ATIA

Australian Travel Industry Association

AIRLINE INTELLIGENCE & RESEARCH

Reliability and Cancellation Trends in Australian Aviation

Dr Tony Webber

February 2025

Table of Contents

List of Figures & Tables

List of Figures

List of Tables

0. Executive Summary

0.1 What are Airport Slots?

[1] An airport slot is a time to take-off or land on a particular day at a particular time at an airport. Take-off and landing times at airports are an important part of an airline's schedule of operations. An airline has cancelled services when it has flown fewer flights than it has scheduled.

0.2 What is the 80/20 rule?

[2] Airlines that have scheduled take-off and landing times at airports in 2025 have the right to retain these scheduled take-off and landing times in 2026 if they have used 80% of those take-off and landing times in 2025. If an airline with rights to a take-off or landing slot in 2025 cancels more than 20% of the services attached to that take-off or landing slot in 2025, then the airline will lose the right to have access to that take-off or landing slot in 2026.

0.3 Airlines and Capacity Flexibility

[3] Airlines can vary their capacity over three planning horizons – the short run (0 to 12 months), the medium run (12 to 36 months) and the long run (in excess of 36 months). The airline can only make significant alterations to capacity over the medium to long runs. In the medium run this involve changes to the airline's schedule, which includes the number of flights and the aircraft that is used on those flights. In the long run this involves adding new aircraft, or newly configured aircraft, to the fleet.

[4] Airlines do not have access to an operating lever that allows them to make significant changes to capacity over a short horizon. The only operational lever that the airline has access to, to modify capacity in the short run is the cancellation of services. Increasingly, airlines are using this short run cancellation lever to modify capacity when their demand for flying has fallen short of expectations, or the cost of flying is significantly higher than expected.

0.4 Recent Observations in Domestic Cancellation rates

0.4.1 By Airlines

[5] The results indicate that the 2024 cancellation rates are:

- lower than the 2023 cancellation rates for every domestic airline at the total network level except for Regional Express Airlines;
- lower than the most recent pre-Covid cancellation rates (2019) for Jetstar and Regional Express Airlines but higher for Qantas and Virgin Australia; and
- higher than the pre-Covid average cancellation rates for every airline, providing evidence that the Australian domestic cancellation rate remains elevated across all airlines.

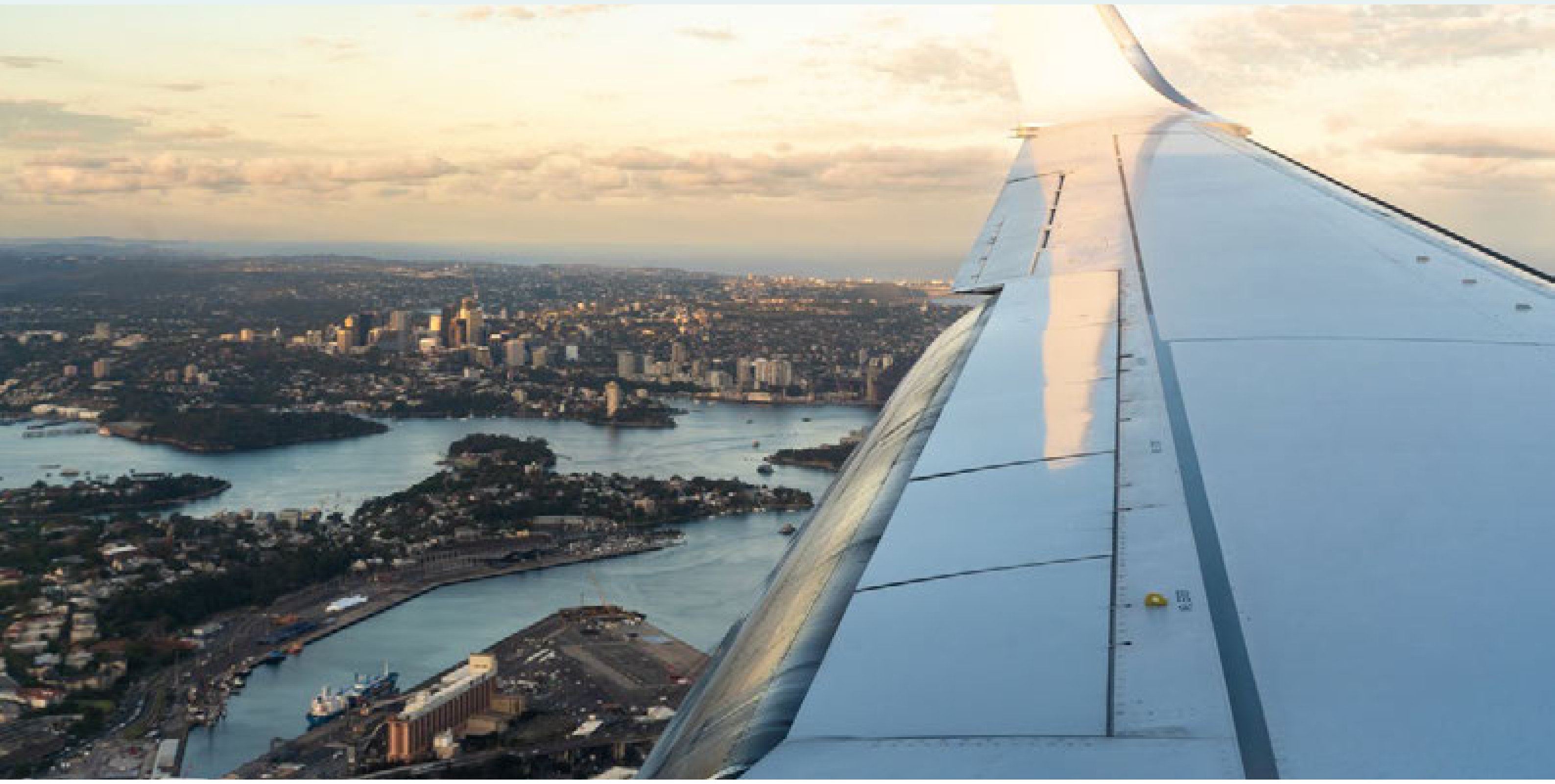
Airline	Average Cancellation Rate 2003 to 2019	2019 Cancellation Rate	2023 Cancellation Rate	2024 Cancellation Rate
Jetstar	1.4%	2.6%	5.4%	2.0%
Qantas	1.5%	2.9%	3.4%	3.1%
QantasLink	1.8%	1.8%	3.7%	3.4%
Regional Express	0.7%	2.3%	1.9%	2.0%
Virgin Australia	1.5%	1.7%	4.3%	2.0%

0.4.2 By Major Airports

[6] The summary results in the case of the 2024 domestic cancellation rates for the major airports is as follows:

- the cancellation rate is lower than 2023 levels across all top-ten airports except for Darwin;
- the cancellation rate is higher than the most recent pre-Covid year of 2019 for every top-ten airport; and
- the cancellation rate is higher than the average annual rate between 2003 and 2019 for every top-ten airport.

Airport	Average Cancellation Rate 2003 to 2019	2019 Cancellation Rate	2023 Cancellation Rate	2024 Cancellation Rate
Sydney	2.1%	3.4%	5.6%	3.3%
Melbourne	1.9%	3.3%	5.1%	3.2%
Brisbane	1.4%	1.8%	3.6%	2.1%
Perth	1.1%	1.3%	2.8%	2.7%
Adelaide	0.9%	1.3%	3.2%	2.1%
Gold Coast	1.3%	1.9%	3.8%	1.6%
Darwin	0.5%	0.9%	1.5%	2.0%
Hobart	0.7%	1.0%	2.3%	1.4%
Canberra	2.1%	2.2%	4.8%	3.1%
Cairns	0.7%	1.2%	3.3%	1.5%



0.4.3 By High Frequency City Pairs by Airline

[7] The summary results for the 2024 cancellation rates of Australia's top-ten domestic city pairs is as follows:

Route	QF 2024	JQ 2024	Rex 2024	VA 2024	Comment
SYD-MEL	7.2%	4.1%	3.9%	5.5%	The cancellation rate continues to exceed pre-Covid average levels for all airlines on SYD-MEL.
SYD-BNE	2.5%	3.8%	3.7%	3.4%	All carriers have 2024 cancelation rates that are higher than pre-Covid average levels.
BNE-MEL	3.6%	2.6%	2.9%	2.0%	For most carriers, cancellation rates in 2024 remain high compared to pre-Covid average levels.
SYD-OOL	0.3%	2.4%	3.3%	1.5%	All carriers have elevated cancellation rates relative to pre-Covid historical except for Qantas on this route.
MEL-ADL	1.6%	1.2%	2.7%	1.1%	Most airlines have cancellation rates that are close to pre-Covid average levels in 2024.
OOL-MEL	0.4%	2.3%	3.2%	1.1%	Regional Express and Jetstar have cancellation rates that are elevated relative to pre-Covid average levels on this route.
MEL-PER	2.0%	2.8%		1.2%	Cancellation rates on the route remain elevated compared to historical averages and in some cases they are elevated compared to 2019 levels (Qantas and Virgin Australia).
ADL-SYD	2.8%	5.0%		2.3%	The cancellation rate across all airlines continues to remain well above pre-Covid levels on ADL-SYD.
PER-SYD	1.8%	2.3%		1.1%	Cancellation rates are high across all airlines compared to historical average values and compared to pre-Covid 2019 levels.
MEL-HBA	4.1%	0.7%		0.3%	Qantas' cancellation rate on MEL-HBA services in 2024 is well above pre-Covid and historical cancellation rates but Jetstar's and Virgin Australia's are in line with historical cancelation rates.

0.5 Why do Airlines Cancel Services?

[8] Airlines cancel services because of weather events, sick flight crew and air traffic control staff, aircraft mechanical issues, and to make higher profits.

[9] The dominant reason for cancellation that is outside of the airline's control is the weather. Weather events that cause cancellation of airline services include strong crosswinds, low cloud, fog, thunderstorms and lightening, and heavy rain and flooding. The most important weather source of cancellation of services at Australian airports is the existence of strong crosswinds. When the wind is blowing across a runway, and the wind speed is significant, which is typically in excess of 35 knots, this makes it difficult to safely land aircraft and for aircraft to take-off. For most airports around Australia, winds blowing from the east or west in excess of 35 knots will typically cause major problems with flight cancellations because most major runways run north-south.

[10] When many crew members call into the airline ill at the same time, or they call in ill on the morning of a flight or close to the departure of a flight, this makes it very difficult for the airline to find replacement crew. Short notice illness of staff can also affect the operations of air traffic control towers. If air traffic controller staff call in ill at short notice and cannot be replaced, then this may leave the control tower with too few staff to oversee the safe arrival and departure of the scheduled aircraft.

[11] A problem with an aircraft that that has been identified by line maintenance crews or the pilot, may need to be fixed before the aircraft can return to the air. The process of fixing the aircraft requires maintenance technicians to follow a series of steps that are outlined in the maintenance procedure manual. The time that it takes to fix the problem may be too long for the aircraft to return to the air for the next flight. If the aircraft can't be replaced, then the next flight will be cancelled.

[12] Take-off and landing slots at highly congested airports are so highly valued by airlines that they often form a part of the intangible assets of an airline's balance sheet. If the landing or take-off slot occurs at a morning or afternoon peak, this raises the value of the asset to the airline. This is because the airline is likely to generate more income by flying aircraft during the morning and afternoon peaks compared to an off-peak time of the day. The morning and afternoon peaks will generate higher seat factors, higher yield, and greater revenue for airlines because passengers place a higher value on flying during these more convenient times of the day. Airlines do not like to give up these slots because they are highly profitable, and they don't want to turn them over to a competitor who could profit from them.

[13] Airlines will cancel a flight when the variable costs that are saved by cancelling the flight are greater than the revenue that is lost by cancelling the flight. The main driver over time of the costs that are saved by cancelling flights are jet fuel prices. When jet fuel prices are unexpectedly high, this increases the motivation for airlines to cancel flights. Airlines will also cancel flights when demand is much lower than expected on marginally profitable flights. It is for this reason that we observed a significant increase in the cancellation rate across all major airports, airlines and routes during the Global Financial Crisis, as this crisis resulted in much weaker demand than airlines expected.

0.6 Are there More Cancellations on Routes where there is Less Competition?

[14] An airline is more likely to cancel a service if the loss of revenue from cancelling is less than the costs that are saved from cancelling. The loss of revenue from cancelling a flight is low when most cancelled passengers choose to continue to fly on the same airline at a different time to the cancelled service, rather than fly on another airline or choose to seek a refund. An airline is less likely to cancel a service for commercial reasons if it believes there is a strong chance that the passenger will choose to fly on another airline in response to the cancellation. The likelihood of a passenger choosing to fly on another airline is higher the more competition that exists on the route, because this raises the chance that a competitor airline is able to offer a seat at an adjacent time to the cancelled flight. This in turn means that there is likely to be a lower cancellation rate on a route for commercial reasons if more competition exists on a route.

[15] Data was collected on the cancellation rate across 43 city pairs in the domestic Australian market in 2024. Along with the cancellation rate data, data was also collected on the number of sectors flown per day on the same 43 city pairs, the extent of competition that exists on those city pairs and the distance between the city pairs. This data was used to estimate a multivariate cross-sectional regression relationship between the cancellation rate, the number of flights offered per day, the extent of competition between airlines and the distance between city pairs.

[16] The multivariate regression model statistically significantly found the following:

if route A is 1,000 units more competitive than route B then route A will have a 0.6 percentage points lower cancellation rate than route B. In other words, airlines operating on routes that are not competitive are more likely to cancel services to maximise profits.

0.7 What are the Costs of Cancelling Services?

[17] In the case of travel agents the major cost associated with cancellation of flights includes the time that it takes travel agent staff to reorganise trips on behalf of passengers, which is valued at the wage rate per hour of the staff member multiplied by the time it takes to reorganise the booking. Travel agents also face an opportunity cost, which is the revenue that may be lost by the agency because the travel agent staff could have used the time to reorganise a cancelled flight and other bookings, to book a new flight for new clients.

[18] Cancelled flights will also result in lost aeronautical and non-aeronautical revenue at airports if passengers decide not to travel in response to the cancellation of a flight. If just 5% of passengers on cancelled domestic flights decide not to travel, then the impact on aeronautical revenue at Australia's top ten airports totals around A$4.0m per year at current, listed aeronautical charges while the impact on non-aeronautical revenue is estimated to be A$4.5m per year.

[19] When an airline cancels a service and the passenger is first notified about the cancellation on arrival at the airport, then a passenger that decides to cancel the trip bears the out-of-pocket costs of travel to and from the airport as well as the opportunity cost of time that could have been spent on a more productivity activity. The passenger may receive a refund for the fight, but not necessarily on other bookings that are a part of the travel itinerary, such as accommodation. If the passenger does not decide to cancel the trip, the passenger will incur opportunity costs as a result of waiting longer at the airport for the new flight. The opportunity cost of time for leisure and VFR travellers is currently around A$20.06 per hour. If the passenger cannot secure a flight on the same day as the cancelled flight and must return home or return to a hotel, then the passenger is likely to incur additional out-of-pocket expenses. Cancellations also lead to seats being withdrawn from the market, which raises airfares for those passengers who are yet to book a flight.

[20] The cost to business-purpose passengers is usually higher than that for leisure and VFR-purpose passengers because business-purpose passengers place a higher price on time, estimated to be around three times that of leisure and VFR passengers at A$64.26 per hour. A business-purpose passenger who must wait longer at the airport for a flight as a result of a cancellation, bears a higher opportunity cost because the price of time is higher. For business-purpose passengers it is also far more difficult to re-organise meetings in response to a flight cancellation because there are usually multiple attendees at meetings. The need to reorganise meetings is therefore disruptive to all those who attend the meetings. Business-purpose passengers are also more likely to book flights at the last minute. If an airline cancels flights and therefore withdraws seats from the market, this raises airfares. Business-purpose passengers are more likely than other passenger types to buy these more expensive post-cancellation seats because they are more likely to buy seats at the last minute, resulting in an additional out-of-pocket expense for business-purpose passengers.

[21] When passengers decide not to travel because of domestic flight cancellations this affects domestic tourism. If we assume that 5% of passengers on cancelled flights decide not to travel at all, then the estimated impact on domestic tourism that is facilitated by Australia's top ten domestic airports is estimated to be A$223m over the 12 months to September 2024.

0.8 Economic Benefits of Moving to a 95/5 rule

[22] Evidence indicates that airlines are more likely to cancel services during the colder off-peak months in air travel in Australia, notably between May and July. Under the 80/20 rule the airline is able to cancel 10 services associated with a particular slot over the year. This number of allowable cancellations approximately coincides nicely with the number of weeks between the May and June colder months. This means that an airline could potentially cancel flights at a particular slot in each week of the off-peak winter months of May and June and still retain the slot under the 80/20 rule. A 95/5 slot allocation rule will prevent this from occurring, because this rule will only allow the airline to cancel 2 services per year rather than 10. Rather than potentially cancelling most flights for a particular slot over May and June, the airline will only be able to cancel one fifth of those flights.

1. What are Airport Slots?

An airport slot is a time to take-off or land on a particular day at a particular time at an airport. For example, on the 12th of October, 2023, Virgin Australia flight VA 901 is allocated a time slot of 06:00am to depart Sydney Kingsford Smith Airport and is allocated a time slot of 06:30am to land at Brisbane International Airport. The 06:00am time slot is a take-off time slot at Sydney Airport that is allocated to Virgin Australia and the landing time of 06:30am at Brisbane is an airport landing slot that has been allocated to Virgin Australia airlines.

These time slots for take-off and landing are set into the airline and the airport's schedule. While they are a part of schedules, this does not necessarily mean that the take-off or the landing takes place at the scheduled time or takes place at all. The take-off and landing may occur after the scheduled time. If the take-off takes place more than 15 minutes after the scheduled time the departure is not on-time, and if the flight arrives fifteen minutes after the scheduled arrival time the landing or arrival is not-on time. Take-offs and landings that are not on-time affect the on-time performance of the airline and the airports. If a departure or take-off does not take place at all the slot is not used by the airline and the service is cancelled. This affects an operational metric called the reliability of the airline. The more services that an airline cancels the less reliable it becomes, which in turn affects customer demand in the future, particularly business-purpose demand.

At busy airports, time slots during the morning and afternoon peaks are incredibly valuable to airlines. This is because airlines are able to charge passengers and freight distributors higher prices for flights during peak times, and these flights are also likely to be more heavily utilised, resulting in higher passenger seat factors and freight load factors. These higher prices and loads convert into higher levels of airline revenue and earnings. By securing slots at busy airports during the morning and afternoon peaks, and holding onto those slots, this secures the airline the best possible opportunity to maximise earnings from its flights.

2. What is the 80/20 Rule?

The 80/20 rule, which is also known as the 'use it or lose it' rule, requires that airlines must use at least 80% of their take-off and landing slots at airports over a particular year or face losing them to a competitor the following year. Airlines are entitled to keep a particular slot for the next season if it has operated more than 80% of the slot's flights over the current season.

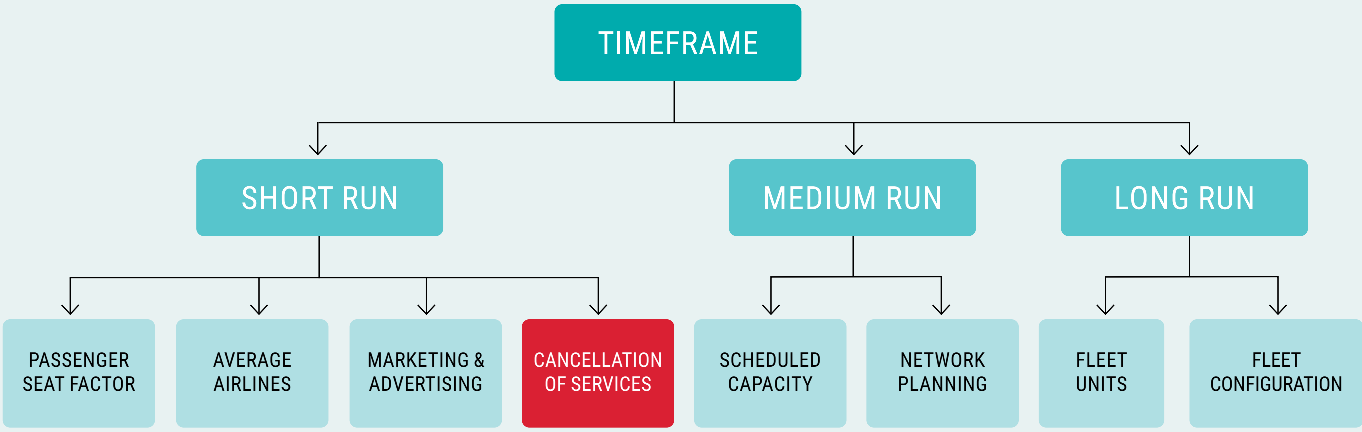
A slot in this case refers to a specific time on a specific day of the week that the aircraft of an airline either takes-off or lands. For example, Qantas flight QF 409 from Sydney to Melbourne takes place every Monday morning at 07:00am. This is the 07:00 time slot on a Monday at Sydney Airport domestic. This slot is different to Qantas flight QF 409 every Tuesday morning at 07:00am. For Qantas to keep its QF 409 07:00am take-off time slot at Sydney domestic every Monday morning, the airline would need to fly 42 or more of the possible 52 weekly QF 409 flights every Monday morning at 07:00am over a given yearly period of time. If Qantas flies fewer than 42 take-offs of QF 409 on Monday morning at Sydney, then it may lose the Monday at 7am time slot to Virgin Australia.

