra, Barossa, McLaren Vale, Adelaide Hills and Margaret River	9
Australia Trade Tastings	Jan-2019	Largest annual event in the UK for Australian wine (London, Edinburgh, Dublin). Comprises over 1000 wines and 245 wineries and attracts UK trade as well as visitors from across Europe. Across all three events attendees included 88 media, 288 on-trade, 182 off trade, 67 educators, 164 importers, 172 'other'. Masterclass attendance: 122 London, 26 Edinburgh, 17 Dublin	700
ProWein	Mar-2019	World's largest annual wine trade fair. Australia was represented by 83 wineries and 674 wines. Sneaky tasting= 80 guests (15 countries); Feature tastings saw >200 guests. Forum masterclass had 50 guests; free pour bar had 70 guests.	Varied by event
Belgium + The Netherlands master classes	Apr-2019	Educational masterclasses showcasing how Australian wine makers are experimenting with alternative varieties and new styles- targeting consultants, educators, press, on-trade, retail, importers, wine PR, diploma students. Both events were fully booked and fully attended; 31 at the Belgium masterclass, 41 at the free pour, 40 at the Netherlands masterclass, 51 at the free pour	Varied by event

Source: Wine Australia

A.6 Reach of Wine Australia's marketing activities in the Asia Pacific

Name	Date	Description	Reach
			Persons
Hong Kong Wine and Dine	Oct-2017	Flagship event of the Hong Kong Wine and Dine month, leverage relationship with retailer Watson's Wine and showcase Australian regions and their fine wines, included 41 wineries from 9 regions across 15 booths, 20 911 tastings in the outdoor area and 2 707 tastings in the grand pavilion	Varied by event

Name	Date	Description	Reach
			Persons
Hong Kong Watson's Wine Trip	Apr-2018	Wine tour for 8 employees of Watsons Wine, the largest specialist wine retailer in Hong Kong. Tour included visits to the Margaret River, Barossa, McLaren Vale, Yarra Valley and Macedon Ranges	8
Vinexpo Hong Kong	May-2018	Multi day event including master classes, conference, media event, exhibition, brunch	Varied by event
Australian Wine Grand Tasting	Sep-2018	Event co-hosted by AusTrade comprising a market briefing, a retail tour, seminar, tasting showcase. Master class had 80 attendees and showcase has 385 attendees, South Korea	Varied by event
Hong Kong Wine and Dine	Oct-2018	Consumer facing four-day event which incorporated a bespoke Australian precinct, offering stakeholders the opportunity to send a winery/brand representatives or send wine to be managed by Wine Australia	Varied by event
Asian Emerging Markets Roadshow	Oct-2018	Daylong event comprising market briefing, retail tour, seminar and tasting showcase. Attendance- Manilla, 65 at the seminar, 100 at the tasting showcase; Bangkok, 62 at the seminar, 140 at the tasting showcase; Colombo, 45 at the seminar, 62 at the tasting showcase; Ho Chi Minh City, 65 at the seminar, 110 at the tasting showcase; Hanoi, 43 at the seminar, 75 at the tasting showcase.	Varied by event
Asia Pacific Media Visit	Nov-2018	Visit to the wine regions of Mornington Peninsula, Geelong, Orange and Mudgee. Objective of building Wine Australia's education and influencer network to promote Australian wine via social and traditional media to build on previous years' effort to engage with media key opinon leaders. Sort to promote Australian wine's strategic narrative - quality, diversity, innovation and terroir. Countries represented included Singapore, Hong Kong, The Philippines, South Korea and Vietnam	5
Emerging Markets Visit	May-2019	Visit to 7 wineries in Adelaide Hills, McLaren Vale and the Barossa. Attendees were key educators from Singapore, Japan, Vietnam, South Korea, India, Sri Lanka and the Philippines.	8
China Sommelier Visit	May-2019	Visit to Barossa, McLaren Vale, Adelaide Hills and Yarra Valley. Countries represented included China, Hong Kong, Taiwan and the Maldives	9
Sommelier Immersion Program Visit	Jun-2019	Opportunity for sommeliers from Australia and New Zealand to visit regions, meet the wine makers and increase their knowledge of Australian fine wine	10

Source: Wine Australia

B Event feedback

The NPS by country, by event (when available) is described in detail below.

China

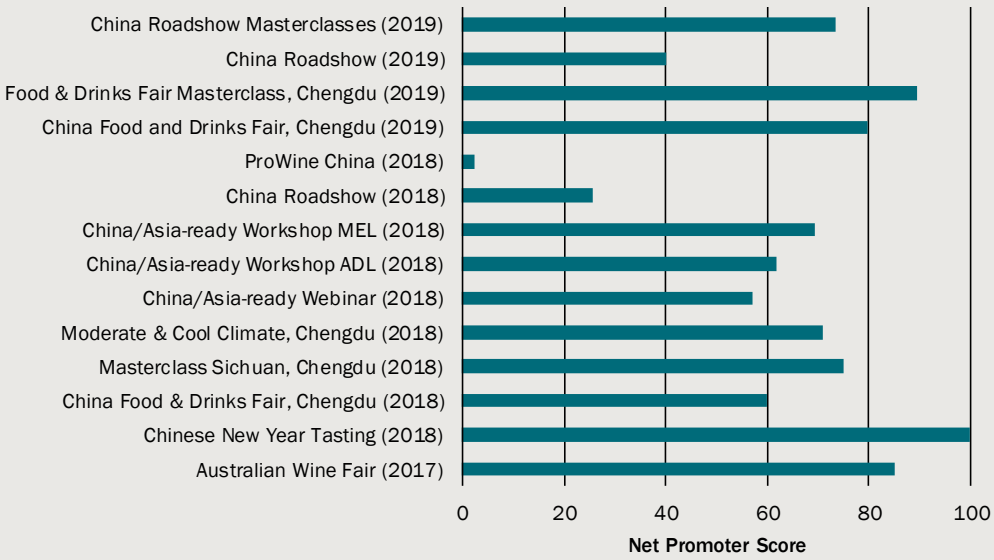
In China the NPS ranged from 2 for ProWine China 2018 to 100 for the 2018 Chinese New Year Tasting. The average NPS was 64 and the average number of survey participants was 151, with a range of 5 at the 2018 Chinese New Year Tasting to 613 at the 2019 China Roadshow Masterclasses (table B.1 and chart B.2).

B.1 Event feedback: China

Metric	Survey respondents	NPS
	No.	No.
Minimum	5	2
Maximum	613	100
Average	151	64

Source: CIE analysis of Wine Australia data.

B.2 Net Promoter Score of attendees: China events



Note: events with an NPS score that did not report the number of survey respondents were excluded from the analysis
Data source: CIE analysis of Wine Australia data.

UK and Europe

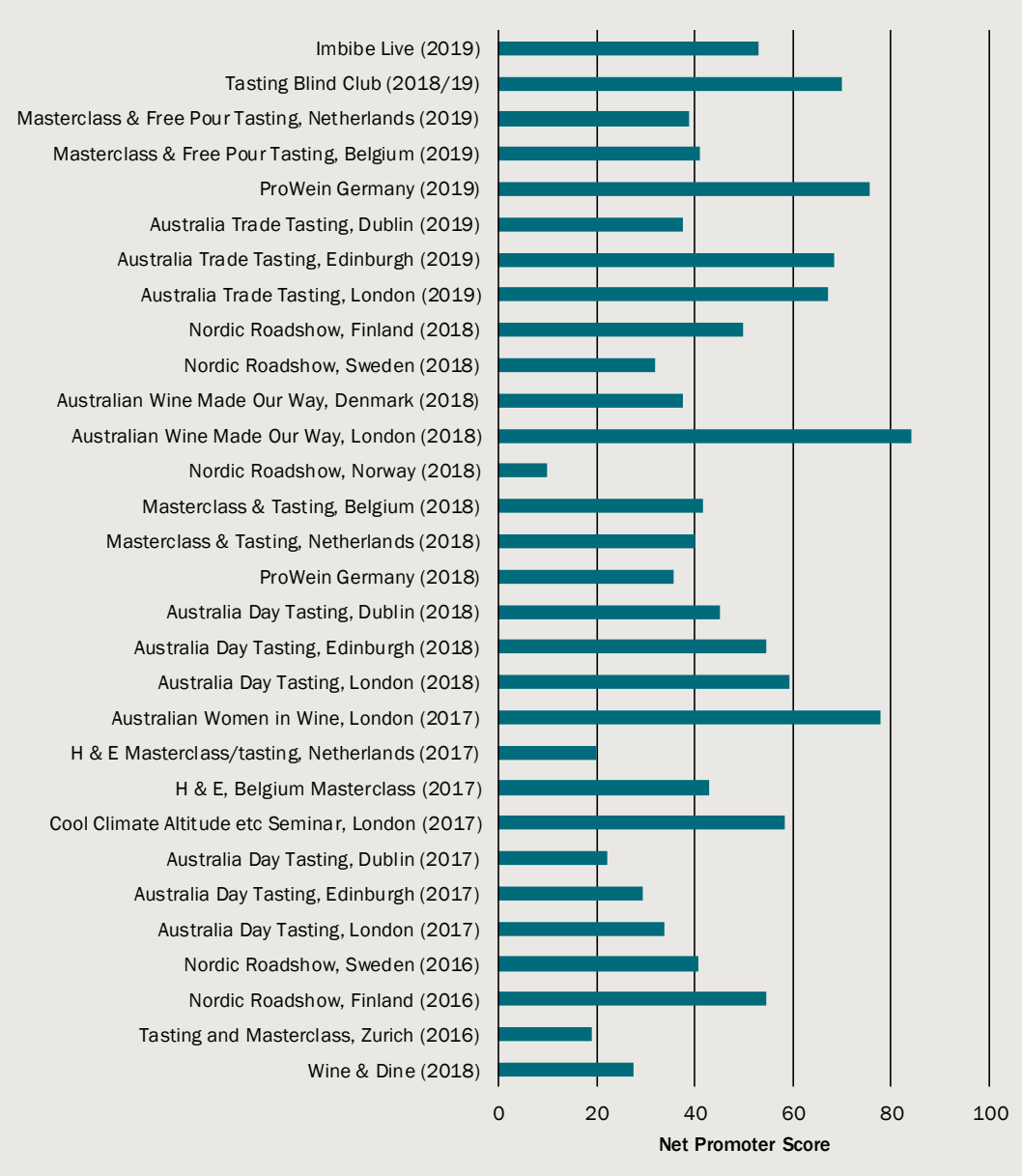
In the UK and Europe, the NPS ranged from 10 for the Nordic Roadshow, Norway (2018) to 84 for Australia Wine Made Our Way, London (2018). The average NPS was 46 and the average number of survey participants was 31, with a range of 10 at the 2018 Nordic Roadshow, Norway to 135 at the 2018 Australia Day Tasting in London (table B.3 and chart B.4).