The 80/20 rule was created with at least two considerations in mind. The first is airlines that have a history of access to the slot should have the opportunity to continue using that slot. This not only benefits the incumbent airline but it also benefits passengers because they can continue to align a take-off time with a particular carrier. The second intention of the 80/20 rule is to prevent airlines from cancelling too many services for commercial reasons, that is to maximise profit. If an airline cancels too many unprofitable services, then it may not meet the 80/20 rule, which means sacrificing slots to a competitor.

3. Airlines and Capacity Flexibility

Airlines operate over three-time horizons – the short run, the medium run and the long run. Refer to ***Figure 1*** below.

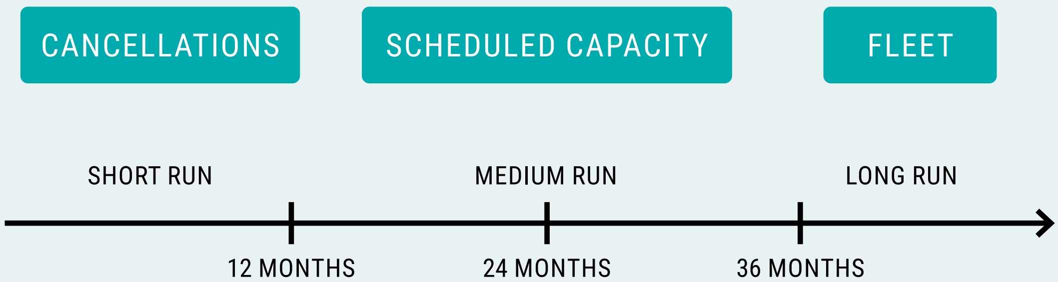
FIGURE 1: Short, Medium and Long Run Time Horizons of Airlines and Operational Levers



The short run is a period of time that is up to 12 months, which is long enough for the airline to alter short run operational levers such as the average airfare, the load factor, the labour force, marketing and advertising effort, and the percentage of services that are cancelled. It isn't long enough, however, to alter other operational levers such as the size of the airline's network and its scheduled capacity, which can only be altered over a medium run horizon.

The medium run is defined as a period of between 12 months and 3 years which is long enough for the airline to alter operational levers such as scheduled capacity and an airline's network composition, as well as altering short run levers, but not long enough to alter the size and the configuration of the fleet. The long run is a period of 3 years or more, which is enough time to alter the number of fleet units operated by the airline and the seat mix of the fleet that it operates – refer to ***Figure 2*** below.

FIGURE 2: Short, Medium and Long Run Timeline of Airlines and Key Operating Levers



The scheduled capacity of airlines is a medium run operational lever as indicated in ***Figure 2*** because airlines must provide the travelling public with the time of departure, the arrival time, and the type of aircraft to be used on the flight, up to twelve months prior to departure of the flight. This time period of 12 months between the time the flight is advertised and the time the flight departs is required to give passengers enough time to plan their trips and book their flights. The decision to schedule a certain amount of capacity 12 months prior to departure, however, is problematic for airlines. This is because the scheduled capacity that is set today is based on the airline's expected demand for the flight in 12-months. If demand in 12-months is greater than expected, then the airline has not scheduled enough seats in the market. If demand in 12-months is less than expected, then the airline has scheduled too many seats in the market.

For example, the capacity that is scheduled for Brisbane Airport on the Brisbane-Sydney service on 1 January 2024 at 8am on a Monday morning by Virgin Australia Airlines, is based on Virgin Australia's expectations about demand on 1 January 2024 from the perspective of 1 January 2023. On 1 January 2023, the airline expects the Brisbane economy to grow by 3% over 2023 and the Sydney economy to grow by 2.5% over the same time period. These economic growth figures will provide the airline with a certain expectation about demand on the 8am Monday Sydney-Brisbane service on 1 January. If economic growth for Brisbane turns out to be 2% and Sydney economic growth turns out to be 1%, then the demand for the 1 January 2024 flight is likely to be lower than expected, and the airline has scheduled too many seats on the flight.

If an airline overestimates demand for a flight, then it may need to sell more seats at cheaper price points to fill the plane, or the plane may depart with a number of vacant seats. For example, if Virgin Australia believes that it can sell 150 tickets at $200 per ticket for the 8am Monday morning flight on 1 January 2024 based on the information that it knows on 1 January 2023, but it overestimates demand and all it can sell are 100 tickets at $150 each, then this will mean 50 more seats flying vacant and a much lower level of passenger revenue. If the airline had better information about demand on 1 January 2023, it may have decided to use a smaller aircraft for the service, or it may decide to use the aircraft on another route at that time.

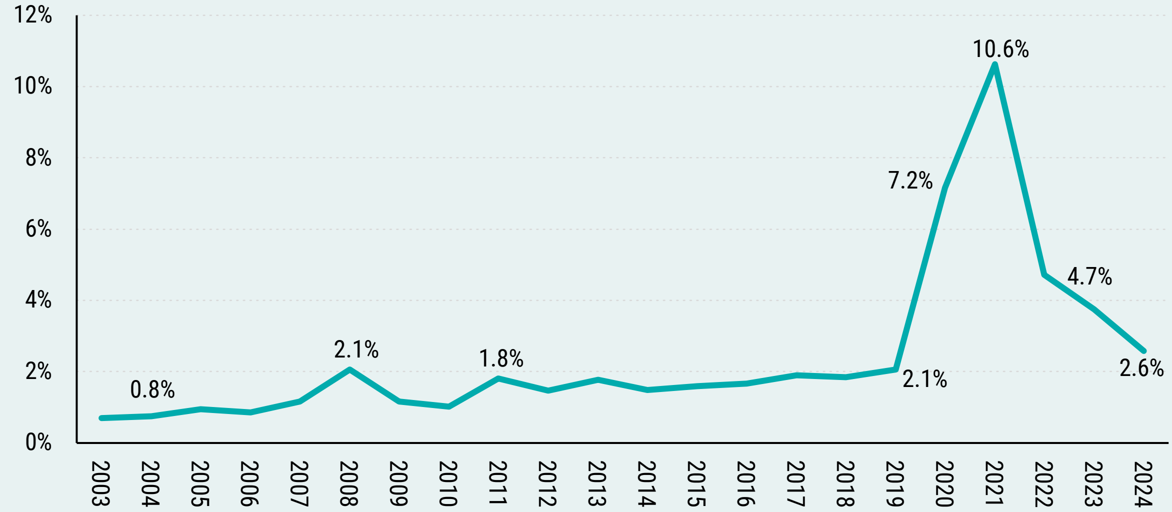
As a flight draws closer to departure an airline will have information about the number of people who have booked a seat on the flight. These are referred to as the forward bookings for the flight. These forward bookings will provide the airline with some insight into whether demand for the future flight is tracking above or below expectations. If demand is tracking well below expectations in the lead up to departure for a flight, and knowing that it can't alter its flight schedule, the airline may decide to cancel the flight and attempt to find other flights for passengers booked on the cancelled flight. This gives the airline some flexibility in capacity over a short horizon, which enables the airline to better match supply with approaching final demand. The scheduled capacity of the airline doesn't have this short run capacity flexibility because it can only be altered over a medium run horizon. Cancelling services offers airlines a short run capacity lever to reoptimise the supply it is offering to the market when it has overestimated demand and revenue.

4. Recent Trends in Cancellation Rates at Australian Airports

4.1 Domestic Market

Figure 3 below presents the cancellation rate for the total domestic Australian flying network on a calendar annual basis between 2004 and 2024.[1]

Figure 3: Domestic Australian Market Cancellation Rate



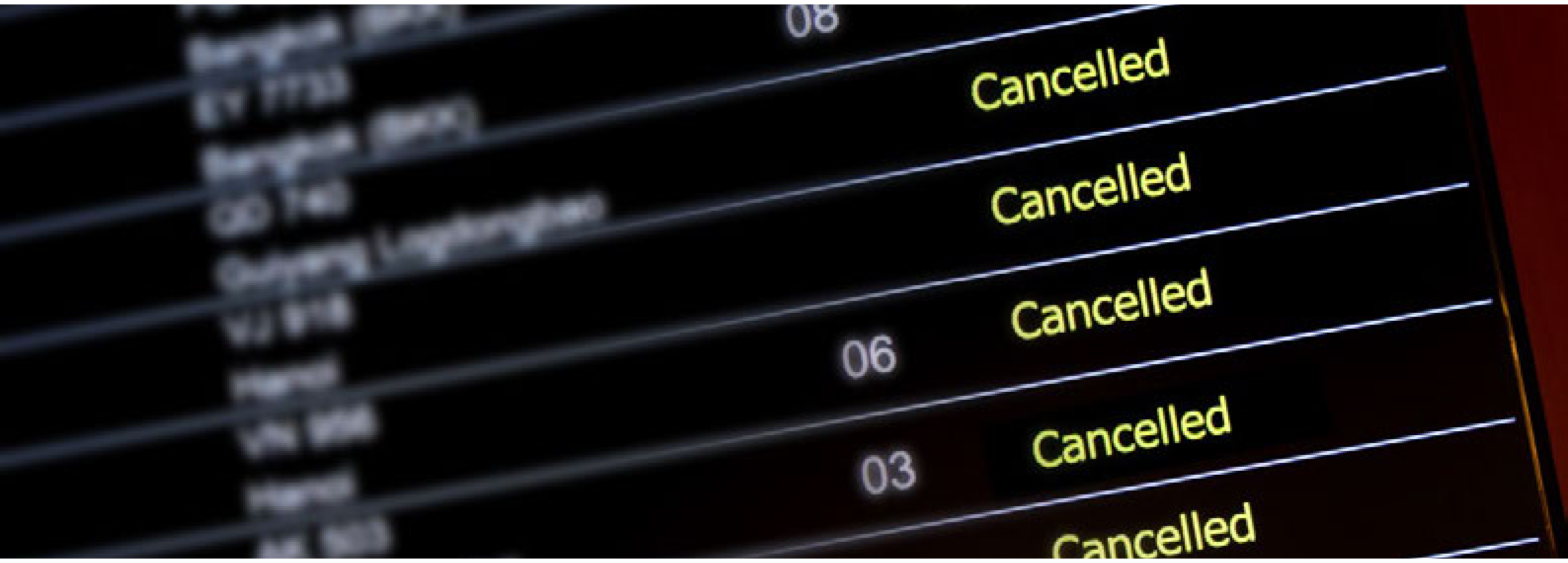
Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

The cancellation rate in ***Figure 3*** is determined by using the following formula:

$$\text{Cancellation Rate} = \frac{\text{(Number of Flights Cancelled)}}{\text{(Number of Flights Scheduled)}} \qquad \textbf{(1)}$$

The cancellation rate at equation (1) represents the proportion of flights out of a schedule that are cancelled. We can see in ***Figure 3*** that the domestic cancellation rate has trended upward at a relatively gentle pace between 2004 and 2019, rising from 0.8% in 2004 up to 2.1% in 2019, with a sharp cycle upward in the cancellation rate in 2008 to 2.1% and in 2011 to 1.8%. During Covid, the cancellation rate rose to 7.2% in 2020, then increased sharply to 10.6% in 2021, before falling to 4.7% in 2022. The cancellation rate in calendar 2024 fell to 2.6%, however this remains elevated compared to pre-Covid highs and long run average levels.

1 This information is obtained from the BITRE On-Time Performance database by using the “All Ports” option in the definition of departing and arriving ports.

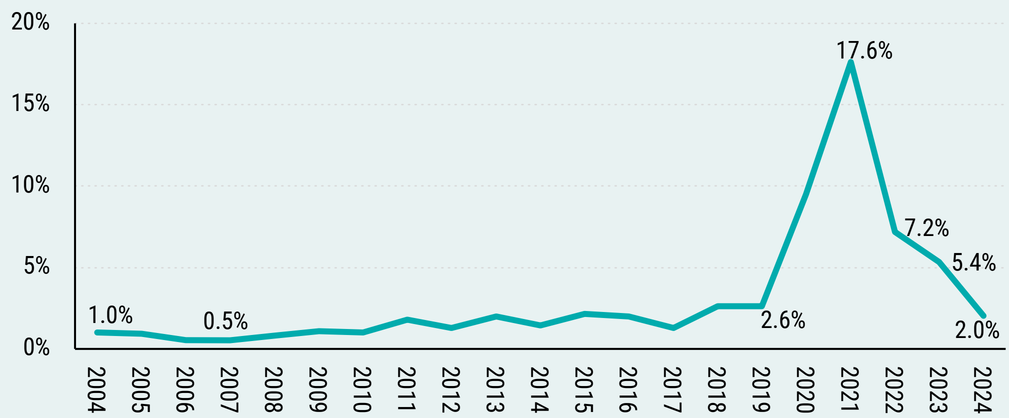


4.2 Cancellation Rates By Airline

4.2.1 Jetstar

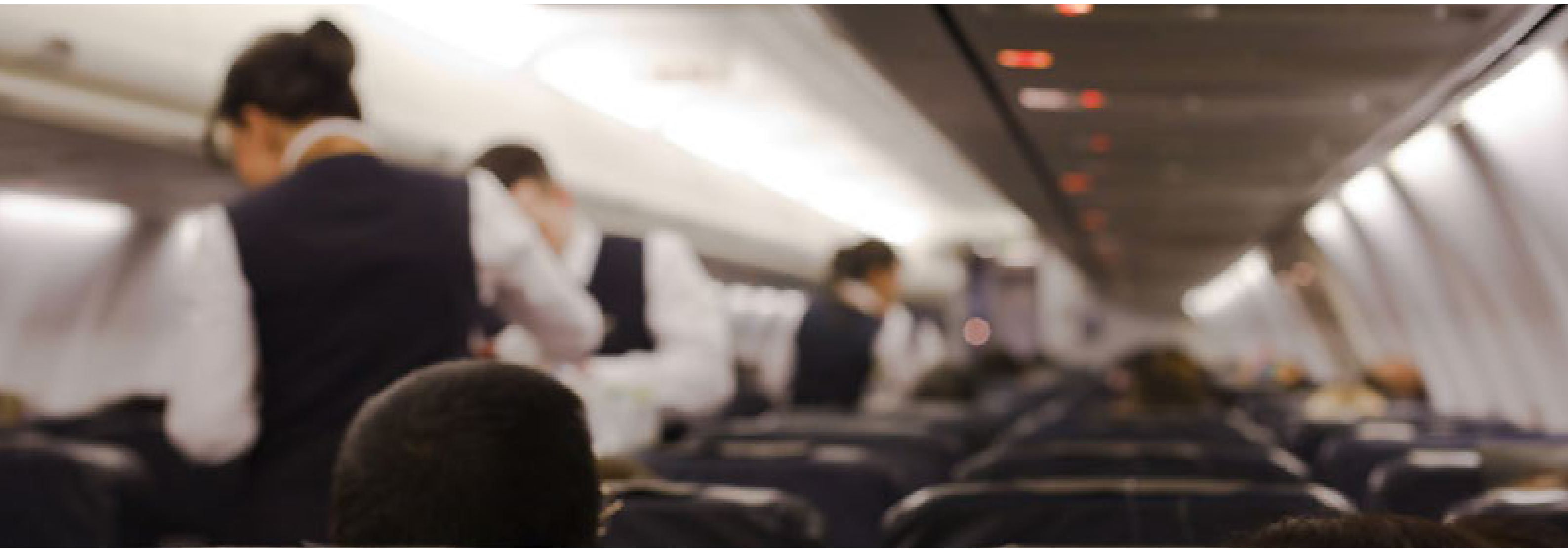
Figure 4 below presents the movement over time in the calendar annual cancellation rate of Jetstar Airlines between 2004 and 2024.[2] During the year in which the airline entered the domestic market in 2004 the airline's cancellation rate was 1%. The cancellation rate subsequently declined to 0.5% by 2007, but began to trend upward thereafter, reaching a pre-Covid high of 2.6% in 2019. The airline's cancellation rate then surged to 17.6% in 2021 at the height of Covid, before falling to 7.2% in 2022 and then 5.4% in 2023. The 2024 cancellation rate dropped to 2% in 2024 but remains more than double the average cancellation rate between 2004 and 2011.

Figure 4: Jetstar Domestic Cancellation Rate



Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

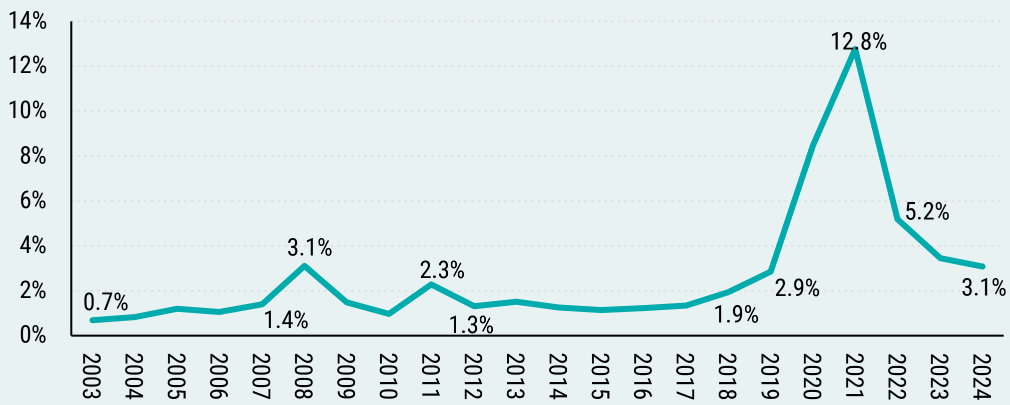
2 This data was obtained from the BITRE On-Time Performance database by using the airline option "Jetstar" and using the BITRE routes definition "All Ports".



4.2.2 Qantas Mainline

Figure 5 below presents the movement over time in the average calendar annual cancellation rate of Qantas Mainline between 2004 and 2024 (excluding the regional arm of Qantas).[3] Qantas Mainline's cancellation rate rose steadily between 2004 and 2007 from 0.7% up to 1.4%. This was followed by two sharp increases above the upward trend in 2008 of 3.1%, which coincides with the Global Financial Crisis, and then again in 2011 at 2.3%. The cancellation rate dropped to 1.3% in 2012 and stayed around that level for the next 5 years, before the cancellation rate rose sharply once again in 2018 and 2019, to 1.9% and 2.9% respectively. Covid resulted in a peak in the cancellation rate of 12.8% in 2021, before falling to 5.2% in 2022 as the recovery from Covid began, and a further drop to 3.1% over the 12-months to December 2024. The 2024 cancellation rate is still 0.2 percentage points above 2019 pre-Covid levels and well above long run average levels.

Figure 5: Qantas Mainline Domestic Cancellation Rate



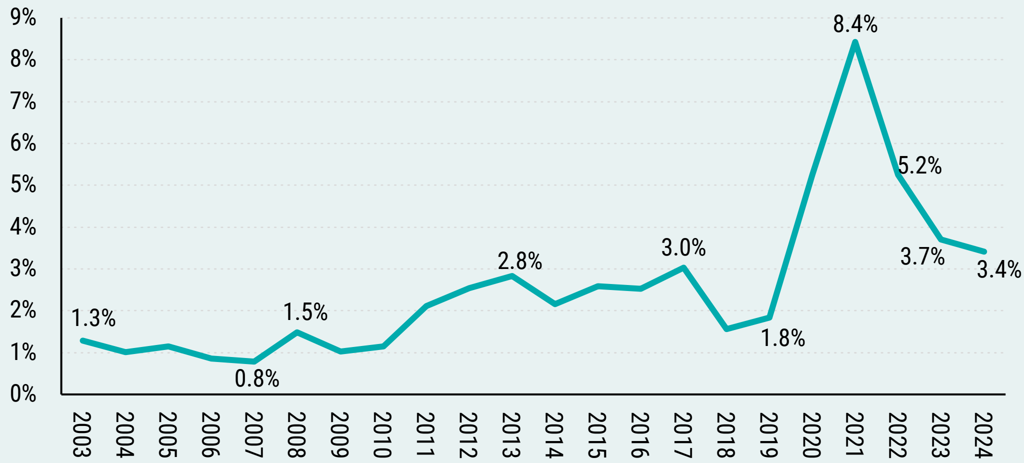
Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

3 This is found using the BITRE On-Time Performance database across "All Ports" using the airline option "Qantas". This does not include the regional arm of Qantas, QantasLink.

4.2.3 QantasLink

Figure 6 below presents the calendar annual movements over time in the average cancellation rate of the regional flying arm of the Qantas Group, QantasLink. The QantasLink annual average cancellation rate fell over the first three years of the sample timeframe from 1.3% in 2003 down to 0.8% in 2007. This was followed by a sharp spike in the cancellation rate to 1.5% in 2008 in response to the Global Financial Crisis. The cancellation rate fell in 2009 and 2010 but thereafter began to strongly trend upward reaching a sub-peak of 2.8% in 2013. The cancellation rate fell once again in 2014 but the upward trend in the rate continued thereafter reaching 3.0% by 2017, which is a pre-Covid high. The cancellation rate then dropped in 2018 and 2019, before surging upward to 8.4% in 2021 during the peak impact of Covid. The QantasLink cancellation rate then fell to 5.2% in 2022 and 3.7% in 2023. The 2024 cancellation rate of 3.4% is 0.4 percentage points higher than the highest annual rate recorded prior to Covid and remains well above pre-Covid long run averages.