B.3 Event feedback: UK and Europe

Metric	Survey respondents	NPS
	No.	No.
Minimum	10	10
Maximum	135	84
Average	31	46

Source: CIE analysis of Wine Australia data.

B.4 Net Promoter Score of attendees: UK and Europe events



Note: H & E= History and evolution; ATT= Australian Trade Tasting; events with an NPS score that did not report the number of survey respondents were excluded from the analysis

Data source: CIE analysis of Wine Australia data.

United States

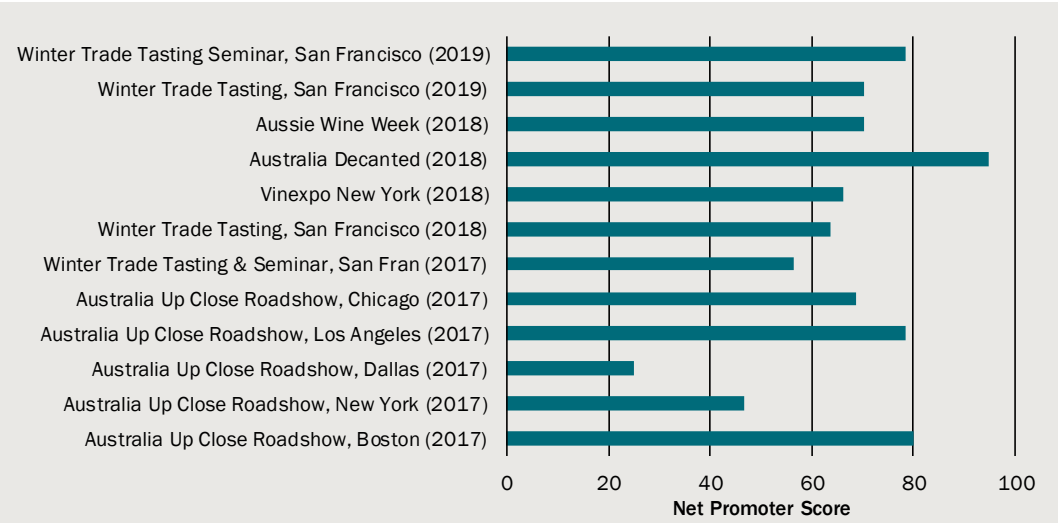
In the United States the NPS ranged from 25 for the Australia Up Close Roadshow, Dallas (2017) to 95 for Australia Decanted (2018). The average NPS was 67 and the average number of survey participants was 29, with a range of 5 at the Australia Up Close Roadshow, Boston to 77 at the 2018 Vinexpo in New York (table B.5 and chart B.6).

B.5 Event feedback: United States

Metric	Survey respondents	NPS
	No.	No.
Minimum	5	25
Maximum	77	95
Average	29	67

Source: CIE analysis of Wine Australia data.

B.6 Net Promoter Score of attendees: United States events



Note: events with an NPS score that did not report the number of survey respondents were excluded from the analysis
Data source: CIE analysis of Wine Australia data.

Canada

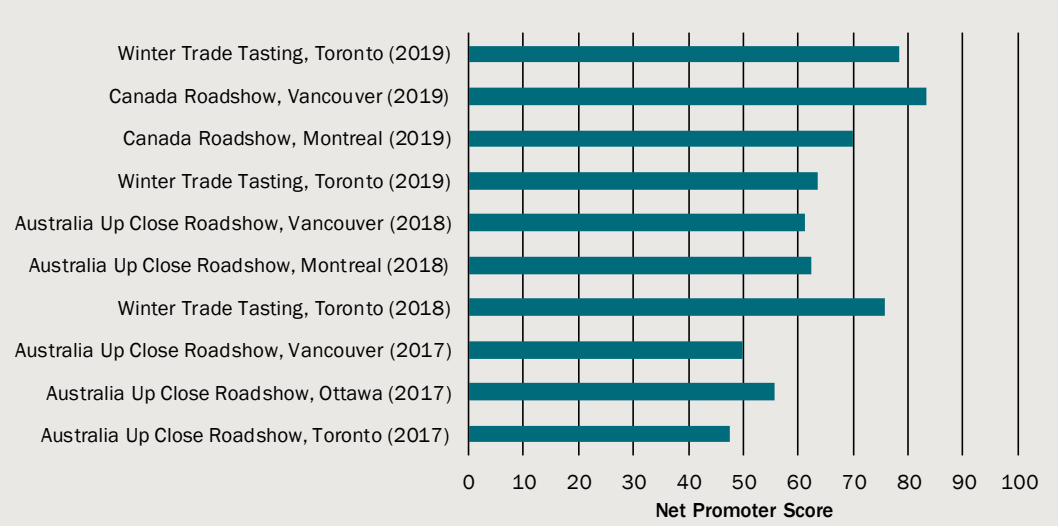
In Canada the NPS ranged from 48 for the Australia Up Close Roadshow, Toronto (2017) to 83 for the 2019 Canada Roadshow in Vancouver. The average NPS was 65 and the average number of survey participants was 21, with a range of 8 at the 2018 Australia Up Close Roadshow, Montreal to 33 at the 2019 Winter Trade Tasting Toronto (table B.7 and chart B.8).

B.7 Event feedback: Canada

Metric	Survey respondents	NPS
	No.	No.
Minimum	8	48
Maximum	33	83
Average	21	65

Source: CIE analysis of Wine Australia data.

B.8 Net Promoter Score of attendees: Canadian events



Note: events with an NPS score that did not report the number of survey respondents were excluded from the analysis

Data source: CIE analysis of Wine Australia data.

Hong Kong

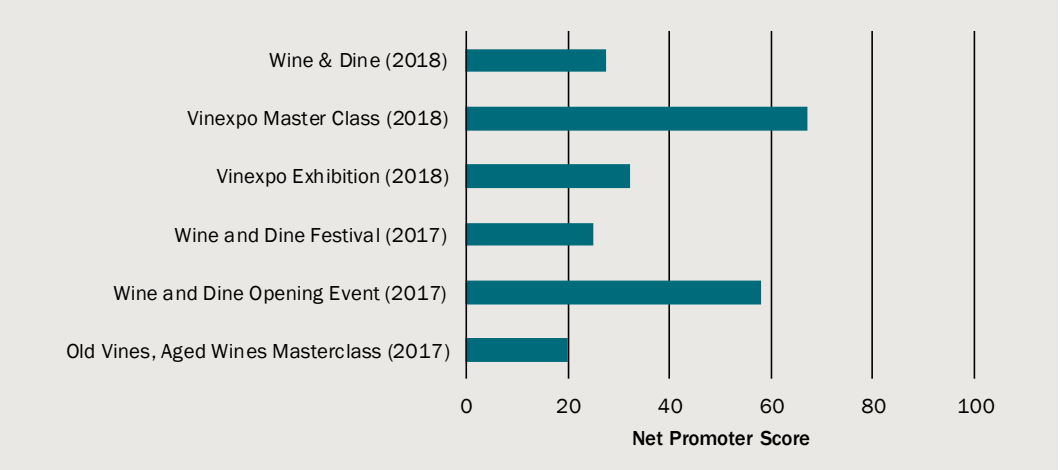
In Hong Kong the NPS ranged from 20 for the 2017 Old Vines, Aged Wines Masterclass to 67 for the 2018 Vinexpo Masterclass. The average NPS was 38 and the average number of survey participants was 271, with a range of 15 at the 2017 Old Vines, Aged Wines Masterclass to 887 at the 2017 Wine and Dine Festival (table B.9 and chart B.10).

B.9 Event feedback: Hong Kong

Metric	Survey respondents	NPS
	No.	No.
Minimum	15	20
Maximum	887	67
Average	271	38

Source: CIE analysis of Wine Australia data.