Figure 6: QantasLink Domestic Cancellation Rate

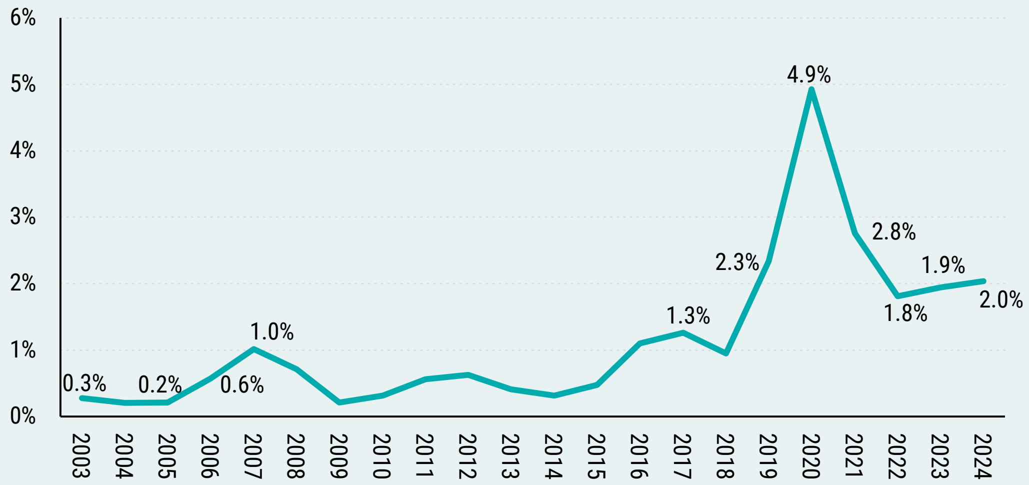


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.2.4 Regional Express

Figure 7 below presents the annual average cancellation rate of Regional Express Airlines (Rex).[4] Rex's cancellation rate began the timeframe at very low levels of 0.16% to 0.3% between 2004 and 2006. The cancellation rate then cycled upward, reaching a sub-peak of 1.0% in response to the impact of the Global Financial Crisis in 2008. The Rex cancellation rate then fell in 2009 and cycled between 0.2% and 0.7% for the 6 years following the impact of the Global Financial Crisis. Between 2015 and 2017 the cancellation rate swung upward strongly to 1.3% in 2017, before falling once again in 2018 to 1% and then rising again in 2019 to 2.3%. Compared to other airlines the impact of Covid on the cancellation rate of Rex was relatively mild, reaching a peak of 4.9% in 2020, before falling to 2.8% in 2021, 1.8% in 2022 and rising to 1.9% in 2023. The 2024 cancellation rate of 2.0% exceeds the highest annual average cancellation rate recorded prior to 2019, which is 1.3%.

Figure 7: Regional Express Airlines Domestic Cancellation Rate



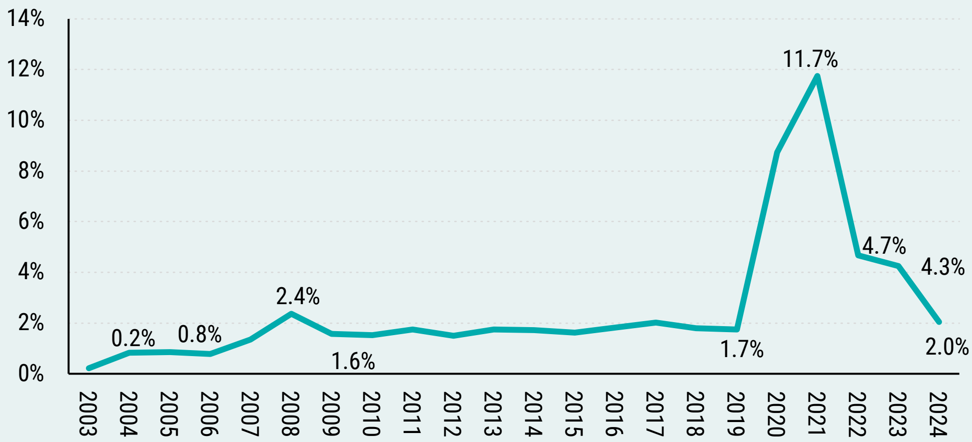
Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4 This is obtained from the BITRE On-Time Performance database using the airline definitions "Regional Express" and "Rex Airlines" combined.

4.2.5 Virgin Australia

The movement over time in the average annual cancellation rate of Virgin Australia is presented in ***Figure 8*** below.[5] The cancellation rate of the airline was relatively stable at around 0.8% for the first three years of the timeframe, but began to trend increase between 2006 and 2008, reaching pre-Covid high in 2008 of 2.4% in response to the Global Financial Crisis. The cancellation rate fell to 1.6% in 2009 and stayed at around this level through to 2019. The Covid peak in 2021 was 11.7%, which fell to 4.7% in 2022 and 4.3% in 2023. The declining cancellation rate continued in 2024, with the rate falling to 2.0%. The 2024 cancellation rate remains above 2019 pre-Covid levels and is higher than average cancellation rates prior to Covid (between 2003 and 2019).

Figure 8: Virgin Australia Domestic Cancellation Rate



Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

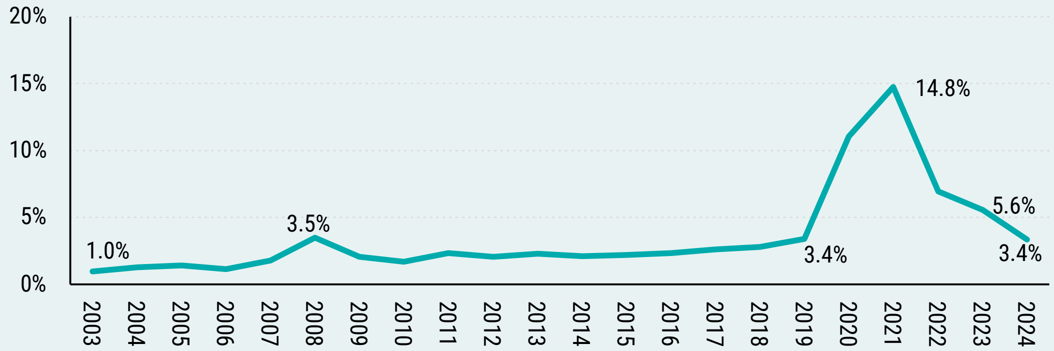
5 This information is obtained from the BITRE On-Time Performance Database using the sum across three airline definitions – "Virgin Australia", "Virgin Australia – ATR/F100 Operations" and "Virgin Australia Regional Airlines".

4.3 By Major Airport

4.3.1 Sydney Domestic

The average cancellation rate at Australia's busiest airport has more than quadrupled over the pre-Covid period 2003 to 2019, increasing from 1.0% in 2003 up to 3.4% in 2019, with a sharp, one-year increase in the cancellation rate in 2008 to 3.5% in response to the Global Financial Crisis.[6] The cancellation rate has returned to pre-Covid levels at 3.4% in 2024, but pre-Covid levels are high relative to historical cancellation rates of between 1% and 2%.

Figure 9: Sydney Airport Domestic Market Cancellation Rate

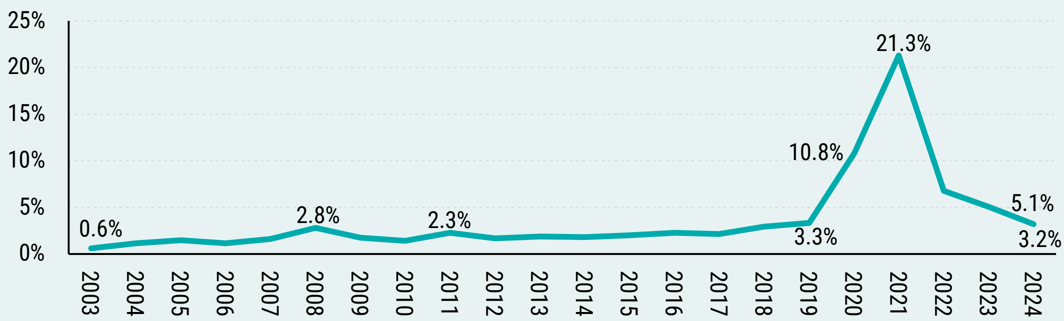


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.3.2 Melbourne Domestic

In the case of the second busiest airport in Australia, Melbourne Airport, the average cancellation rate in the case of its domestic business has increased more than five-fold between the 0.6% recorded in 2003 up to the pre-Covid high of 3.3% over the 2019 calendar year. In between these two periods is a sharp increase in the cancellation rate of 2.8% in 2008 due to the Global Financial Crisis, and a more moderate jump to 2.3% in 2011. After the large spike in the cancellation rate during Covid in 2021 to 21.3% and to a much lesser extent in 2020 to 10.8%, the cancellation rate in 2024 has fallen to pre-Covid levels but still remains elevated compared to historical averages of between 1% and 2%.

Figure 10: Melbourne Airport Domestic Cancellation Rate



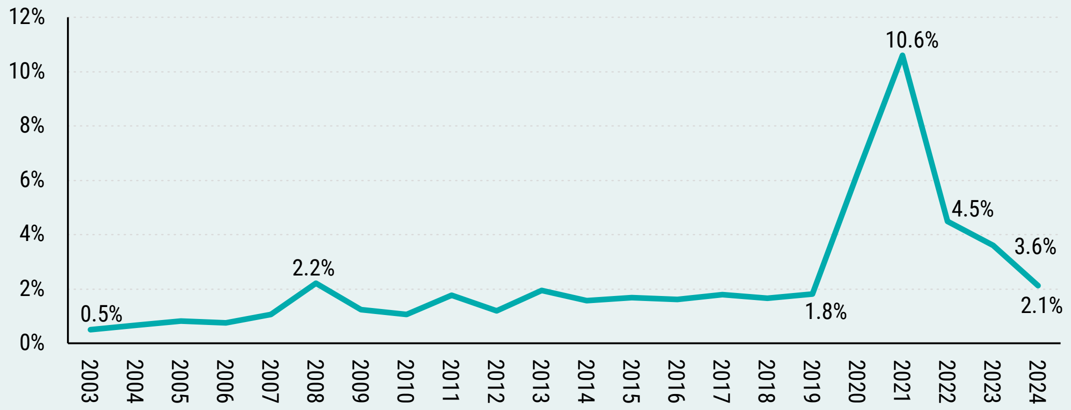
Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

6 The cancellation rate for an airport is found using the BITRE On-Time Performance database by setting the arriving airport equal to the airport of interest and collecting sectors flown and sectors scheduled data from that query and setting the departing airport equal to the airport of interest and collecting the same data. The arriving and departing airport of interest data is then combined to generate an arrival and departure cancellation rate for the airport.

4.3.3 Brisbane Domestic

The third biggest airport in Australian in terms of domestic passenger numbers is Brisbane Airport. Brisbane's average cancellation rate like Melbourne's was very low at 0.5% throughout calendar 2003, jumped to 2.2% in 2008 as a result of the Global Financial Crisis and slowly increased to 1.8% by 2019. During Covid-19 the cancellation rate spiked in 2021 to 10.6%, before declining in 2022 to 4.5%. The cancellation rate remained elevated over 2023 at 3.6%, which is well above the high reached pre-Covid. In 2024 the cancellation rate declined to 2.1%. Despite the decline, the 2024 cancellation rate remains 30 basis points above pre-Covid levels, and well above historical average levels of between 0.5% and 1%.

Figure 11: Brisbane Airport Domestic Cancellation Rate

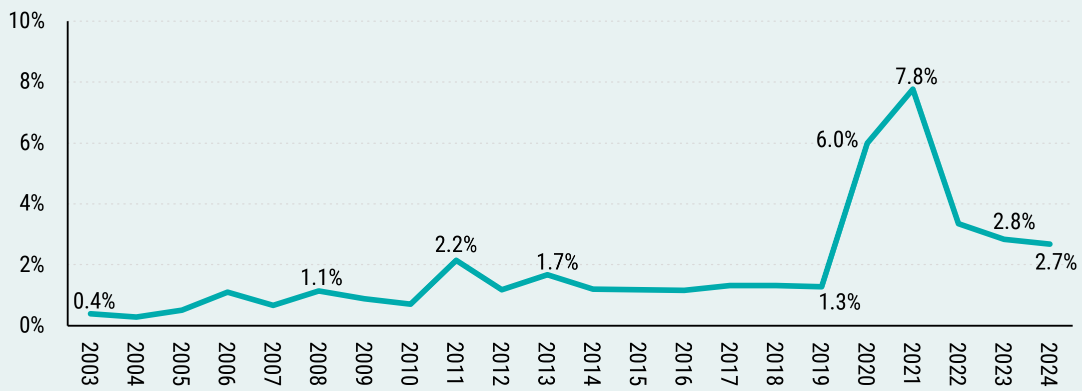


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.3.4 Perth Domestic

Perth Airport's domestic cancellation rate was just 0.4% in 2003 but climbed to three-times this level by 2019 at 1.3%. Like other domestic airports the cancellation rate spiked in 2008 at 1.1% due to the Global Financial Crisis, and later at 2.2% in 2011 and 1.7% in 2013 before remaining steady at between 1.1% and 1.3% between 2014 and 2019. After the Covid-19 spike in 2020, reaching 6.0%, and a peak of 7.8% in 2021, the cancellation rate fell to 2.8% in 2023 and 2.7% in 2024. The 2023 and 2024 cancellation rates still remain very high compared to 2003 to 2019 average levels.

Figure 12: Perth Airport Domestic Cancellation Rate

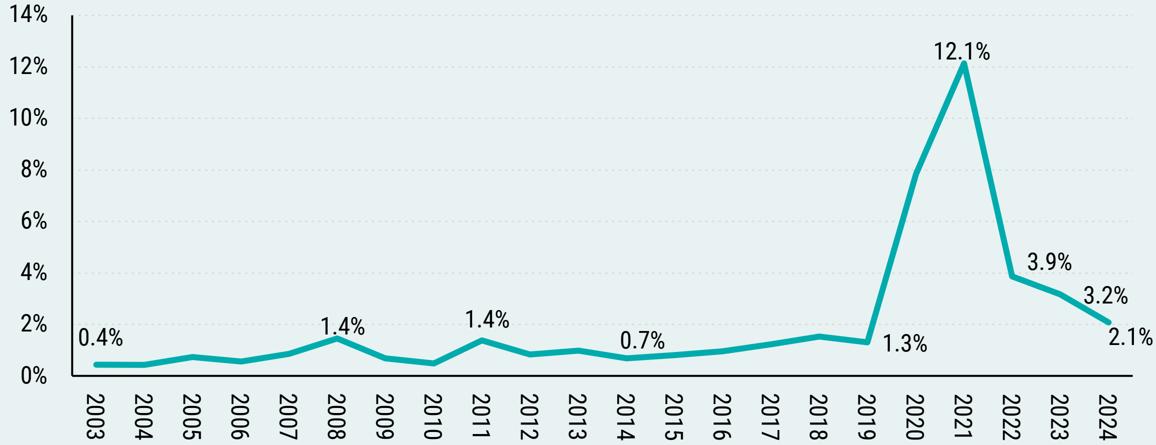


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.3.5 Adelaide Domestic

Adelaide Airport's domestic annual average cancellation rate started in 2003 at 0.4% and remained relatively flat for the next 4 years. Like other airports spikes in the Adelaide cancellation rate occurred during the Global Financial Crisis in 2008 at 1.4% and later in 2011 at 1.4% before gradually falling to 0.7% by 2014. From 2014 to 2019 the cancellation rate gradually increased in trend terms to reach 1.3% by 2019. Following the Covid spike in 2021 where the cancellation rate increased to 12.1%, the cancellation fell to 3.9% in 2022, 3.2% in 2023 and 2.1% in 2024. The 2024 cancellation rate at Adelaide Airport remains well above pre-Covid levels and considerably above historical average levels.

Figure 13: Adelaide Airport Domestic Cancellation Rate

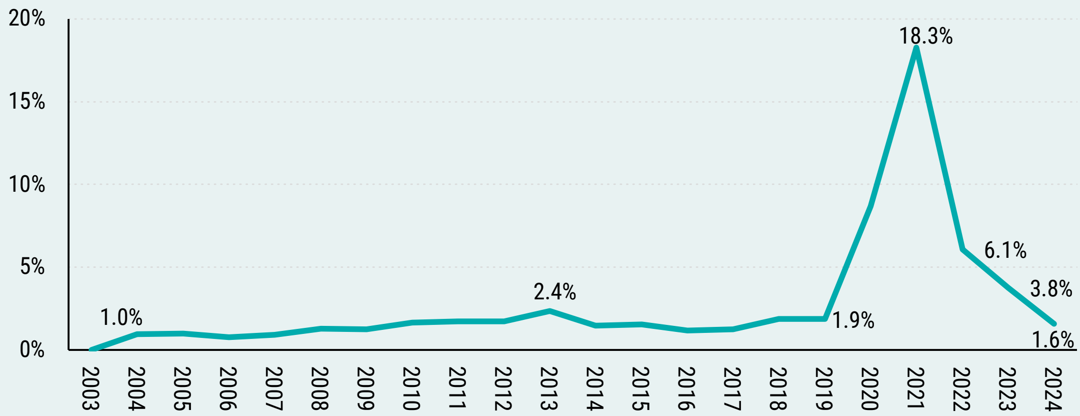


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.3.6 Gold Coast Domestic

The Gold Coast domestic cancellation rate has risen gradually from 0% in 2003 up to 1.9% by calendar 2019 with a peak in 2013 of 2.4%. Following the 2021 Covid spike in cancellations, which saw the cancellation rate jump to 18.3% in 2021, the cancellation rate fell to 6.1% in 2022, 3.8% in 2023 and 1.6% in 2024. The 2024 result is a strong decline and is below 2019 pre-Covid levels of 1.9%, but like other airports the cancellation rate remains above historical average levels.

Figure 14: Gold Coast Airport Domestic Cancellation Rate

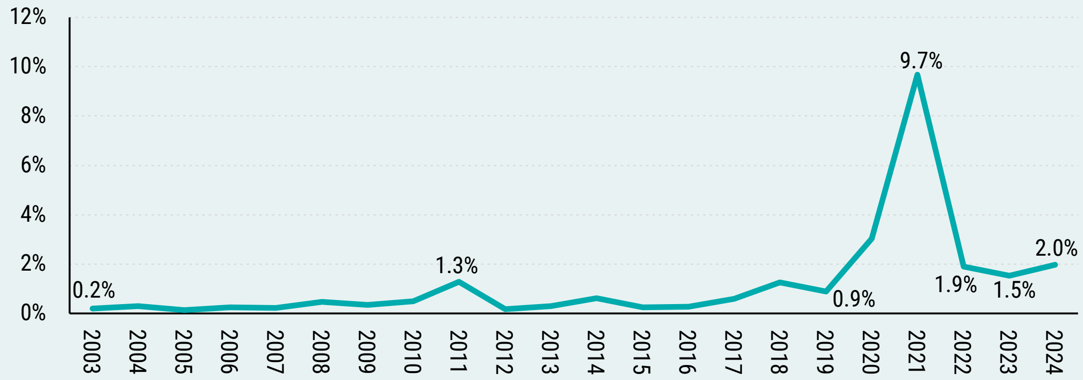


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.3.7 Darwin Domestic

The annual time series movement in the Darwin domestic cancellation rate are presented in ***Figure 15*** below. After a series of very moderate cancellation rates over the period 2003 and 2010 of between 0.2% and 0.5%, the cancellation rate jumped sharply in 2011 to 1.3% before returning to low levels once again in 2012. Between 2012 and 2019 the cancellation rate gradually rose from 0.2% up to 0.9%. After the Covid-19 spike in 2021 in which the cancellation rate jumped to 9.7%, the cancellation rate fell sharply to 1.9% in 2022, 1.5% in 2023 and 2.0% in 2024. The 2024 cancellation remains double pre-Covid levels.

Figure 15: Darwin Airport Domestic Cancellation Rate

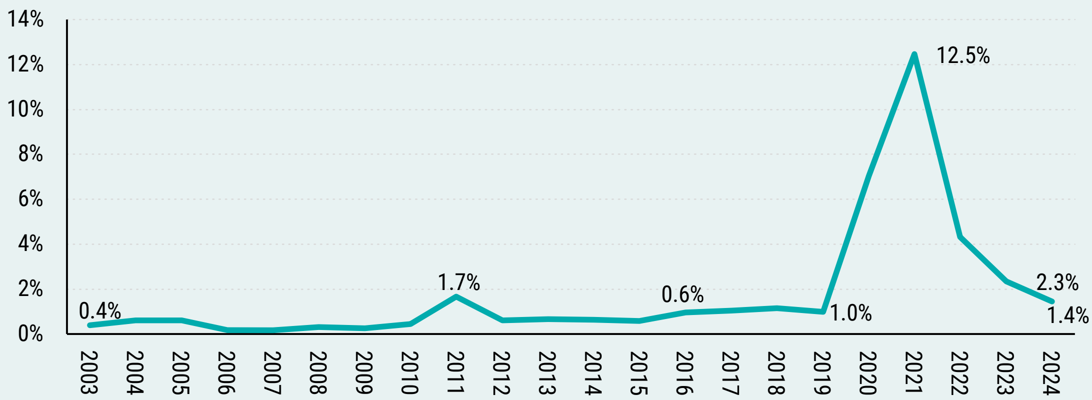


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.3.8 Hobart Domestic

Figure 16 below presents the annual average cancellation rate for Hobart Airport domestic services. In 2003 the cancellation rate for the airport was just 0.4% and remained reasonably steady at this rate for the next seven years until there was a spike in 2011 at 1.7%. The cancellation rate subsequently declined through to 2015 but steadily increased thereafter to 1.0% by 2019. Following the Covid spikes in 2021 and to a lesser extent 2022, the cancellation rate at Hobart domestic remained elevated in 2023 at 2.5% and 1.4% in 2024. The 2024 cancellation rate remains above pre-Covid levels and well above historical average levels.