B.10 Net Promoter Score of attendees: Hong Kong events



Note: events with an NPS score that did not report the number of survey respondents were excluded from the analysis

Data source: CIE analysis of Wine Australia data.

Asia Pacific

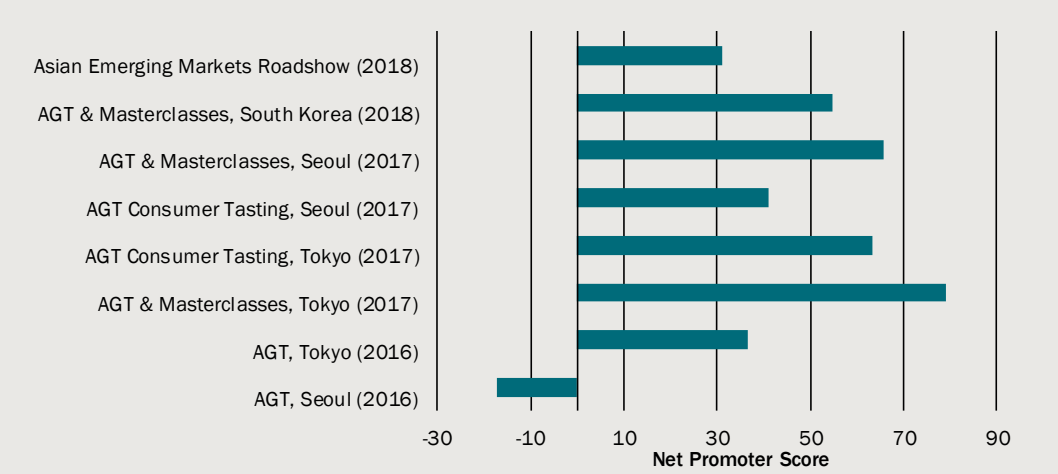
In the Asia Pacific the NPS ranged from -17 for the Australia Grand Tasting in Seoul (2016) to 79 for the Australia Grand Tasting and masterclasses in Tokyo (2017). The average NPS was 44 and the average number of survey participants was 47, with a range of 29 at the 2018 Asian Emerging Roadshow to 63 at the 2016 Australian Grand Tasting in Tokyo (table B.11 and chart B.12).

B.11 Event feedback: Asia Pacific

Metric	Survey respondents	NPS
	No.	No.
Minimum	29	-17
Maximum	63	79
Average	47	44

Source: CIE analysis of Wine Australia data.

B.12 Net Promoter Score of attendees: Asia Pacific events



Note: AGT= Australian Grand Tasting; events with an NPS score that did not report the number of survey respondents were excluded from the analysis

Data source: CIE analysis of Wine Australia data.

C Timeline of marketing events

A timeline of Wine Australia's marketing events in China is presented in chart C.1.

C.1 Wine Australia marketing activities: China

Mar-2015	China Food and Drinks Fair (Chengdu)
May-2015	
	China National Sommelier Comp
Jul-2015	
Sep-2015	
	China Awards
Nov-2015	Prowine China
	Regional Tasting
Jan-2016	City Shop Retail Promo - Beijing & Shanghai
Mar-2016	China Food and Drinks Fair (Chengdu)
May-2016	China Roadshow
	China Young Somm Team Comp, China Top 100, China Wine List of the Year, Decanter
Jul-2016	
Sep-2016	Thirsty Thursday Blind Tastings
	China Awards
Nov-2016	Prowine China
Jan-2017	
	Aged Australia Tasting
Mar-2017	China Food and Drinks Fair (Chengdu), Winestar China
	China Vintage Visit
May-2017	China Roadshow, VR expansion into China Education
	China Young Somm Team Comp, China Top 100, China Wine List of the Year
Jul-2017	
	China A+ Wine, China Wine List of the Year
Sep-2017	China Young Somm Team Comp, China Top 100, China National Sommelier Comp
	China Awards, Hong Kong Wine and Dine Festival, Grand Tasting, China Specialist Program
Nov-2017	AWIC Collaborator Project, AWIC Collaborator Project, Prowine China
	Regional Tasting
Jan-2018	
	Beyond Busby
Mar-2018	China Food and Drinks Fair (Chengdu)
	Watsons Retail Activation , China Vintage Visit
May-2018	Vinexpo HK, China Roadshow
	China Top 100, China National Sommelier Comp, China Wine List of the Year, IMW Symposium
Jul-2018	Exporter Forum
Sep-2018	Alibaba Ali Expo, Shanghai Wine & Dine, China Int'l Import Expo, Tmall 9:9 Wine & Spirits Festival
	China Awards, Hong Kong Wine & Dine Festival
Nov-2018	AWIC Collaborator Project, Prowine China, China Awards
	Misc Visits
Jan-2019	
	China Trade KOL Visit
Mar-2019	
	China Vintage Visit, China Vintage Visit
May-2019	China Somm Trip, China Roadshow, Australian Wine month
	China Young Somm Team & National Somm Comp, Aussie Wine Week/Wine Month
Jul-2019	
	Wine & Spirit Trust Scholarship Visit
Sep-2019	

Data source: Wine Australia.