Figure 16: Hobart Airport Domestic Cancellation Rate

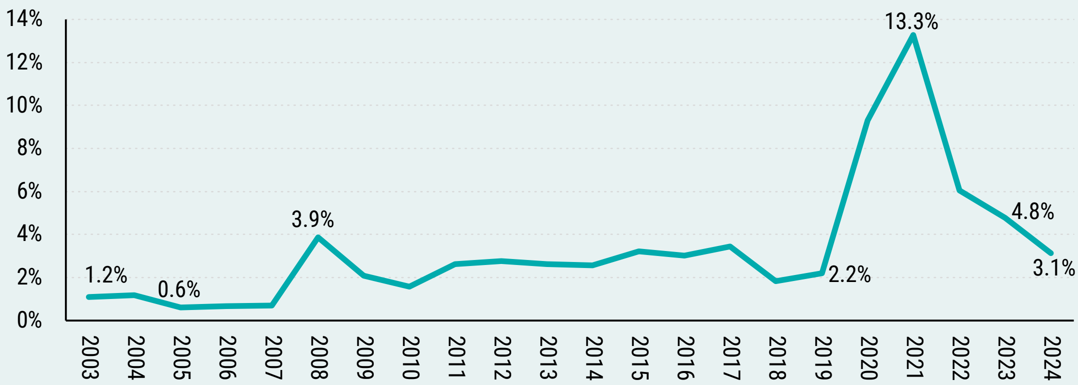


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.3.9 Canberra Domestic

Canberra Airport domestic services have been affected by an elevated cancellation rate over the entire timeframe examined. In 2003 the cancellation rate was 1.2%, which is almost twice the cancellation rate of the airport with the second highest cancellation rate in 2003, which was Sydney at 0.8%. The cancellation rate subsequently declined to more normal levels over the following four years but increased sharply between 2008 and 2010 in response to the Global Financial Crisis and has remained elevated since. By 2019 the cancellation rate rose to 2.2%, it then rose sharply during Covid to 13.3%, after which it fell to 4.8% in 2023 and 3.1% in 2024. The 2024 cancellation rate remains above pre-Covid levels and well above historical average levels.

Figure 17: Canberra Airport Domestic Cancellation Rate

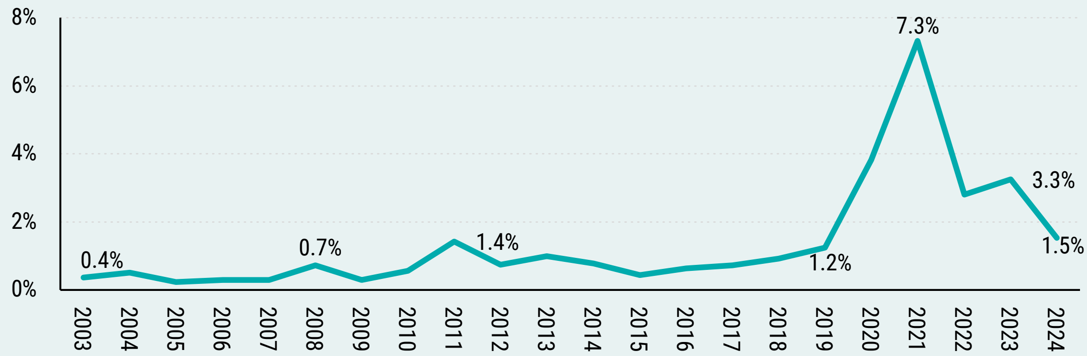


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.3.10 Cairns Domestic

Figure 18 below presents the annual time series movements in the Cairns Airport domestic cancellation rate between 2003 and 2024. Like many of the other tier 2 airports investigated in this section, the cancellation rate started-off quite low at 0.4% on average over calendar 2003, but then jumped quite sharply in 2008 and 2011, before returning to a gentle upward trend that has seen the cancellation rate gradually climb to 1.2% over calendar 2019. After the sharp increases in the cancellation rate during Covid-19 the cancellation rate has dropped sharply to 3.3% in 2023 and a further large drop to 1.5% in 2024. The 2024 cancellation rate remains above 2019 pre-Covid levels of 1.2% and well above historical average values of between 0.5% and 1.0%.

Figure 18: Cairns Airport Domestic Cancellation Rate



Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.3.11 Major Airport Cancellation Correlation Matrix

We would expect some connections between the domestic cancellation rates across airports, particularly the main airports. This is because a service that is cancelled from a particular departing port will also show-up as a service that is cancelled at an arriving port. For example, a service that is meant to originate from Sydney, or Sydney is the departing point, that is destined for Melbourne, or Melbourne is the arriving port, will register as a cancelled departing Sydney service and a cancelled arriving service in Melbourne.

The connection between domestic cancellation rates across airports is also complicated by the fact that some aircraft in the domestic fleets of the airlines are not used on one city pair alone. This means that an aircraft may depart port A and arrive at port B, and then depart port B and arrive at port C. For example, a Qantas aircraft may fly from Sydney to Perth and then fly from Perth to Broome. Or a Virgin Australia aircraft may fly from Brisbane to Adelaide, and then from Adelaide to Darwin. What this means is that the cancellation of the service between ports A and B may also result in the cancellation of other services outside of ports A and B, such as from ports B to C. These knock-on or network effects of cancellations will be significant for those city pairs that have relatively low frequency of service.

It is possible to determine the extent to which cancellation across airports is correlated by estimating the correlation in the cancellation rates across the various airports over the period 2003 to 2024. This airport cancellation correlation matrix is presented in ***Table 1*** below.

Table 1: Domestic Australian Airport Cancellation Rate Correlation Matrix – 2003 to 2024

	SYD	MEL	BNE	PER	ADL	OOL	DRW	HBA	CBR	CNS
SYD	100%	97.54%	98.86%	97.54%	98.81%	96.23%	90.75%	97.31%	97.71%	96.60%
MEL		100%	98.88%	95.33%	98.98%	99.23%	97.05%	98.93%	95.63%	97.02%
BNE			100%	97.16%	98.70%	98.27%	94.25%	98.13%	98.09%	97.84%
PER				100%	97.65%	94.38%	90.89%	96.43%	96.20%	96.17%
ADL					100%	97.87%	94.62%	99.03%	96.38%	96.89%
OOL						100%	96.28%	98.75%	94.78%	96.45%
DRW							100%	95.67%	89.29%	94.45%
HBA								100%	95.46%	96.77%
CBR									100%	94.66%
CNS										100%

In ***Table 1*** we see that all correlations are exceptionally high, with a limited number of correlations shaded in green that are below the 96% mark. The highest correlation is that between the cancellation rates of Melbourne and the Gold Coast with 99.23%, followed by Adelaide and Hobart with 99.03%, and Melbourne and Adelaide with 98.98%. The airport pairs with the lowest cancellation rate correlation is that between Darwin and Canberra with 89.26% followed by Darwin and Perth with 90.89%.

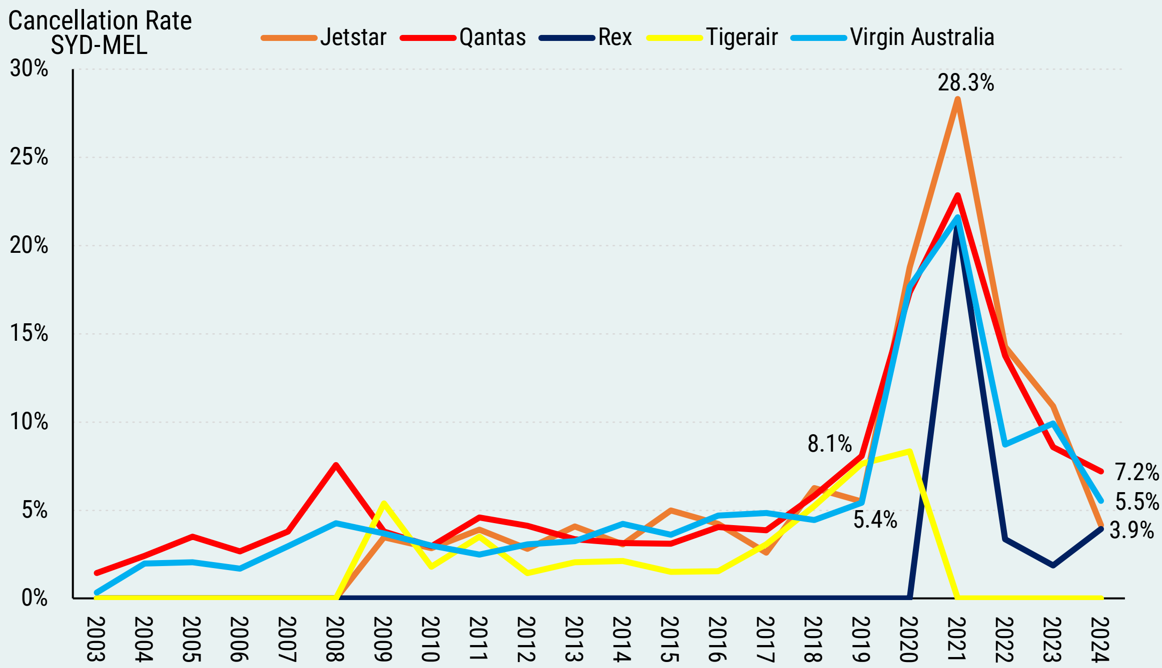
One would expect that high airport cancellation rate correlations are likely to occur where (1) there is a high frequency of services between the airports, and (2) the airports face similar adverse weather conditions at the same time.

4.4 High Frequency Key Routes by Airline

4.4.1 Sydney-Melbourne

Figure 19 below presents the cancellation rate in the case of five airlines operating services on one of the busiest city pairs on the planet, Sydney-Melbourne.[7] The cancellation rate is estimated on a calendar annual basis for each airline between 2003 and 2024.

Figure 19: Sydney-Melbourne Cancellation Rate by Airline – 2003 to 2024



Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

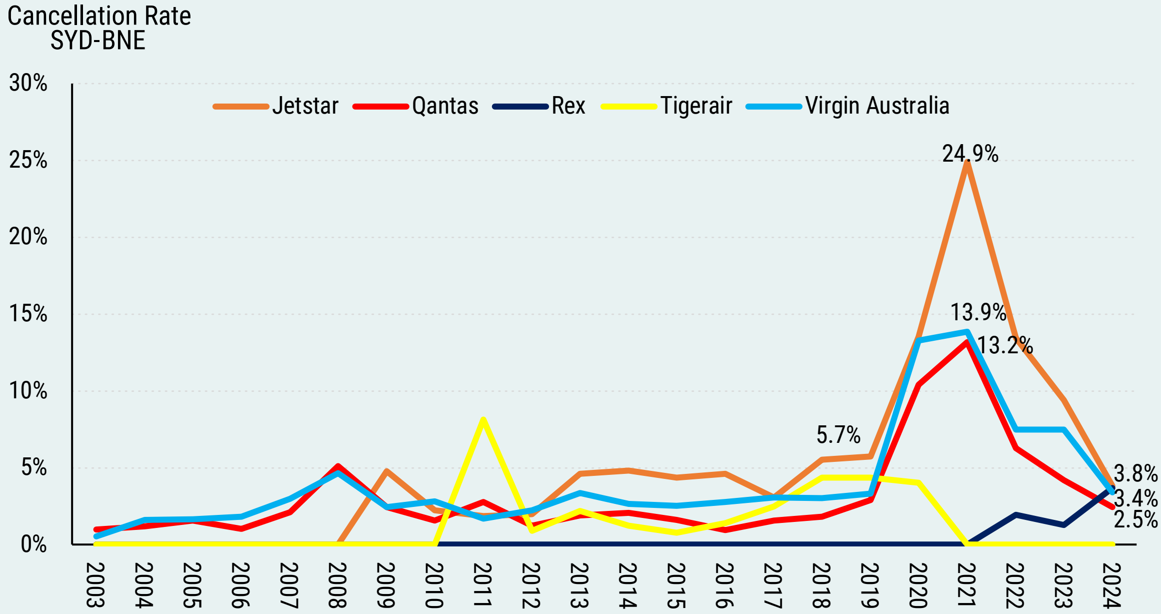
We can see in the early part of the timeframe that Qantas consistently had a higher cancellation rate on SYD-MEL than Virgin Australia, but this tended to change after 2009 with Jetstar, Qantas and Virgin Australia taking turns in having the highest cancellation rate. During Covid-19 the Jetstar cancellation rate soared higher than any other carrier to reach a high of 28.3%. The cancellation rates on SYD-MEL have fallen markedly since the Covid highs for all carriers, but they still remain elevated compared to pre-Covid levels and to historical averages. Qantas' cancellation rate at 7.2% is lower than pre-Covid levels but still very high compared to 2003 to 2015 average levels. Virgin Australia's cancellation rate in 2024 of 5.5% remains above pre-Covid highs of 5.4%. Jetstar's 2024 cancellation rate of 3.9% remains well above historical averages even though it is below pre-Covid levels.

7 The data for the city pair A-B is obtained from the BITRE On-Time Performance database. It is found by obtaining data on the number of sectors flown and the number of sectors scheduled for a departing airport that is airport A and an arriving airport that is B, and obtaining the same data for an arriving airport that is A and a departing airport that is B. The data is collected for 5 airlines by setting the airlines at Jetstar, Qantas (which includes QantasLink), Tigerair, Regional Express (which includes regional and jet services) and Virgin Australia (which includes both mainline and regional services).

4.4.2 Sydney-Brisbane

The annual movement over time in the average cancellation rate on Sydney-Brisbane is presented in ***Figure 20*** below by airline. Prior to Jetstar entering the market, Virgin Australia had the highest cancellation rate on the route over most years. From 2013 onwards, however, Jetstar's cancellation rate rose above all other carriers for the majority of the timeframe, reaching a peak of 24.9% during Covid in 2021, much higher than the 13.9% and 13.2% peaks of Virgin Australia and Qantas respectively over the same calendar year. In 2024 Jetstar continues to have the highest cancellation rate of any other carrier on Sydney-Brisbane with 3.8%, followed by Rex with 3.7%, Virgin Australia with 3.4%, and Qantas with 2.5%. All carriers have cancelation rates that are high by historical averages prior to Covid.

Figure 20: Sydney-Brisbane Cancellation Rate by Airline – 2003 to 2024

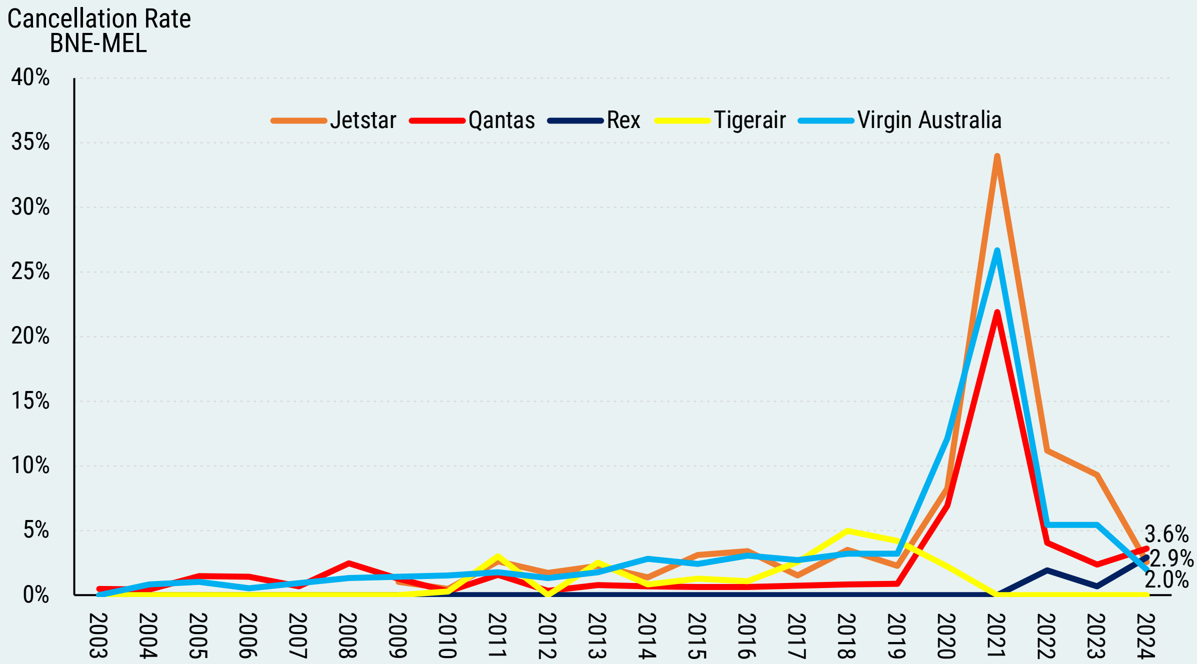


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.4.3 Brisbane-Melbourne

In the case of Brisbane-Melbourne, the average cancellation rate on a calendar annual basis is presented in ***Figure 21*** below.

Figure 21: Brisbane-Melbourne Cancellation Rate by Airline – 2003 to 2024



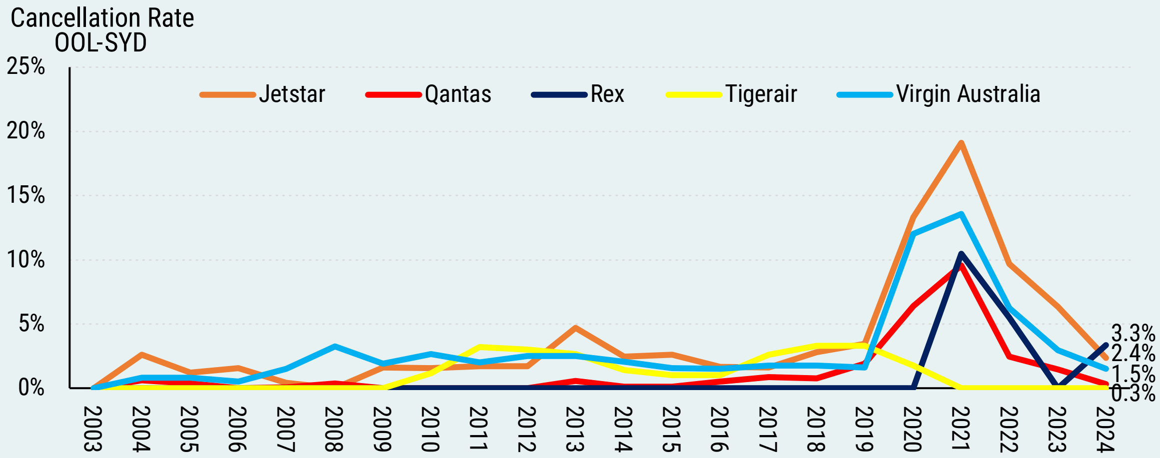
Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

Figure 21 follows similar patterns to that of Sydney-Brisbane, although early in the timeframe it is Qantas that has the highest cancellation rate on more occasions than Virgin Australia, but only marginally so. When Jetstar enters the market in 2009, the carrier soon establishes itself as having the highest cancellation rate across all of the carriers across most years (2012, 2015-2016 and 2021-2023), followed closely by Tigerair Australia (2011, 2013, 2018-2019), which has the most volatile cancellation rate, and Virgin Australia (2014, 2017). In 2024, Qantas has the highest cancellation rate of 3.6% followed by Rex Express with 2.9%, Jetstar with 2.6% and Virgin Australia with 2.0%. For most carriers cancellation rates in 2024 continue to remain high compared to pre-Covid levels and compared to historical long run averages prior to Covid.

4.4.4 Gold Coast-Sydney

The average annual cancellation rate on the Gold Coast-Sydney route is presented in ***Figure 22*** below over the time period 2003 to 2024. This route was one of Jetstar's inaugural routes, but it took some time before the carrier had the highest cancellation rate, mainly because of its relative lack of frequencies on the route. Over most annual time periods early in the timeframe, Virgin Australia had the highest rate of cancellation, followed by Jetstar, with Qantas mainline performing well on the cancellation rate until trending upward from 2015 onwards. In 2024 after a significant recovery from Covid-19, the cancellation rate was highest for Regional Express at 3.3%, followed by 2.4% for Jetstar and 1.5% for Virgin Australia. Qantas mainline has the lowest cancellation rate on Sydney-Gold Coast in 2024 at just 0.3%.