A timeline of Wine Australia's marketing events in the UK is presented in chart C.2.

C.2 Wine Australia marketing activities: UK

Mar-2015	Regional Masterclasses
May-2015	
Jul-2015	
Sep-2015	Oxford Wine Festival
Nov-2015	Premium Australia Tasting
Jan-2016	Australia Day Tasting London & Edinburgh
Mar-2016	Market Access UK, Retail / on premises staff Training, WSET Sponsorship Masterclass - London
May-2016	Langton's Classification Roadshow London & Endinburgh, Alternative Varieties Majestic Store Promo, M Jukes top 100 Tasting Blind Club, Foodies festival, Tasting Blind Club
Jul-2016	
Sep-2016	Majestic visit, IVP/Media UK visit, Artisans tasting, Artisans of Australian Wine
Nov-2016	Old Vines Seminar Wine Writers Christmas Party
Jan-2017	Australia Day Tasting London & Edinburgh
Mar-2017	
May-2017	WSET Sponsorship, Media Campaign Retail / on premises staff Training Alternative Varieties, One Day Wine School - Regional, M Jukes top 100, Tasting Blind Club
Jul-2017	
Sep-2017	Alternative Varieties, Women in Wine Awards IVP/Media UK visit
Nov-2017	AWD Training Session Masterclass - London
Jan-2018	Australia Day Tasting London & Edinburgh Beyond Busby
Mar-2018	One Day Wine School - Regional, Retail / on premises staff Training Big Fortified Tasting, Masterclass - London
May-2018	Media Campaign One Day Wine School - London, M Jukes top 100, Tasting Blind Club
Jul-2018	
Sep-2018	Off the Vine, London Australian Wine Made Our Way, Wine & Spirit Education Trust Scholarship visit
Nov-2018	IVP/Media UK visit Sponsorship, Media Visit
Jan-2019	Australia Day Tasting London & Edinburgh
Mar-2019	Big Fortified Tasting
May-2019	AWD Training Session
Jul-2019	
Sep-2019	Wine & Spirit Education Trust Scholarship visit

Data source: Wine Australia.

A timeline of Wine Australia's marketing events in the United States is presented in chart C.3.

C.3 Wine Australia marketing activities: United States

Jan-2015	Off Premises Seminar Series
Mar-2015	
May-2015	
Jul-2015	
Sep-2015	US Media Visit
Nov-2015	
Jan-2016	Off Premises Seminar Series Winter Trade Tasting, San Francisco
Mar-2016	
May-2016	US Roadshow US Buyers/Educators Visit, Retailer/Distributor Training Sessions
Jul-2016	
Sep-2016	US Retailer Trade Visit
Nov-2016	SommCon Sandiego
Jan-2017	US Retailer Trade Visit US Buyers/Educators Visit, Winter Trade Tasting, San Francisco
Mar-2017	Artisan of Australian Wine
May-2017	US Roadshow
Jul-2017	Great Australian Red Tasting, US Roadshow
Sep-2017	BevCon, Aussie Wine Month NYC
Nov-2017	Margaret River 50th Anniversary investment MD Travel
Jan-2018	Winter Trade Tasting, San Francisco Vinexpo, NYC, SommCon, San Diego, Wine Enthusiast visit, Silversea buyer visit, Beyond Busby
Mar-2018	US Retailer Trade Visit
May-2018	US Distributor Visit IMW Symposium, Retailer/Distributor Training Sessions, Off Premises Seminar Series
Jul-2018	Australia Decanted
Sep-2018	BevCon, Aussie Wine Month NYC, Australian Wine Week Digital Campaign Wine & Spirit Education Trust Scholarship Visit
Nov-2018	US Buyers/Educators Visit WSET Visit
Jan-2019	Winter Trade Tasting, San Francisco
Mar-2019	US Sommelier Visit
May-2019	US Media Visit US Retailer Trade Visit
Jul-2019	
Sep-2019	

Data source: Wine Australia.

A timeline of Wine Australia's marketing events in Canada is presented in chart C.4.