Figure 22: Gold Coast-Sydney Cancellation Rate by Airline – 2003 to 2024

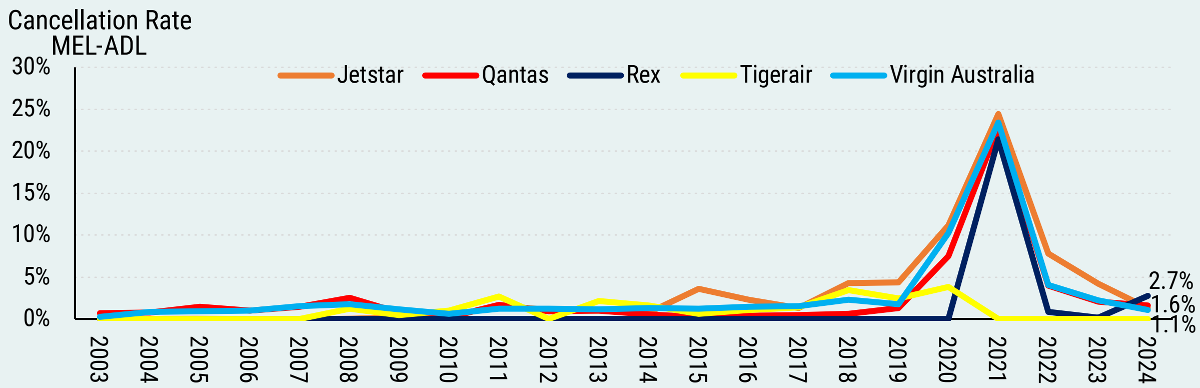


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.4.5 Melbourne-Adelaide

Figure 23 below presents the average annual cancellation rate by airline in the case of services on the Melbourne-Adelaide city pair. Over most annual points the highest cancellation rate switches between Qantas and Virgin Australia over the first 6 years of the timeframe. From 2010 to 2014 Tigerair Australia has the highest cancellation rate over most annual periods, and from 2015 onwards this mantle is taken over by Jetstar. Qantas, Virgin Australia and Regional Express Airlines all had equally high cancellation rates during Covid, however Jetstar's cancellation rate took longer to recover compared to other airlines between 2021 and 2023. In 2024, the cancellation rate of Regional Express is the highest at 2.7%, followed by Qantas at 1.6% and Jetstar at 1.2%. Virgin Australia has the lowest cancellation rate at 1.1%. Most airlines have cancellation rates that are close to historical average values in 2024 on MEL-OOL.

Figure 23: Melbourne-Adelaide Cancellation Rate by Airline – 2003 to 2024

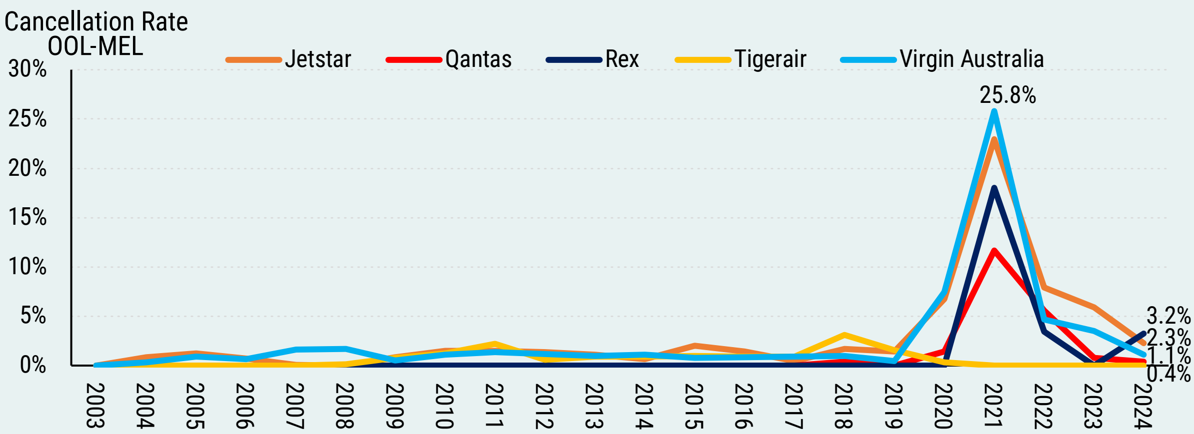


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.4.6 Gold Coast-Melbourne

Figure 24 below presents the annual average cancellation rate on the Gold Coast-Melbourne route between 2003 and 2024. For the vast majority of the timeframe there is no single airline that stands out as regularly having the highest cancellation rate. During the peak impact of Covid-19 in 2021 Virgin Australia had the highest cancellation rate at 25.8%, followed by Jetstar and then Regional Express Airlines, although Rex has the lowest frequencies of all the airlines. Virgin Australia's cancellation rate settled down the fastest in response to the industry returning to some form of normality after Covid with a cancellation rate of just 1.1% in 2024, however, Regional Express' cancellation rate remains elevated at 3.2% and Jetstar is not far below this at 2.3%. With few frequencies on the route relative to the other carriers, Qantas has managed to maintain very low levels of cancellation on the route in 2024 at 0.4%.

Figure 24: Gold Coast-Melbourne Cancellation Rate by Airline – 2003 to 2024

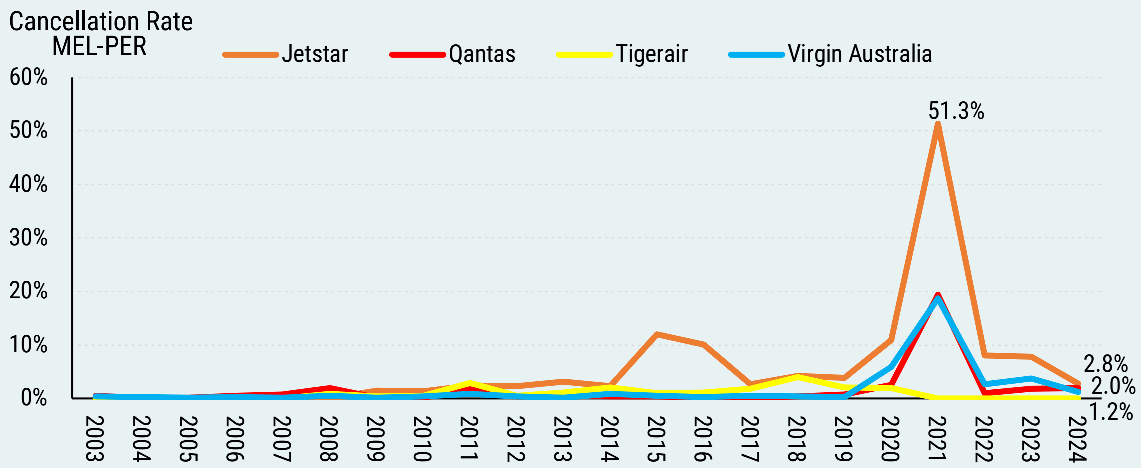


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.4.7 Melbourne-Perth

Figure 25 presents the annual time series movements in the cancellation rate by airline in the case of the Melbourne-Perth route. For both Qantas and Virgin Australia, the cancellation rate is very low for much of the timeframe with upward cycles in 2008 and 2011. When Jetstar entered the route in 2009, however, this lifted the market cancellation rate, with Jetstar experiencing the highest cancellation rate of any carrier on the route in every year since 2009 except for 2011. Such was the impact of Covid-19 on the airline, the cancellation rate rose to 51.3% in 2021. As the route returns to normal following Covid, Jetstar continues to have the highest cancellation rate in 2024 at 2.8%, followed by Qantas at 2.0% and Virgin Australia at 1.2%. Cancellation rates on the route remain elevated compared to historical averages and in some cases they are elevated compared to 2019 levels (Qantas and Virgin Australia).

Figure 25: Melbourne-Perth Cancellation Rate by Airline – 2003 to 2024

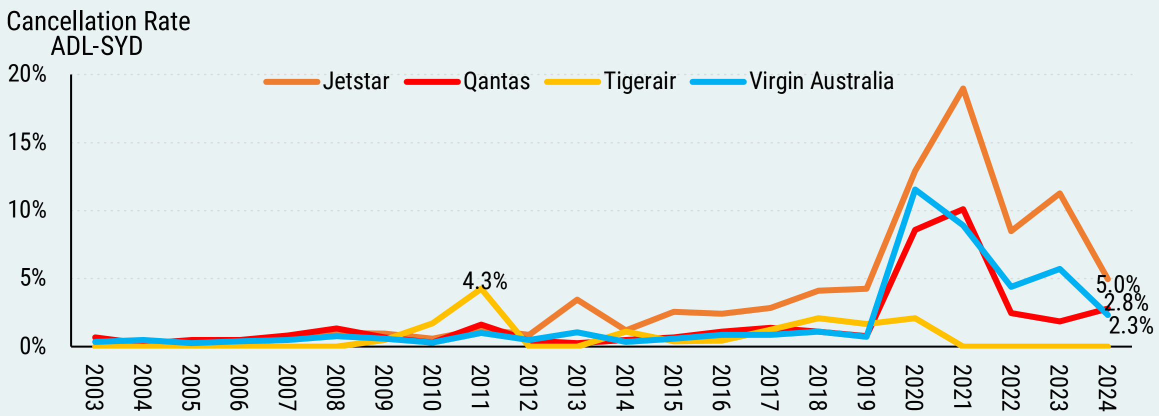


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.4.8 Adelaide-Sydney

Figure 26 presents the annual average movement in the cancellation rate by airline on the Adelaide-Sydney route. For most annual time periods in the initial 6 years of the timeframe Qantas had the highest cancellation rate. Tigerair Australia took over the mantle of the highest cancellation rate amongst the Adelaide-Sydney airlines between 2009 and 2011, with a cancellation rate above 4% in 2011. Jetstar took over from Tigerair Australia in 2012 until the remainder of the timeframe, culminating in a high cancellation rate in 2024 of 5.0%, which is followed by Qantas with 2.8% and 2.3% for Virgin Australia. The cancellation rate across all airlines continues to remain well above pre-Covid levels.

Figure 26: Adelaide-Sydney Cancellation Rate by Airline – 2003 to 2024

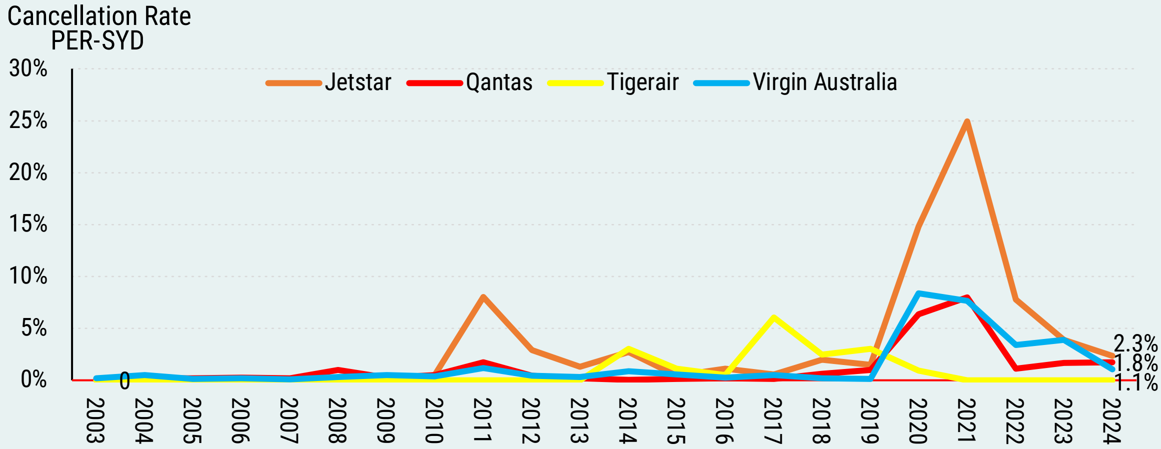


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.4.9 Perth-Sydney

Figure 27 presents the movements in the cancellation rate on SYD-PER by airline. We can see early in the timeframe that the cancellation rate was steady at low levels for both Qantas and Virgin Australia, with both airlines having the highest cancellation rate at various stages. By 2011, Jetstar took over as the airline with the highest cancellation rate, which a large spike in 2011 and elevated rates for the next 3 years. Tigerair Australia also operated with very high cancellation rates on the route, particularly in 2014, and 2017 and beyond. As is the case for a number of the top ten routes, the Jetstar cancellation rate surged above that of other carriers during Covid. The airline also has the highest cancellation rate in 2024 at 5.0%, compared to 2.8% for Qantas and 2.3% for Virgin Australia. Cancellation rates are high across all airlines compared to historical average values and compared to pre-Covid 2019 levels.

Figure 27: Perth-Sydney Cancellation Rate by Airline – 2003 to 2024

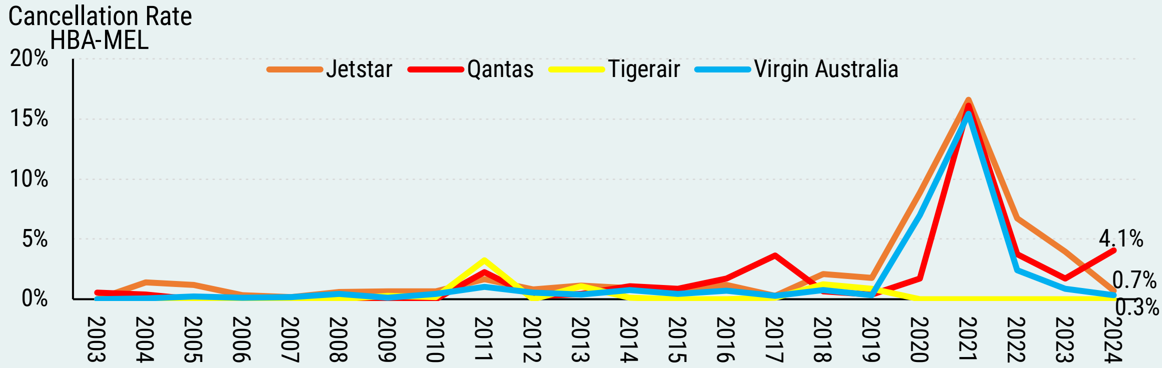


Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

4.4.10 Hobart-Melbourne

Figure 28 below presents the annual average cancellation rate in the case of HBA-MEL between 2003 and 2024. For this route the carrier that has the highest cancellation rate over most years is Jetstar, with the highest cancellation rate over 13 of the 21 years examined. The cancellation rates of Qantas, Jetstar and Virgin Australia were all heavily impacted by Covid in 2021, but none more than Jetstar. In the return from Covid, Jetstar continued to have the highest cancellation rate up until 2024, when the Jetstar cancellation rate dropped to a low 0.7%. This was higher than the Virgin Australia cancellation rate in 2024 at 0.3% but below the Qantas cancellation rate in 2024 of 4.1%. Qantas' cancellation rate on MEL-HBA services in 2024 is well above pre-Covid and historical cancellation rates but Jetstar's and Virgin Australia's are in line with historical cancelation rates.

Figure 28: Hobart-Melbourne Cancellation Rate by Airline – 2003 to 2024



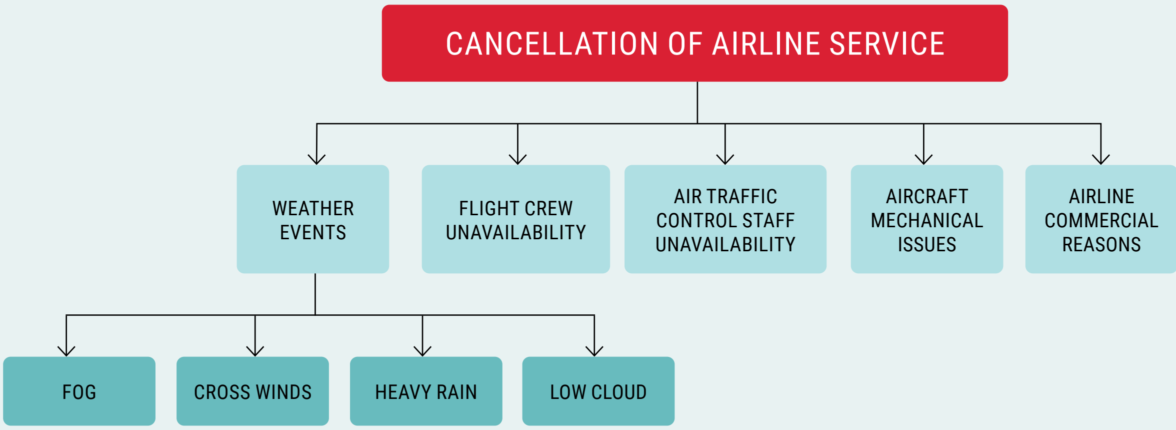
Source: *Bureau of Infrastructure, Transport and Regional Economics – On-time Performance Database*

5. Why Do Airlines Cancel Flights?

5.1 General Observations

As indicated in ***Figure 29*** below airlines cancel services for a variety of reasons. The dominant reasons include weather events, the unavailability of flight crew because of illness, the unavailability of air traffic control staff because of illness, and for airline commercial reasons. These reasons are both out of the control of airlines, such as weather events, flight crew unavailability and air traffic control staff unavailability, and within the control of airlines, such as airline commercial reasons.

Figure 29: Factors that Influence Cancellation of Services



5.2 Weather Conditions

The dominant reason for cancellation that is outside of the airline's control is the weather. Weather events that have in the past caused cancellation of airline services globally include:

- Strong cross-winds[8];
- Low cloud causing low visibility[9];
- Fog which causes low runway visibility[10];
- Thunderstorms and lightening[11];
- Snowstorms[12]; and
- Heavy rain and flooding[13].

Often these weather events occur together, for example, heavy rain and strong crosswinds will often coincide with thunderstorms and lightening.

The most important weather source of cancellation of services at Australian airports is the existence of strong crosswinds. Aircraft take-off and land into the wind to minimise the speeds that are needed to become airborne or to come to a stop. This means that when the wind is blowing across a runway rather than down or along it, and the wind speed is significant, which is typically in excess of 35 knots, this makes it impossible to safely land aircraft and take-off on the runway.

As indicated by the compass directions in ***Figure 30*** below, most of Australia's major airports lie in a north-south direction.

8 Maryanne Taouk and Alison Xiao, 2023. "Strong winds force cancellation of almost 100 flights in and out of Sydney domestic airport", *ABC News*, October 5, 2023. Accessed November 22, 2023 available at *https://www.abc.net.au/news/2023-10-05/nsw-sydney-airport-flights-cancelled-wind-gusts/102936734*.

9 Radio National New Zealand, 2023. "Low Cloud causes havoc for travellers on Tuesday", Morning Report, 6.13 am November 21, 2023. Accessed on November 22, 2023 available at *https://www.rnz.co.nz/national/programmes/morningreport/audio/2018916355/low-cloud-causes-havoc-for-travellers-on-tuesday*. Gianina Schwanecke, 2023. "Low cloud causes delays at Wellington Airport", *The Post*, November 21, 2023. Accessed November 22, 2023 available at *https://www.thepost.co.nz/nz-news/350115302/significant-flights-cancellations-and-wellington.*

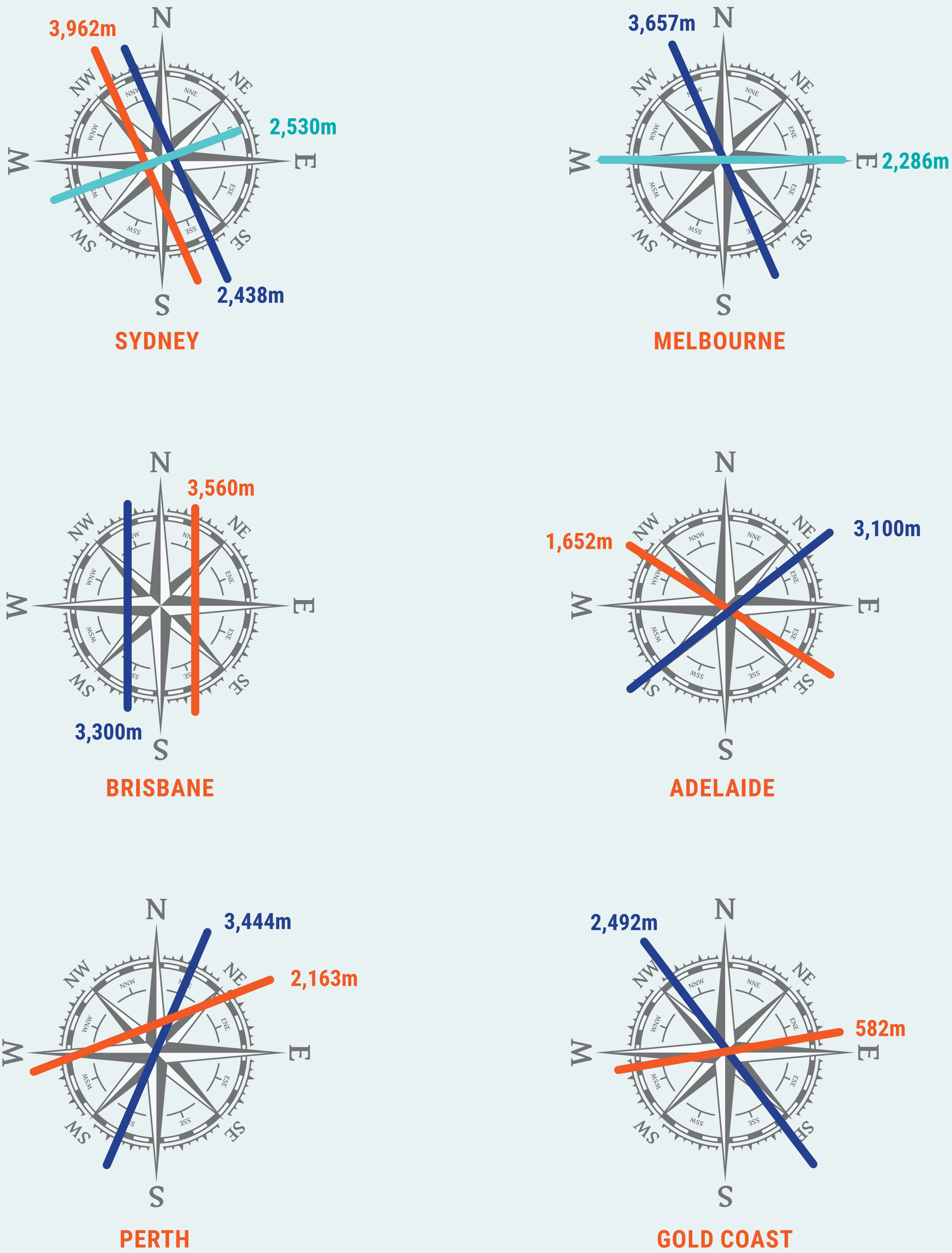
10 Rhiannon Lewin, 2023. "Heavy fog causes commuter chaos on Boxing Day as flights cancelled and ferries halted in Sydney", *Seven News*, December 26, 2022. Accessed November 22, 2023, available at *https://7news.com.au/travel/transport/heavy-fog-causes-commuter-chaos-on-boxing-day-as-flights-cancelled-and-ferries-halted-in-sydney-c-9273688*.

11 Lauren McMah, 2023. "Virgin Australia explains why thunderstorms impact flights so much", *Escape Magazine*, December 20, 2018. Accessed November 23, 2023 available at *https://www.escape.com.au/travel-advice/virgin-australia-explains-why-thunderstorms-impact-flights-so-much/news-story/53fc400ac93bbf94ed9173d15b1a0156*.

12 Andrea Sachs, 2022. "Winter storms wreak havoc on flights. Here's why.", *The Washington Post*, December 20, 2022. Accessed November 23, 2023, available at *https://www.washingtonpost.com/travel/2022/12/20/winter-storm-air-travel/*.

13 Al Jazeera, 2023. "Heavy rain causes flight cancellations, floods in Germany", *Al Jazeera News*, August 17, 2023. Accessed November 23, 2023, available at *https://www.aljazeera.com/news/2023/8/17/heavy-rain-causes-flight-cancellation-floods-in-germany*.

Figure 30: Directions of Main Runways at Australian Key Domestic Airports



Sydney Airport's longest runway lies in a north-north-west direction with a length of 3,962m, while the shorter parallel runway is 2,438m. The airport has a single runway that runs perpendicular to the north-north-west runways (running east-north-east) but it is much shorter than the main runway at 2,530m. When the wind blows from the east or the west at Sydney Airport at more than 35 knots, the airport has only one operational runway that can be used, which significantly reduces the capacity of the airport to safely land aircraft and to have aircraft take-off safely.[14]

Melbourne Airport has a single runway that points in a north-north-west direction like Sydney with a length of 3,657m, and has a runway that runs east-west but it is much shorter at just 2,286m. The fact that the east-west runway is significantly shorter than the main runway means that the capacity of the airport to land and take-off large aircraft is significantly reduced when the wind is blowing in an east-west wind direction, and the wind speed exceeds 35 knots. For example, large aircraft such as the Airbus A330 and the Boeing 777 are unlikely to be able to take-off from Melbourne Airport on the east-west runway because the runway length is too short for their safe take-off.[15]

Brisbane Airport has two main parallel runways that run south-north, with the longest runway being 3,560m in length and the shorter of the two runways 3,300m in length. The airport doesn't have a runway that runs in an east-west direction, which means that if the wind is blowing at Brisbane Airport in an east-west direction and it exceeds 35 knots then the airport may not be able to land and take-off aircraft until the wind direction changes or the wind speed falls.[16]

Adelaide Airport has two runways that are almost perpendicular to one another. The main runway is in a south-west to north-east direction and is the longest of the two runways at 3,100m while the shorter runway runs east-south-east to west-north-west with a length of just 1,652m. If the wind runs perpendicular to the longest runway at a speed in excess of 35 knots, then the airport will need to open up the shorter runway for services, which will place significant restrictions on the type of aircraft that can land and take-off from the airport.

Perth Airport has both a main runway and a cross-runway. The main runway runs in a north-north-east direction while the cross-runway runs in an east-north-east direction. Crosswinds affect the main runway at Perth when the wind direction is east-south-east or west-north-west. In the event of crosswinds this will affect the ability of the airport to land and take-off larger aircraft because the cross-runway is around 1,3km shorter than the main runway. Storms and strong wind activity have also affected the operations of Perth Airport in the past by cutting off power to the airport.[17]

The Gold Coast airport has a main runway that runs in a north-west to south-east direction and is around 2.5km long and has a much shorter runway of just 582m that runs almost parallel to this main runway. If the wind direction is across the main runway and is sufficiently strong then the airport will likely cancel all services that involve jet aircraft, such as the Boeing 737-800 of Qantas, Virgin Australia and Regional Express Airlines, and the Airbus A320 aircraft of Jetstar.

---

14 Lucy Slade, Emily Bennett and Allanah Sciberras, 2023. "Airport chaos as flight delays and cancellations hit east coast travellers", *Nine News*, July 2, 2023. Accessed November 25, 2023, available at *https://www.9news.com.au/national/airport-delays-sydney-melbourne-and-brisbane-flights-delayed-and-cancelled/a6a9c148-dd96-4d55-bee9-8eb02b5cb898*

15 Yan Zhuang, 2019. "Strong winds cause delays, cancellations at Melbourne Airport", *The Age*, July 10, 2019. Accessed November 25, 2023, available at *https://www.9news.com.au/national/airport-delays-sydney-melbourne-and-brisbane-flights-delayed-and-cancelled/a6a9c148-dd96-4d55-bee9-8eb02b5cb898*.

16 4BC Breakfast, 2022. "Flights cancelled at Brisbane Airport as 'Arctic blast' hammers south-east", *4BC Breakfast*, May 31, 2022. Accessed November 25, 2023, available at *https://www.4bc.com.au/flights-cancelled-at-brisbane-airport-as-arctic-blast-hammers-south-east/*.

17 Sarah Brookes and Holly Johnson, 2022. "Record winds smash Perth leaving thousands without power, and there's more on the way", *WA Today*, August 2, 2022. Accessed November 25, 2023, available at *https://www.watoday.com.au/national/western-australia/blackouts-monster-swells-and-record-winds-smash-perth-with-more-on-the-way-20220802-p5b6h7.html*.

5.3 Unavailability of Staff

When cabin crew and/or flight crew are ill and unable to fly, the airline will attempt to find replacement crew. When many crew members call into the airline ill at the same time, or they call in ill on the morning of a flight or close to the departure of the flight, this makes it very difficult for the airline to find replacement crew.

Replacement crew must be eligible to fly according to an airline's or the industry's crew rest rules, with many crew members likely to be ineligible to replace the sick crew if they have just completed a large number of continuous flying hours, which in turn requires them to have a certain number of hours of days off as rest prior to resuming flying commitments.[18] If there are difficulties finding replacement crew as a result of managing crew fatigue, this makes it very difficult for the airline to maintain its schedule resulting in the airline cancelling services.[19]

It could be argued that it isn't unusual to have sick or ill employees. This is an inherent part of doing business. Many industries must implement measures to deal with the disruption caused by sick or ill employees, such as schools, train, bus and ferry services, and hospitals. The airline can, of course, employ more back-up pilots and crew to accommodate situations in which a large number of crew call in sick at the same time and at short notice, however this comes at a significant cost to the airline, which is likely to be passed onto passengers through higher airfares. The airline must balance these extra costs associated with employing more back-up crew against the likelihood of being unable to find replacement crew during periods in which a number of crew call in sick at the same time and at short notice.

Short notice illness of staff can also affect the operations of air traffic control towers. If air traffic controller staff call in ill at short notice and cannot be replaced, then this may leave the control tower with too few staff to oversee the safe arrival and departure of the scheduled aircraft. In this case it's necessary to reduce the number of arrivals and departures so that they can be handled by fewer air traffic control staff, which in turn means cancelling services.[20]

18 U.S. ALPA, 2006. "Guide to Flight Time Limitations and Rest Requirements", *ALPA*. Accessed November 26, 2023, available at *https://www3.alpa.org/portals/alpa/committees/ftdt/Guide-to-FTDT-Limits-6-A-ed-June-04.pdf*.

19 Jamie Freed, 2022. "Virgin Australia says high staff illness rates hampering capacity, lifting fares", *Reuters*, September 14, 2022. Accessed November 24, 2022, available at *https://www.reuters.com/business/aerospace-defense/virgin-australia-says-high-staff-illness-rates-hampering-capacity-lifting-fares-2022-09-14/*. *Daily Mail Newspaper*, September 15, 2023. Accessed November 24, 2023, available at *https://www.dailymail.co.uk/news/article-12521607/gatwick-airport-flight-chaos-travellers-stranded-overnight.html*.

20 John James and Eirian Jane Prosser, 2023. "Gatwick flights chaos 'caused by a sickie': Air traffic control 'was down to TWO people after one person called in sick', sparking travel hell for thousands", *The Daily Mail UK*. September 15, 2023. Accessed November 28, 2023 available at *https://www.dailymail.co.uk/news/article-12521607/gatwick-airport-flight-chaos-travellers-stranded-overnight.html?utm_source=flipboard&utm_content=DailyMailUS%2Fmagazine%2FTop+Stories*.

5.4 Aircraft Mechanical Issues

A problem is often identified with an aircraft by a pilot or by line maintenance crew when performing pre or post flight inspections, or during flight. If the problem cannot be fixed in time for the next flight, and another aircraft is not available to replace the aircraft that requires repair, then the next flight may need to be cancelled.

To fix problems that have been identified by line maintenance employees or the pilot, the airline must follow the steps set out in the maintenance procedure manual. The maintenance technician that is tasked with fixing this problem must collect all of the necessary tools, diagnostic equipment and parts that are required to attempt to fix the problem. These are all listed in the maintenance procedure manual. These tools, equipment and parts are often very difficult to find and may take time to locate. Indeed, the airline may not have all of the parts and diagnostic equipment necessary to fix the problem, with some parts and equipment needed to be flown into the location of the aircraft that needs maintenance from other locations. This will depend on the location of the major spare part hubs of the airline.

Once the maintenance technician fixes the problem, the technician must account for all of the tools that have been used and must record the steps that have been taken to fix the aircraft in the aircraft's maintenance logbook. The maintenance technician must then locate a quality assurance engineer to ensure that the technician's work follows the maintenance procedure manual, and the work performed has fixed the underlying problem. This assurance check is often required by safety regulators.

If the aircraft requires certain components to be replaced, then the pilot or the maintenance technician must check to determine if the new components have been installed properly and are functioning the way that they should be functioning. After these checks are completed and the quality assurance engineer has given the aircraft the all clear to return to operations then the aircraft can be returned to flying, and this is written-into the aircraft logbook.

As indicated above, there are a number of stages in this maintenance process that may cause a delay in the aircraft returning to operations. Any of these delays may be significant enough to cause a cancellation of services if the airline does not have an aircraft that is available to replace the aircraft that has maintenance issues.

5.3 Commercial Reasons

5.3.1 Landing Slots are Airline Intangible Assets

Take-off and landing slots at highly congested airports are often a part of the intangible assets of an airline, along with rights to fly to different countries. For example, in the balance sheet contained in the annual report of Ryanair in 2022 is a breakdown of its assets, which includes €146.4m in intangible assets that are exclusively attributable to landing rights as presented in ***Table 2*** below.

Table 2: Landing Rights Intangible Asset of Ryanair

	As March 31, 2022 €M	As March 31, 2021 €M	As March 31, 2020 €M
Landing Rights			
Balance at beginning of the year	146.4	146.4	146.4
Balance at end of year	146.4	146.4	146.4

Source: *Ryanair Annual Report 2022, p.177.*[21]

Airlines view landing slots at congested airports as an asset on which it will make a return. By deploying its aircraft at the relevant airport and taking-off or landing at the time of the slot, this permits the airline to generate income from that aircraft asset. Without access to the landing or take-off slot it is not possible to operate the aircraft to generate income. If the landing or take-off slot occurs at a morning or afternoon peak, this raises the value of the asset to the airline. This is because the airline is likely to generate more income by flying aircraft during the morning and afternoon peaks compared to an off-peak time of the day. The morning and afternoon peaks will generate higher seat factors, higher yield, and greater revenue because passengers place a higher value on flying during these more convenient and highly valued times of the day.

If the airline gives up a landing slot at a congested airport at a peak time of the day, this affects the asset base of the airline**,** and it reduces the income that the airline is able to generate. By giving up the landing slot, this means that the slot is available to other airlines. These other airlines may use the slot to fly to destinations that are a part of the destination set of the airline that gave up the slot, which means competitor airlines are gifted a free asset. There are therefore strong incentives for airlines not to give up landing slots at airports particularly during the morning and afternoon peaks.

5.3.2 Cancellation of Services and Airline Profits

An airline's profit is its revenue less its costs. Let us suppose that on a particular flight ***A*** on a particular route the airline flies an aircraft with *S* seats on board. The airline is paid an average airfare of P^A and operates to a passenger seat factor of PSF^A.[22] The distance that the aircraft travels on flight ***A*** is ***D*** while the variable cost per available seat kilometre (ASK) of the airline is ***c*** for the flight.[23] The Earnings Before Interest Tax Depreciation Amortisation and Rentals (EBITDAR) for flight ***A*** is:

$$\pi^A = P^A x PSA^A x S - cxDxS \quad (2)$$

Consider another flight on the same route, which we will call flight ***B***. The profit generated from that flight is:

$$\pi^B = P^B x PSA^B x S - c\,xDxS \quad (3)$$

where P^B is the average airfare and PSF^B is the passenger seat factor on flight ***B*** on the same route. Both the average airfare P^B and the passenger seat factor PSF^B will be different on flight ***B*** compared to flight ***A*** depending on whether flight ***B*** occurs at a peak or off-peak time relative to flight ***A***.

If the airline does not cancel flights ***A*** and ***B*** the profit that the airline earns on the route is **(2)** plus **(3)**, which is:

$$\pi = \pi^A + \pi^B = (P^A x PSA^A + P^B x PSA^B) x S - 2xcxDxS \quad (4)$$

21 Accessed November 23, 2023 available at *https://investor.ryanair.com/wp-content/uploads/2022/07/Ryanair-2022-Annual-Report.pdf*.
22 The passenger seat factor is the number of passengers on an aircraft divided by the number of seats on the aircraft. It is the percentage of seats that are filled by revenue generating passengers.
23 Available seat kilometres or ASKs for short equals the number of seats flown times the average distance those seats are flown. In our analytical exposition it is equal to *SxD* per flight.

A key part of **(4)** is that the costs are the same per flight, which is why the last term on the right-hand side is the cost of a single flight times 2. The costs are unaffected by the timing of the flights. The revenue, conversely, is so affected because the average airfares and the passenger seat factors are likely to be different between flights ***A*** and ***B***.

Let us suppose now that the airline decides to cancel flight ***B***. Some passengers booked on ***B*** will be rebooked on flight ***A***. Depending on how far out from departure the flight is cancelled, there will also be new passengers who attempt to book a seat on flight ***A*** after the cancellation of flight ***B***. These new passengers have fewer seats to choose from. A combination of both the rebooked passengers and passengers that book a seat on flight ***A*** post the cancellation of flight ***B*** will generate different outcomes for the average airfare and the passenger seat factor on flight ***A*** after the cancellation. Let us define the average airfare on flight ***A*** after the cancellation of flight ***B*** as P_C^A and the passenger seat factor after the cancellation is PSF_C^A. The profit that the airline earns from the route after the cancellation is equal to:

$$\pi_C^A = P_C^A x PSF_C^A x S - c x D x S \qquad \textbf{(5)}$$

You will notice in **(5)** that we now have a single revenue stream which is different from the original flight ***A***, and only a single cost item.

The route profit after cancellation at ***(5)*** exceeds the route profit before the cancellation at ***(4)*** when:

$$\pi_C^A > \pi$$

or

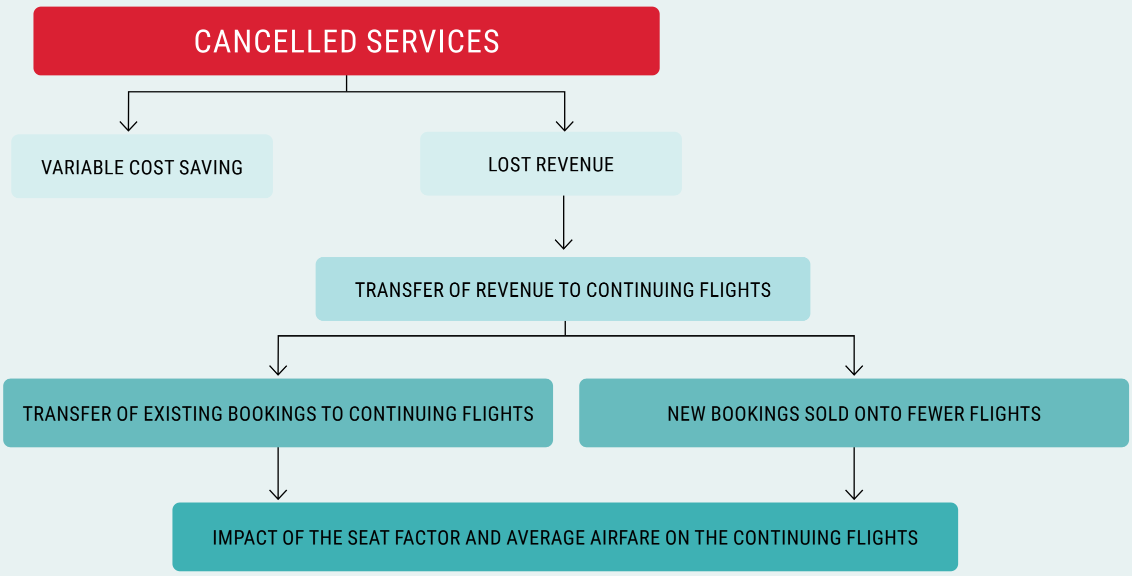
$$(P^A x PSA^A + P^B x PSA^B) - P_C^A x PSF_C^A < cxD \qquad \textbf{(6)}$$

Equation **(6)** says that cancellation of flight ***B*** will improve the airline's profit, if the additional revenue that the airline generates from running the cancelled flight doesn't exceed the additional cost of running the cancelled flight. This is more likely to occur when **(1)** the costs are high of running the cancelled flight (***cxDxS***) is high, **(2)** most passengers from the cancelled flight rebook with the airline (PSF_C^A is much higher than PSF^A), ***(3)*** and the airline is able to sell seats to new passengers post the cancellation at elevated fares (P_C^A is close to P^A) – this is summarised in ***Figure 31*** below.

Consider the following numerical example of the above two-route analytics and ***Figure 31***. Let us suppose that each variable in **(6)** takes on the following numerical values:

- **D=706km** (the route distance);
- **c = 0.12** (cost per available seat kilometre);
- **P^A = 175** (average airfare from flight ***A*** in a world without the cancellation);
- **P^B = 130** (average airfare from flight ***B*** in a world without the cancellation);
- **PSF^A = 75%** (passenger seat factor on flight ***A*** in a world without the cancellation);

FIGURE 31: Impact on Variable Costs and Revenue of a Cancelled Service



- PSF^{B} = 40% (passenger seat factor on flight *B* in a world without the cancellation);
- P^{A}_{C} = 160 (average airfare on flight *A* in the world with the cancellation);
- PSF^{A}_{C} = 100% (passenger seat factor on flight *A* in the world with the cancellation).

Substituting these numbers into the formula at **(6)** yields:

[175x0.75 + 130x0.4 – 160x1] = 23.25 < 0.12x706 = 84.72

This confirms that the profit the airline obtains from cancelling service ***B*** exceeds the profit the airline earns by operating both ***A*** and ***B***. This result is achieved because the airline is able to fill the flight that isn't cancelled, so it gained an additional 25% in passenger seat factor as a result of the cancellation. The airline saved **0.12x706** per seat in costs because it no longer operated the cancelled service. Lastly, the average airfare for the non-cancelled flight ***A*** benefited from sales to passengers after the cancellation, meaning that the average airfare for the non-cancelled flight ***A*** did not materially fall compared to the airfare expected on flight ***A*** if flight ***B*** was not cancelled.

Let us now assume that the passenger seat factor on the ***B*** flight is higher at ***PSF^{B}* = 70%** and the average airfare on the ***B*** flight is ***P^{B}* = $170**. This means that there is a lot more to lose in terms of revenue by not operating the ***B*** flight. Substituting these new values into **(6)** yields:

[175x0.75 + 170x0.7 – 160x1] = 90.25 < 0.12x706 = 84.72

In this case the airline is better-off operating the two flights and not cancelling flight ***B***. This is largely because the ***B*** flight is no longer underperforming in terms of profitability and is a significant contributor to the airline's fixed costs.