C.4 Wine Australia marketing activities: Canada

Sep-2015	LCBO In-store Events Tasting
Nov-2015	
	The Vintage Conservatory Tasting, iYellow Holiday Bash Aussie Lounge
Jan-2016	
	Winter Trade Tasting Toronto
Mar-2016	Vancouver Playhouse International Wine Festival
May-2016	Canada Roadshow
Jul-2016	
Sep-2016	LCBO In-store Events Tasting, SwrilTo - Canada
	Everything Wine Retail Promo, On Off-Prem sem
Nov-2016	
	iYellow Holiday Bash Aussie Lounge
Jan-2017	
	Winter Trade Tasting Toronto
Mar-2017	Vancouver Playhouse International Wine Festival, Canada Roadshow
	SIVSQ
May-2017	Canada Roadshow
	British Columbia Liquor Distribution Branch, On Off-Prem Seminar Series
Jul-2017	
Sep-2017	British Columbia Liquor Distribution Branch
	LCBO buyer visits
Nov-2017	
	iYellow Holiday Bash Aussie Lounge
Jan-2018	
	Beyond Busby
Mar-2018	Vancouver Playhouse International Wine Festival, Winter Trade Tasting Toronto, SAQ BCLDB Visit
May-2018	
	British Columbia Liquor Distribution Branch In-store Tasting, BCLDB Liquor Board
Jul-2018	
Sep-2018	LCBO In-store Events Tasting
	Somm 360 Montreal, SAQ
Nov-2018	Trade Visit Canada, Canada Sommeliers Visit
Jan-2019	SAQ BCLDB Visit
	Winter Trade Tasting Toronto
Mar-2019	LCBO
May-2019	Canada Roadshow
	Top Drop Calgary, British Columbia Liquor Distribution Branch
Jul-2019	
	Wine & Spirit Education Trust Scholarship visit
Sep-2019	

Data source: Wine Australia.

A timeline of Wine Australia's marketing events in Europe is presented in chart C.5.

C.5 Wine Australia marketing activities: Europe

Oct-15	Nordic Roadshow Sweden, Norway, Finland and Denmark Belgium Masterclasses, Stuttgart Masterclasses
Dec-15	
	Annual Trade Tasting Dublin
Feb-16	
	Prowein
Apr-16	
	Polish Trade Press Tasting
Jun-16	One Day Wine School - Regional
Aug-16	
Oct-16	Nordic Roadshow Sweden, Norway, Finland and Denmark, Switzerland PD Germany tasting, Switzerland tasting
Dec-16	
	Annual Trade Tasting Dublin
Feb-17	
	Prowein
Apr-17	
Jun-17	One Day Wine School - Regional
Aug-17	
Oct-17	Nordic Roadshow Sweden, Norway, Finland and Denmark Switzerland tasting, Master classes and free pour tasting, Germany
Dec-17	Germany tasting, Misc Europe Visits Annual Trade Tasting Dublin
Feb-18	
	Prowein
Apr-18	
Jun-18	
Aug-18	
	Australian Wine Made Our Way, Off the Vine, Copenhagen
Oct-18	Nordic Roadshow Norway and Finland, Master classes and free pour tasting, Germany
Dec-18	Misc Australian Visits, Germany tasting, Europe Middle East and Africa Media Visit Annual Trade Tasting Dublin, Australia Trade Tastings, Ireland
Feb-19	
	Prowein
Apr-19	Belgium + The Netherlands master classes
Jun-19	
Aug-19	
Oct-19	Nordic Roadshow Sweden Switzerland tasting, Belgium Tasting
Dec-19	

Data source: Wine Australia.

A timeline of Wine Australia's marketing events in the Asia Pacific is presented in chart C.6.

C.6 Wine Australia marketing activities: Asia Pacific

Jul-15	AGT Tokyo, AGT Seoul
Sep-15	HKIWSF 2015
Nov-15	
Jan-16	Emerging Market AWD Vinexpo HK
Mar-16	Trade Spec Japan, Young Somm Tasting Tokyo, Vinexpo Masterclasses HK, Kenichi Ohash, Taiwan History/Evolution/Revolution Tasting Tokyo, Singapore Masterclass, Foundation Program
May-16	Sakura Wine Awards, Comparative Pinot Master Class NZ One Day Wine School
Jul-16	DS Travel, Aussie Wine Mth
Sep-16	Watsons Group Visit, Miscellaneous education, Miscellaneous education
Nov-16	AGT Tokyo, AGT Seoul, Foundation Program, Misc Australian
Jan-17	Trade Spec Program Japan, Vinexpo Academy Masterclasses HK, Hong Kong Wine & Dine Emerging Market AWD, AYSA Tasting Groups
Mar-17	
May-17	Young Somm Tasting Tokyo , AGT Masterclass , Miscellaneous Visits, Hong Kong Wine and Dine
Jul-17	Kenichi Ohash, APAC Media/Trade Visit, VR expansion into China Education, APAC Media/Trade Visit
Sep-17	Room to Read HK, AGT Tokyo, AGT Seoul, AYSA Tasting Groups
Nov-17	Watsons Group Visit
Jan-18	
Mar-18	Foundation Program
May-18	Hong Kong Watson's Wine Trip Vinexpo HK
Jul-18	Young Somm Tasting Tokyo
Sep-18	AGT Seoul, Emerging Markets, AGT Masterclass Tokyo Seoul
Nov-18	Hong Kong Wine and Dine, Asian Emerging Markets Roadshow APAC Media/Trade Visit, Asia Pacific Media Visit
Jan-19	APAC Sponsorship
Mar-19	
May-19	
Jul-19	Emerging Market Educators Visit, Sommelier Immersion Program Visit