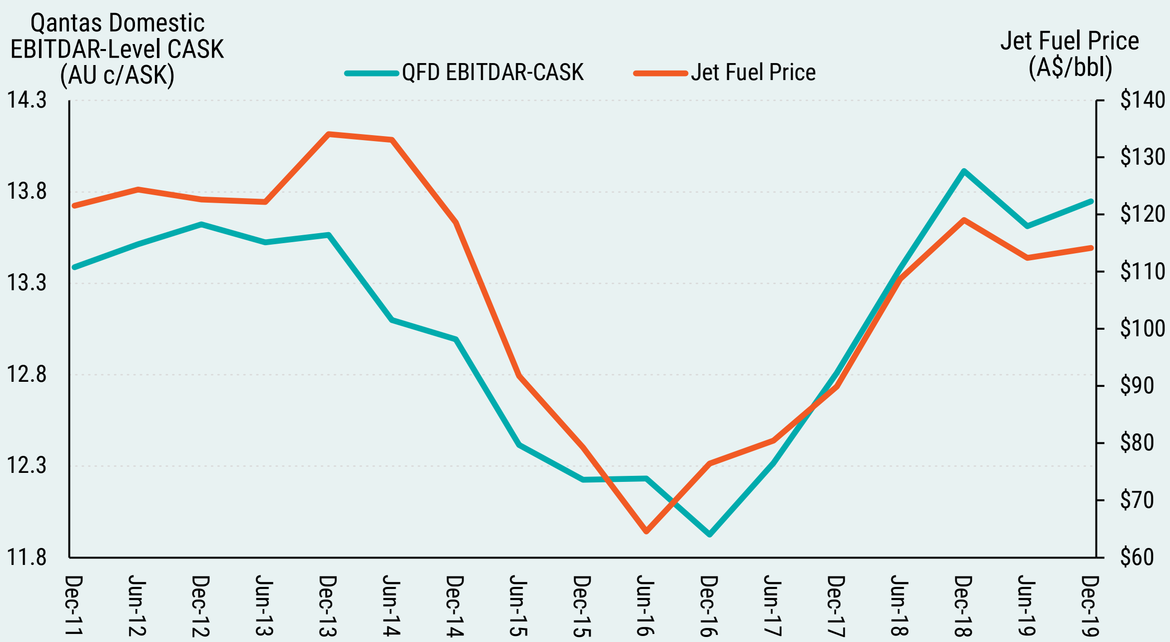
In the sections below we discuss in more detail the cost savings that an airline enjoys by cancelling a flight (***section 5.3.2***) and the revenue that is foregone by cancelling a flight (***section 5.3.3***). Both the cost savings and the revenue foregone are important parts of the numerical and analytical illustrations presented in this section.

5.3.2 Airline Cost Driver of Cancellations

The variable costs that an airline avoids when it cancels a service includes fuel, flight and cabin crew costs, air meals, station engineering, ground handling, and airport and terminal navigation charges. What is the main driver of these avoidable variable costs? There are a number of potential drivers including the Australian dollar price of one US dollar, the wages paid to cabin crew, flight crew and ground handlers, flight crew and ground handling labour productivity, and landing and terminal charges paid to airports.

The main driver of the movements in avoidable cancellation costs over time is the price of fuel. To demonstrate this, consider ***Figure 32*** below, which presents the EBITDAR-level cost per ASK of Qantas domestic (blue line read from the left vertical axis) graphed against the Australian dollar value of jet fuel prices (orange line read from the right vertical axis).

Figure 32: Qantas Domestic EBITDAR-Cost per ASK Vs Australian Dollar Jet Fuel Price

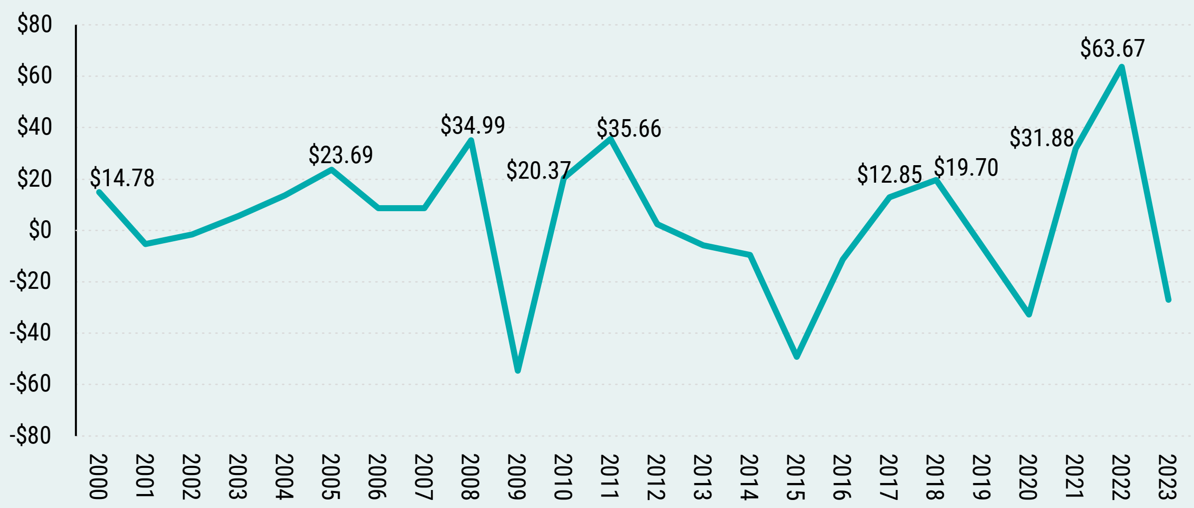


Source: *Airline Intelligence and Research Database, Energy Information Administration, Reserve Bank of Australia*

We can see in ***Figure 32*** that the movement in the cost per ASK and jet fuel price lines follow each other relatively closely over the time period examined. Indeed, the two variables in the graph share a high +86% gross correlation between each other. This indicates that movements in the jet fuel price between 2011 and 2019 are likely to have been the most dominant variable in explaining movements in Qantas domestic variable cost per ASK over the time period examined. Econometric modelling indicates that each time the jet fuel price increases by $10 per barrel, the EBITDAR-level cost per ASK of Qantas domestic increases by 0.25 Australian cents per ASK.[24]

An airline will typically schedule its capacity in the market up to twelve months prior to the departure of the flight. This is usually to allow passengers enough time to book a seat on the flight. The airline's estimate of the variable cost for the scheduled flight will depend heavily on the jet fuel price at the time the flight is scheduled. The jet fuel price at the departure of the flight, however, may vary considerably from the jet fuel price at the point of scheduling. This can be seen in ***Figure 33*** below, which demonstrates how the price of jet fuel can change over the space of 12 months. ***Figure 33*** indicates that between calendar 2021 and 2022 the price of jet fuel increased by US$64 per barrel, between 2010 and 2011 it increased by US$36 per barrel, and between 2007 and 2008 it increased by US$35 per barrel.

Figure 33: Annual Changes in Jet Fuel Prices – 2000 to 2023



Source: *Energy Information Administration*

In the case of Qantas mainline domestic services, an increase in the price of jet fuel of US$64 or A$97 per barrel will result in an increase in Qantas EBITDAR Cost per ASK of 2.43 Australian cents per ASK. Faced with an unexpected surge in jet fuel prices such as this, and the subsequent increase in variable costs, this significantly increases the benefits to the airline of cancelling those flights that (1) operate during the off-peak, (2) have a high probability of being EBITDAR negative, or not contributing to fixed costs, and (3) have a number of flights on the same route that take place at reasonably adjacent times.

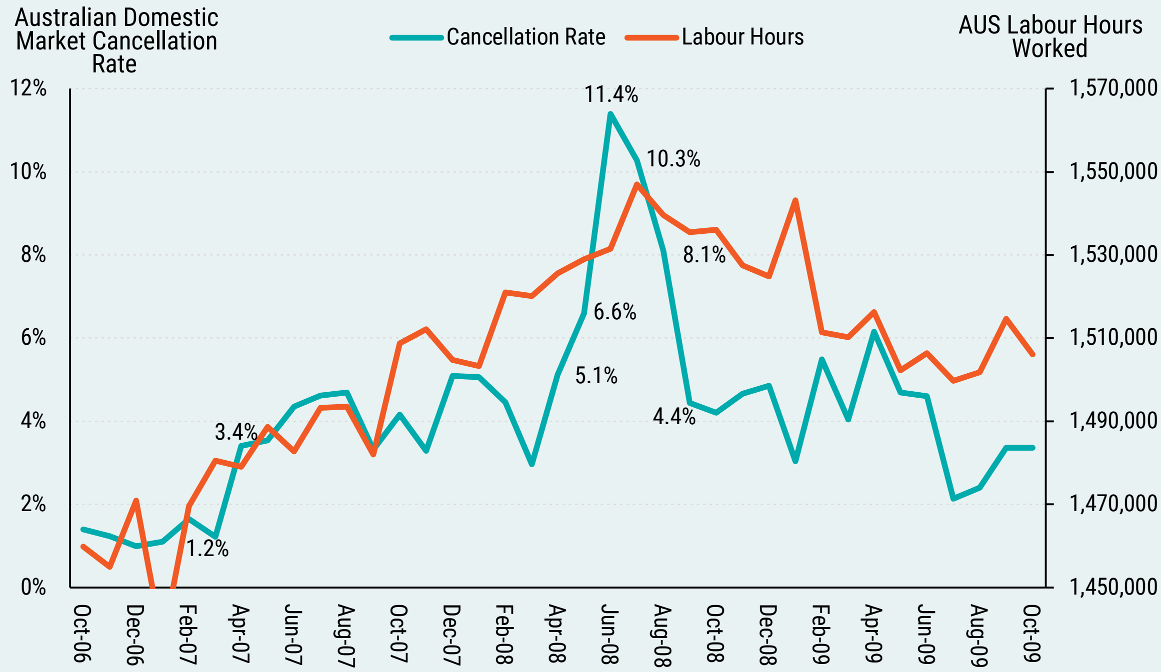
5.3.3 Airline Demand and Revenue Driver of Cancellations

When an airline schedules capacity in advance of departure it has a view about economic activity and the way that it will influence demand and revenue on the route over the year ahead. If that view about economic activity is incorrect, and economic activity is much weaker than expected, then the revenue that the airline generates from both the peak and off-peak flights will be weaker than expected. This means that there will be more flights during the off-peak which are not able to contribute to fixed costs or they are EBITDAR negative. The only operational lever that is available to the airline to respond to this much weaker level of demand is that of cancelling flights that it expects will be EBITDAR negative.

24 This econometric modelling is available from the author upon request.

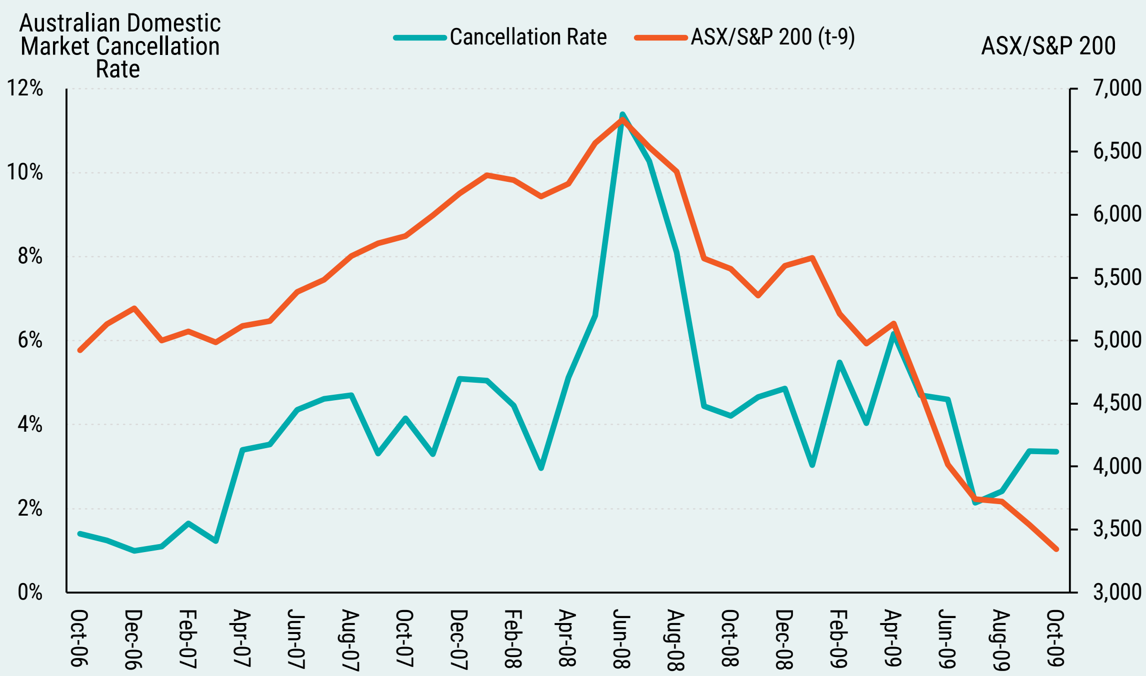
The Global Financial Crisis was a perfect backdrop for this type of phenomena occurring in 2008. In 2007 when Australian domestic airlines were scheduling aircraft for the calendar 2008 season, they were not expecting an economic downturn at all, let alone a downturn that was as severe and long-lived as the Global Financial Crisis. In response to rapidly falling forward bookings and the onset of the crisis, airlines in the domestic aviation market began to rapidly cancel services. We evidence this below in ***Figures 34*** and ***35***.

Figure 34: Australian Domestic Cancellation Rate Versus Australian Labour Hours Worked



Source: *Australian Bureau of Statistics: Labour Force; Bureau of Infrastructure, Transport and Regional Economics: OTP database*

Figure 35: Australian Domestic Cancellation Rate Versus ASX/S&P 200



Source: *Yahoo Finance; Bureau of Infrastructure, Transport and Regional Economics: OTP database*

In ***Figure 34***, the blue line is the domestic cancellation rate for the entire Australian domestic network on a monthly basis between October 2006 and October 2009. We can see that the cancellation rate across the entire Australian domestic network increased sharply from 1.2% in March 2007 to 3.4% in April 2007, it then remained at and around this level for the next 12 months before climbing to extraordinarily high levels of 5.1% in April 2008, 6.1% in May 2008 and to a high of 11.4% in June 2008 during the height of the impact of the Global Financial Crisis. It then began to decline to 10.3% in July 2008, 8.1% in August 2008 and then 4.4% in September 2008. The cancellation rate then remained choppy at and around this level for the next 12 months. We can see in ***Figure 34*** that this coincided with labour hours worked in the Australian economy that continued to rise up until around mid-2008 and then began to decline sharply, falling by 2.9% between July 2008 and August 2009. Labour hours worked typically grows by around 2% per year on average, so a fall of 2.9% is a remarkably significant drop and evidences a sharp weakening in the Australian economy.

Well before labour hours worked weakened, we saw a sharp decline in the Australian share market. A sharply weaker economy is almost always preceded by a significant drop in the share market. This is precisely what we saw in the case of the Australian share market during the Global Financial Crisis. As can be seen in ***Figure 35***, the share market began to significantly decline 9 months prior to the peak in the cancellation rate. The orange line in ***Figure 35*** shows the ASX/S&P 200, which is the leading index representing the Australian share market, lagged 9 months. This means that the peak in the orange line shown in June 2008 in the graph, actually took place 9 months earlier in September 2007. It is the sharp decline in the Australian share market which began three quarters of the way through 2007 which is likely to have started the escalation in the Australian domestic market cancellation rate towards the latter half of calendar 2007. Domestic Australian airlines began to see the declining share market both in Australia and overseas, along with worrying signs about both the Australian and global economy and has combined that with falling forward bookings to determine that they needed to begin cancelling services as expected lower demand, yields and revenue are likely to have driven marginal flights to become EBITDAR negative. The two figures clearly demonstrate that Australia's domestic airlines will eagerly cancel flights if they believe that this is the profit maximising course of action.

5.3.4 More Comprehensive Numerical Example

To demonstrate these revenue and cost views, consider the following hypothetical numerical example which is based on what we actually observe on the Sydney-Melbourne route. Qantas flies 37 daily services during the week using a Boeing 737-800 aircraft with 174 seats on Sydney-Melbourne as presented in Table 3 below. The flight numbers and time of departure are presented in column (1), the expected number of passengers booked on each flight prior to departure are presented in column (2), the expected passenger seat factor (PSF) is presented in column (3), the expected average airfare for the flight is presented in column (4), the expected revenue is presented in column (5) equal to the average airfare multiplied by number of passengers per flight, the expected EBITDAR costs in column (6) are determined by multiplying the EBITDAR cost per available seat kilometre equal to A$0.1650 by the number of ASKs, which equals 174 times the distance which is 706km, and the final column (7) is equal to revenue in column (5) less costs in column (6). Column (7) indicates that on a daily basis, the airline expects to earn A$183,479 in EBITDAR from all of the flights combined, which represents A$67m for the year. All flights are expected to be EBITDAR positive, meaning that the revenue from each flight exceeds the variable cost from each flight. This in turn means that each flight contributes to fixed costs and as a result there is no incentive to cancel any of the flights.

Table 3: Qantas Flights, Cost and Revenue on Sydney-Melbourne Prior to Cancellation

Flight (1)	Passengers Booked (2)	PSF (3)	Average Airfare (4)	Revenue (5) = (2) x (4)	EBITDAR Costs (6)	EBITDAR (7) = (5) – (6)
QF 401 06:00	130	74.7%	$160	$20,800	$20,269	$531
QF 405 06:30	140	80.5%	$170	$23,800	$20,269	$3,531
QF 409 07:00	160	92.0%	$175	$28,000	$20,269	$7,731
QF 415 07:30	160	92.0%	$180	$28,800	$20,269	$8,531
QF 419 08:00	170	97.7%	$185	$31,450	$20,269	$11,181
QF 421 08:15	160	92.0%	$190	$30,400	$20,269	$10,131
QF 423 08:30	155	89.1%	$195	$30,225	$20,269	$9,956
QF 425 08:45	155	89.1%	$190	$29,450	$20,269	$9,181
QF 427 09:00	150	86.2%	$185	$27,750	$20,269	$7,481
QF 431 09:30	150	86.2%	$180	$27,000	$20,269	$6,731
QF 433 10:00	145	83.3%	$180	$26,100	$20,269	$5,831
QF 435 10:30	140	80.5%	$175	$24,500	$20,269	$4,231
QF 437 11:00	140	80.5%	$175	$24,500	$20,269	$4,231
QF 439 11:30	135	77.6%	$175	$23,625	$20,269	$3,356
QF 441 12:00	135	77.6%	$170	$22,950	$20,269	$2,681
QF 443 12:00	125	71.8%	$170	$21,250	$20,269	$981
QF445 13:00	120	69.0%	$170	$20,400	$20,269	$131
QF447 13:30	125	71.8%	$165	$20,625	$20,269	$356
QF449 14:00	125	71.8%	$163	$20,375	$20,269	$106
QF455 15:00	125	71.8%	$165	$20,625	$20,269	$356
QF459 15:30	130	74.7%	$165	$21,450	$20,269	$1,181
QF461 15:45	130	74.7%	$165	$21,450	$20,269	$1,181
QF463 16:00	135	77.6%	$170	$22,950	$20,269	$2,681
QF467 16:30	140	80.5%	$170	$23,800	$20,269	$3,531
QF471 17:00	150	86.2%	$175	$26,250	$20,269	$5,981
QF473 17:15	150	86.2%	$180	$27,000	$20,269	$6,731
QF475 17:30	160	92.0%	$185	$29,600	$20,269	$9,331
QF477 17:45	165	94.8%	$190	$31,350	$20,269	$11,081
QF479 18:00	170	97.7%	$190	$32,300	$20,269	$12,031
QF481 18:15	165	94.8%	$185	$30,525	$20,269	$10,256
QF483 18:30	160	92.0%	$185	$29,600	$20,269	$9,331
QF485 18:45	150	86.2%	$180	$27,000	$20,269	$6,731
QF487 19:00	140	80.5%	$170	$23,800	$20,269	$3,531
QF493 20:00	130	74.7%	$165	$21,450	$20,269	$1,181
QF495 20:30	128	73.6%	$164	$20,992	$20,269	$723
QF497 21:00	126	72.4%	$165	$20,790	$20,269	$521
QF499 22:00	125	71.8%	$164	$20,500	$20,269	$231
Total	5299	82.3%	$176	$933,432	$749,953	$183,479

Let us now assume, however that the airline expects jet fuel prices to increase as a result of the outbreak of war and political tension in the Middle East. The higher jet fuel costs result in the EBITDAR cost per ASK of Qantas increasing from $0.1650 to $0.1750. The impact that the higher fuel costs are expected to have on costs and EBITDAR per flight are presented in ***Table 4*** below. In response to the higher fuel and EBITDAR costs, 12 flights are expected to become EBITDAR negative as shaded in light blue in Table 4. These flights include the following off-peak services:

(1) QF 401 at 06:00 with EBITDAR of -$698
(3) QF 445 at 13:00 with EBITDAR of -$1,098
(5) QF 449 at 14:00 with EBITDAR of -$1,123
(7) QF 459 at 15:30 with EBITDAR if -$48
(9) QF 493 at 20:00 with EBITDAR of -$48
(11) QF 497 at 21:00 with EBITDAR of -$708
(2) QF 443 at 12:00 with EBITDAR of -$248
(4) QF 447 at 13:30 with EBITDAR of -$873
(6) QF 455 at 15:00 with EBITDAR of -$873
(8) QF 461 at 15:45 with EBITDAR of -$48
(10) QF 497 at 21:00 with EBITDAR of -$506
(10) QF 499 at 22:00 with EBITDAR of -$998

Table 4: Qantas Flights, Cost and Revenue on Sydney-Melbourne Prior to Cancellation After Higher Jet Fuel Prices