Note: AGT= Australian Grand Tasting

Data source: Wine Australia.

D Further detail about statistical modelling

Techniques for measuring demand for exported goods

Our statistical approach draws from methodologies presented in two published studies (box D.1 and box D.2) with our primary dataset including elements from both these studies including:

- Marketing expenditure
- Income of the importing country, and
- Prices of substitutes.

D.1 Case Study: Empirical approach to measuring demand for imported goods

Modelling the time-series behaviour of imports and exports involves identifying the type of good being traded — is the good a perfectly homogenous primary commodity or a highly differentiated manufactured good? Is the good for final consumption or a factor input? The imperfect substitute model is appropriate for modelling differentiated goods while the perfect substitute model is appropriate for modelling goods that are close or perfect substitutes (for instance, good traded on organised international commodity markets).

The imperfect substitute model assumes that neither imports nor exports are perfect substitutes for domestic goods. This is based on the premise that if domestic and foreign goods were perfect substitutes, one would take over the whole market and each country would be either an importer or an exporter, but not both. Neither of these criterium are observed in the wine market, hence the assumption that neither imports nor exports are perfect substitutes for domestic goods holds true.

Under this model the quantity of imports demanded by a country is a function of:

- nominal income of the importing country
- price of all domestically produced goods, and
- domestic currency prices paid by importers (which is a function of the domestic currency prices received by exporters, the proportional tariff and the exchange rate).

Source: Goldstein, M., & Khan, M. S. 1985, 'Chapter 20 Income and price effects in foreign trade', Handbook of International Economics, vol. 2, pp 1041–1105. Doi:10.1016/s1573-4404(85)02011-1

D.2 Case study: Impact of California Raisin Export promotion on export demand

Kaiser, H. (2010) conducted an econometric analysis to assess the impact of California Raisin Export promotion programs on import demand for raisins in foreign markets. With respect to five export promotion programs, the analysis set out to estimate the responsiveness of the demand for California raisins in importing countries and overall with respect to California export promotion, what exports of California raisins would have been in the importing countries and in total had there not been any California export promotion. how the gain in export revenue due to California export promotion compared to the costs of the promotion in the 12 importing countries and in total and the marginal return of the export promotion programs in each importing country.

The econometric model used annual time series data for the time period 1996-97 to 2008-09 and considered how strongly various demand drivers were correlated with import demand in a given importing country. The demand drivers considered included:

- The price of California raisins in each importing country
- The price of competing exporting countries raisins in each importing country
- Gross domestic product in each importing country
- Exchange rates, and
- California raisin export promotion expenditures in each importing country.

The demand for raisins was specified in a double-logarithmic form — that is, each of the estimated coefficients can be interpreted as an elasticity that measures the percentage change in demand for California raisins given a 1 per cent change in the demand driver of interest (holding all other variables constant).

To account for the effects of inflation, prices and GDP in each importing country were deflated by the consumer price index. To ensure that the United States dollar was adjusted when exchange rates change over time, the raisin export promotion expenditure was multiplied by the exchange rate index for the United States dollar relative to the importing country's currency and then deflated by the consumer price index (i.e. to account for how a devalued dollar will have the effect of lowering the impact of export promotion expenditures, and hence this should be reflected in the export promotion expenditures).

To account for how export promotion has a carry-over effect on demand, past promotion expenditures were included in the model as an explanatory variable using a distributed lag structure. This involved using a second-degree polynomial lag structure to capture the effect of three years of lagged promotion expenditures. In addition, the Durbin-h statistic was used to identify if the estimated equation had serial correlation problems. This test is considered appropriate in the presence of a lagged dependent variable.

Source: Kaiser, H. (2010), 'An Econometric Analysis of California Raisin Export Promotion', California Raisins, Raisins Administrative Committee, submitted to the Agricultural Marketing Service, USDA to fulfil an evaluation requirement for the Federal Agricultural Improvement Reform Act 1996.



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