Flight (1)	Passengers Booked (2)	PSF (3)	Average Airfare (4)	Revenue (5) = (2) x (4)	EBITDAR Costs (6)	EBITDAR (7) = (5) – (6)
QF 401 06:00	130	74.7%	$160	$20,800	$21,498	-$698
QF 405 06:30	140	80.5%	$170	$23,800	$21,498	$2,302
QF 409 07:00	160	92.0%	$175	$28,000	$21,498	$6,502
QF 415 07:30	160	92.0%	$180	$28,800	$21,498	$7,302
QF 419 08:00	170	97.7%	$185	$31,450	$21,498	$9,952
QF 421 08:15	160	92.0%	$190	$30,400	$21,498	$8,902
QF 423 08:30	155	89.1%	$195	$30,225	$21,498	$8,727
QF 425 08:45	155	89.1%	$190	$29,450	$21,498	$7,952
QF 427 09:00	150	86.2%	$185	$27,750	$21,498	$6,252
QF 431 09:30	150	86.2%	$180	$27,000	$21,498	$5,502
QF 433 10:00	145	83.3%	$180	$26,100	$21,498	$4,602
QF 435 10:30	140	80.5%	$175	$24,500	$21,498	$3,002
QF 437 11:00	140	80.5%	$175	$24,500	$21,498	$3,002
QF 439 11:30	135	77.6%	$175	$23,625	$21,498	$2,127
QF 441 12:00	135	77.6%	$170	$22,950	$21,498	$1,452
QF 443 12:00	125	71.8%	$170	$21,250	$21,498	-$248
QF445 13:00	120	69.0%	$170	$20,400	$21,498	-$1,098
QF447 13:30	125	71.8%	$165	$20,625	$21,498	-$873
QF449 14:00	125	71.8%	$163	$20,375	$21,498	-$1,123
QF455 15:00	125	71.8%	$165	$20,625	$21,498	-$873
QF459 15:30	130	74.7%	$165	$21,450	$21,498	-$48
QF461 15:45	130	74.7%	$165	$21,450	$21,498	-$48
QF463 16:00	135	77.6%	$170	$22,950	$21,498	$1,452
QF467 16:30	140	80.5%	$170	$23,800	$21,498	$2,302
QF471 17:00	150	86.2%	$175	$26,250	$21,498	$4,752
QF473 17:15	150	86.2%	$180	$27,000	$21,498	$5,502
QF475 17:30	160	92.0%	$185	$29,600	$21,498	$8,102
QF477 17:45	165	94.8%	$190	$31,350	$21,498	$9,852
QF479 18:00	170	97.7%	$190	$32,300	$21,498	$10,802
QF481 18:15	165	94.8%	$185	$30,525	$21,498	$9,027
QF483 18:30	160	92.0%	$185	$29,600	$21,498	$8,102
QF485 18:45	150	86.2%	$180	$27,000	$21,498	$5,502
QF487 19:00	140	80.5%	$170	$23,800	$21,498	$2,302
QF493 20:00	130	74.7%	$165	$21,450	$21,498	-$48
QF495 20:30	128	73.6%	$164	$20,992	$21,498	-$506
QF497 21:00	126	72.4%	$165	$20,790	$21,498	-$708
QF499 22:00	125	71.8%	$164	$20,500	$21,498	-$998
Total	5299	82.3%	$176	$933,432	$795,415	$138,017

In response to these negative expected EBITDAR outcomes the airline decides to cancel five flights, representing a cancellation rate for the day of 13.5%. The QF 401 at 06:00, the QF 445 at 12:00, the QF 459 at 15:30, the QF 461 at 15:45 and the QF 493 at 20:00. The airline expects the following re-bookings as a result of the cancellations:

- 34 passengers are re-booked on the QF 405 at 06:30 and 14 passengers are re-booked on the QF 409 at 07:00 lifting the passenger seat factor on those flights to 100%;
- 20 passengers are rebooked on the QF 445 at 13:00, 15 passengers are rebooked on the QF 447 at 13:30, 25 passengers are rebooked on the QF 449 at 14:00, 20 passengers are rebooked on the QF 455 at 15:00;
- 25 passengers are rebooked on the QF 463 at 16:00 and 20 passengers are rebooked on the QF 467 at 16:30; and
- 22 passengers are rebooked on the QF 495 and 14 passengers are rebooked on the QF 497

As indicated in ***Table 5*** below, these cancellations (shaded in yellow) and re-bookings (shaded in green) have converted all negative EBITDAR flights into positive EBITDAR flights, and instead of earning A$138,017 per day in EBITDAR in the high fuel price environment without any cancellations the airline now earns A$175,794 per day in the high fuel price environment with he cancellations.

Table 5: Qantas Flights, Cost and Revenue on Sydney-Melbourne After Cancellation and Higher Jet Fuel Prices

Flight (1)	Passengers Booked (2)	PSF (3)	Average Airfare (4)	Revenue (5) = (2) x (4)	EBITDAR Costs (6)	EBITDAR (7) = (5) – (6)
QF 401 06:00	0	0.0%	$160	$0	$0	$0
QF 405 06:30	174	100.0%	$170	$29,580	$21,498	$8,082
QF 409 07:00	174	100.0%	$175	$30,450	$21,498	$8,952
QF 415 07:30	160	92.0%	$180	$28,800	$21,498	$7,302
QF 419 08:00	170	97.7%	$185	$31,450	$21,498	$9,952
QF 421 08:15	160	92.0%	$190	$30,400	$21,498	$8,902
QF 423 08:30	155	89.1%	$195	$30,225	$21,498	$8,727
QF 425 08:45	155	89.1%	$190	$29,450	$21,498	$7,952
QF 427 09:00	150	86.2%	$185	$27,750	$21,498	$6,252
QF 431 09:30	150	86.2%	$180	$27,000	$21,498	$5,502
QF 433 10:00	145	83.3%	$180	$26,100	$21,498	$4,602
QF 435 10:30	140	80.5%	$175	$24,500	$21,498	$3,002
QF 437 11:00	140	80.5%	$175	$24,500	$21,498	$3,002
QF 439 11:30	135	77.6%	$175	$23,625	$21,498	$2,127
QF 441 12:00	135	77.6%	$170	$22,950	$21,498	$1,452
QF 443 12:00	0	0.0%	$170	$0	$0	$0
QF445 13:00	140	80.5%	$170	$23,800	$21,498	$2,302
QF447 13:30	140	80.5%	$165	$23,100	$21,498	$1,602
QF449 14:00	150	86.2%	$163	$24,450	$21,498	$2,952
QF455 15:00	145	83.3%	$165	$23,925	$21,498	$2,427
QF459 15:30	0	0.0%	$165	$0	$0	$0
QF461 15:45	0	0.0%	$165	$0	$0	$0
QF463 16:00	160	92.0%	$170	$27,200	$21,498	$5,702
QF467 16:30	160	92.0%	$170	$27,200	$21,498	$5,702
QF471 17:00	150	86.2%	$175	$26,250	$21,498	$4,752
QF473 17:15	150	86.2%	$180	$27,000	$21,498	$5,502
QF475 17:30	160	92.0%	$185	$29,600	$21,498	$8,102
QF477 17:45	165	94.8%	$190	$31,350	$21,498	$9,852
QF479 18:00	170	97.7%	$190	$32,300	$21,498	$10,802
QF481 18:15	165	94.8%	$185	$30,525	$21,498	$9,027
QF483 18:30	160	92.0%	$185	$29,600	$21,498	$8,102
QF485 18:45	150	86.2%	$180	$27,000	$21,498	$5,502
QF487 19:00	140	80.5%	$170	$23,800	$21,498	$2,302
QF493 20:00	0	0.0%	$165	$0	$0	$0
QF495 20:30	150	86.2%	$164	$24,600	$21,498	$3,102
QF497 21:00	140	80.5%	$165	$23,100	$21,498	$1,602
QF499 22:00	135	77.6%	$164	$22,140	$21,498	$642
Total	4873	75.7%	$177	$863,720	$687,926	$175,794

This numerical example demonstrates how (1) an airline might choose flights that it is considering cancelling, (2) it demonstrates the impact of rebooking passengers, and (3) it shows how an airline can make more money by cancelling services that are expected to switch from EBITDAR positive to EBITDAR negative in response to higher fuel prices or a weaker economy.

6. The Relationship between Competition and Cancellations

6.1 The Logical Connection between Competition and the Cancellation Rate

As indicated in ***section 5*** above, an airline will cancel a flight for commercial reasons if the cost savings generated as a result of cancelling the flight exceed any revenue penalty as a result of the cancellation. The revenue that is lost as a result of the cancellation depends on how many passengers choose not to travel at all, that is, they withdraw from the market, how many passengers choose to continue the journey on the same carrier but at a different departure time, and how many passengers choose to continue the journey on a different carrier. The greater the competition that exists between carriers on a route, the more likely it is that the cancellation of a service by airline ***A*** on a route will lead to passengers flying with competitor airline ***B*****,** which offers services on the same route.

The switch to airline ***B*** from airline ***A*** in response to ***A*** cancelling a service is more likely to occur when there are seats available on airline ***B*** at a departure time that is adjacent to ***A***'s cancelled service. For example, if Qantas decides to cancel its QF 441 service from Sydney to Melbourne at 12pm on a Wednesday, there is a high chance that it could lose the revenue from this passenger to Virgin Australia, which operates the 12pm service VA 838 from Sydney to Melbourne on a Wednesday. This will depend on the availability of a seat on VA 838 on a Wednesday.

The more competition that exists on a route, the greater the ability of the passenger to secure a flight on another carrier at an adjacent time to the cancelled service. This increases the threat to revenue of an airline cancelling a service, which in turn reduces the volume of cancellations made by the airline. We should therefore expect that if there is less competition on route ***X*** than on route ***Y*** we would expect to see, other things being equal, a higher cancellation rate on route ***X*** than on route ***Y***. It is possible to test this hypothesis by using cross-sectional data to examine whether the cancellation rate is higher on routes where there is less competition, other things being equal.

To test the possibility of a relationship between the cancellation rate on a route and the level of competition on a route, we construct a variable called the Herfindahl-Hirschman-Index or the HHI for short. The HHI is constructed for a route by finding the sum of the squared market shares of each airline operating services on a route. For example, if on a route Regional Express' share of the market is 20%, Virgin Australia's is 30% and Qantas' is 50% then the calculated HHI for the route is:

$$HHI = 20^2 + 30^2 + 50^2 = 400 + 900 + 2{,}500 = 3{,}800$$

A HHI that is 10,000 means that there is just one operator on the route, or the route is a monopoly, which is the highest level of concentration. A HHI that is close to 0 means that there are a large number of competitors on the route, and the route is close to perfectly competitive, which is the least concentrated the route can be. The U.S. department of justice considers a HHI to be in excess of 1,800 as highly concentrated.[25]

We would also expect that the frequency of services on a route will also drive the cancellation rate on a route because an airline is more likely to cancel services if the airline can move passengers onto a another service on the same day, preferably at a time that is adjacent to the cancelled service. The ability to transfer passengers onto another service is greater the more frequent are the number of services operated on the route. For example, it is far easier for an airline to cancel a service on Sydney-Melbourne and transfer passengers onto an adjacent Sydney-Melbourne service then it is to cancel a Sydney-Tamworth service and transfer passengers onto an adjacent Sydney-Tamworth service because Sydney-Melbourne operates 45 services per day while Sydney-Tamworth operates just 3. If Qantas were to cancel its 8:55am QF 2002 service on Sydney-Tamworth then the only other same-day services onto which passengers can be transferred are the QF 2004 at 12:05 pm and the QF 2006 3:20pm, where there are a limited number of seats on Q400 dash 8 aircraft. In the case of Sydney-Melbourne, on the other hand, Qantas and Jetstar can both offer 15 alternative services at reasonably adjacent times of the day on 174 to 180 seat aircraft, while passengers are also available to book on Virgin Australia.

Route distance is also likely to be a factor that influences the cancellation rate. The longer is a route distance the thinner is market demand and the fewer the frequencies that are likely to be offered. The fewer the frequencies that are offered the weaker is the ability to transfer passengers onto alternative services and the lower is the cancellation rate as a result.

25 Refer to the Department of Justice, Horizontal Merger Guidelines at *https://www.justice.gov/atr/horizontal-merger-guidelines-0*.

6.2 The Empirical Connection between Competition and the Cancellation Rate

To demonstrate whether domestic Australian competition statistically significantly influences the cancellation rate across Australian routes we use cross sectional data across 43 domestic city pairs in 2024 to estimate the following multivariate regression specification:

$$\text{Cancellation rate}_i = \alpha_0 + \alpha_1 \text{ Frequencies Per Day}_i + \alpha_2 \text{ HHI}_i + \alpha_3 \text{ Distance}_i + \text{Residual}_i \qquad (7)$$

The i-subscript in (7) represents the cross-sectional unit, of which there are 43 cross-sectional units. The "Frequencies Per Day" variable is defined as the number of sectors flown in a year divided by 365. The HHI is constructed by using information about the market shares in sectors flown of airlines on the 43 Australian domestic routes. This is information that is publicly available from the BITRE Aviation On-Time Performance Database. The cancellation rate is determined for the same cross-section of routes used to determine the HHI's.

If we estimate (7) using Ordinary Least Squares we obtain the results presented in ***Table 6*** below.

Table 6: Estimated Cross-Sectional Multivariate Cancellation Rate Regression

Variable	Coefficient Estimate	Standard Error	t-Value	P-value
Intercept	-0.019674	0.011590	-1.697473	0.0976
Frequencies Per Day	0.000743	0.0000951	7.819765	0.0000
HHI	0.00000602	0.00000203	2.965074	0.0051
Distance	-0.0000037	0.00000126	-2.950174	0.0053
R^2 = 66.7% Breusch-Pagan-Godfrey Heteroskedasticity F-test = 2.424234 (p-value = 0.0802) Jacque-Bera Normality Test = 0.775349 (p-value = 0.678633)				

Table 6 indicates that all three explanatory variables are statistically significant. This is evidenced by the figure in the last column (p-value), which requires the entries to be less than 0.05 to indicate a variable that is statistically significant. The coefficient estimates in ***Table 6*** are also derived from an estimated regression that has healthy statistical properties. This can be seen by the two test results presented at the bottom of ***Table 6***. Both the Breusch-Pagan-Godfrey test, which is a test for constancy of the variance of the residual in the regression, and the Jacques-Bera test, which is a test of the normality of the residuals, indicate the absence of problems with the residual term. The degree of explanatory power of the regression, estimated to be 66.7%, is also very high for a cross-sectional regression, indicating that 66.7% of the variation in the cancellation rate across the 43 cross-sectional units is explained by the frequencies per day, the HHI and the distance variables.

The variable of most interest, however, is the HHI, which is statistically significant at the 0.5% level and has a positive sign. The positive sign means that if city pair ***A*** has a higher HHI than another city pair ***B***, which indicates that city pair ***A*** is less competitive than city pair ***B***, then city pair ***A*** will have a higher cancellation rate than city pair ***B***. The magnitude of the coefficient attached to the HHI means the following:

> *If city pair A has a 1,000 unit higher HHI then city pair B then city pair A's cancellation rate will be 0.6 percentage points higher, other things being equal.*

This provides evidence that the more anticompetitive is a route the higher the cancellation rate is likely to be.

7. What are the costs of Cancelling Services?

7.1 Travel Agents

When a passenger has booked a ticket on a flight through a travel agent, and an airline has cancelled the flight, the travel agent must spend time reorganising key aspects of the trip. The travel agent must:

- Find a new flight at a time and date that is as close as possible to the time and date of the cancelled flight;
- Determine whether the altered flight time necessitates a change in accommodation booking, and if this is the case spend time making changes to the accommodation booking;
- Determine whether the altered flight time requires changes to car rental and other land transport bookings, and if changes are required, spending time making those changes; and
- Determine whether the altered flight time requires changes to other tourism-experiences that the travel agent has booked on behalf of the passenger, and if changes are required make the relevant changes.

The time it takes to rebook the passenger on flights, accommodation, car rental, land transport and tourism experience activities is a cost to the travel agent, both in terms of an out-of-pocket expense and an implicit or opportunity cost. The explicit expense to the travel agent is the wage cost of the travel agent analyst that must make the rebookings. If it takes the analyst an hour to research and make the rebookings and communicate those rebookings to the client, then the additional cost to the travel agent is equal to an hour multiplied by the wage rate of the travel agent analyst. The opportunity cost is the one hour that could have been spent with a new client on a new booking, which would have generated additional revenue for the travel agency.

The ability of the travel agent to successfully reorganise the trip will depend on the timing of notice of the cancellation. If the passenger is informed about the cancelled flight on arrival at the airport, the ability of the travel agent to reorganise the trip will depend on whether the passenger can be booked on a flight on the same day as the cancelled flight, and a time that is reasonably adjacent to the cancelled flight. If the travel agent can book the passenger on a new flight on the same day as the cancelled flight and at a time that is not materially later than the cancelled flight, then it is unlikely to be necessary for the travel agent to reorganise other bookings that are a part of the trip. In this case the additional cost to the travel agent is the time that it takes for travel agent staff to reorganise a flight. If the travel agent is unable to organise a flight on the same day at an adjacent time of the day because there has been insufficient notice from the airline, then the travel agent is likely to spend time on rebooking accommodation and other bookings.

A subset of passengers may also decide to cancel their trip in response to the flight cancellation. If this is the case the travel agent may have incurred a significant amount of time organising the trip and building the itinerary without generating any income. This generates both an out-of-pocket expense in the form of the labour cost that is incurred organising the trip, as well as the opportunity cost associated with not using that time to attend to another revenue-generating trip to be organised.

7.2 Airports

When an airline cancels a service there will be some passengers who decide not to continue with the flight as noted in ***section 6.1***. These passengers are lost from the aviation market. They are not only lost from airlines, but they are also lost from airports.

A reduction in the number of passengers that travel with an airline not only leads to a reduction in the aeronautical income of the airport but also the non-aeronautical income. The aeronautical income of the airport includes fees for landing at the airport and fees for the use of the terminal. These fees are often based on the number of departing passengers and/or the number of arriving passengers.[26] When the number of passengers that pass-through the airport declines as a result of airline cancellations, this leads to lower charges that are paid by airlines to the airport in the form of landing charges and terminal use charges. It also means that there are fewer passengers buying non-aeronautical goods and services. These goods and services include:

- Goods and services available for purchase as passengers pass-through the terminal (such as food and beverages, newspapers, books, jewellery, footwear and clothing, and other merchandise);
- Car rental;
- Use of trains, busses, taxis and rideshare to and from the airport;
- Use of airport hotels;
- Use of the airport carpark; and
- Hiring of space within the airport.

Table 7 below presents the estimated number of passengers that decide not to travel at all in response to airlines cancelling their flights in the Australian domestic aviation market by airport.

Table 7: Cancelled Flights and Estimated Passengers who leave the Aviation Market

			Number of Non-Flying Arriving and Departing Passengers			
Airport	Cancelled Flights 12 Months to December 2024	Passengers Per Flight 12 Months to November 2024	5% Non-Flying	10% Non-Flying	15% Non-Flying	20% Non-Flying
Sydney	12,516	115	71,967	143,934	215,901	287,868
Melbourne	10,586	131	69,338	138,677	208,015	277,353
Brisbane	5,685	107	30,415	60,830	91,244	121,659
Perth	3,078	117	18,006	36,013	54,019	72,025
Adelaide	2,278	104	11,846	23,691	35,537	47,382
Gold Coast	1,014	158	8,011	16,021	24,032	32,042
Hobart	514	131	3,367	6,733	10,100	13,467
Canberra	2,200	74	8,140	16,280	24,420	32,560
Darwin	240	68	816	1,632	2,448	3,264
Cairns	2,200	97	10,670	21,340	32,010	42,680

26 Sydney Airport for example imposes its "Passenger Charge", "Runway Charge" and "Airfield and Terminal Security Charges" on the number of billable passengers (Sydney Airport Table of Charges, 2023. Accessed November 22, 2023 available at *https://assets.ctfassets.net/v228i5y5k0x4/2tcwb2ANL0CGo62FyNfAhb/76b087420af2c16e91d2bdacba22c55a/Table_of_Charges_COU_Version_v4.0_-_1_May_2023.pdf*).

Melbourne Airport imposes a "landing charge" on arriving and departing passengers, an "airport security and passenger screening charges" per departing passenger and "check-in and terminal equipment" charges per departing passenger (Melbourne Airport Schedule of Charges, 2023. Accessed November 22, 2023, available at *https://assets-au-01.kc-usercontent.com/be08d7b0-97a1-02f9-2be6-a0c139c3c337/6766a2da-82f8-40d5-ad35-035e5976ee0e/Schedule%20of%20Charges%20FY2024%20Non-Signatories%20to%20an%20ASA%201%20July%202023.pdf*).

Column (1) of ***Table 7*** contains information about different Australian airports which carry domestic passengers, column (2) provides information about the numbers of cancelled domestic services at the airport over the 12 months to December 2024, which is the latest available 12 months of cancellation data at the time of writing, while column (3) provides information about the number of passengers per flight by airport over the 12 months to November 2024. The last four columns of ***Table 7*** provide assumptions about the percentage of passengers per flight that cancel their trip in response to the flight cancellation. We assume that 5%, 10%, 15% and 20% of passengers decide not to fly at all in response to cancelled flights. This generates the passenger numbers that have decided not to fly at all over the 12 months to December 2024 in response to actual flight cancellations in the Australian domestic market, which are presented in the last four columns of ***Table 7***.

Table 8 below presents the current listed domestic aeronautical charges of the same airports presented in ***Table 7***, and an estimate of the domestic non-aeronautical revenue per passenger of the various airports. The domestic non-aeronautical revenue per passenger is an estimate because the listed airports do not provide this information in their annual reports. Almost all airports only provide total non-aeronautical revenue per passenger in their reporting – they do not provide a breakdown of domestic and international non-aeronautical revenue per passenger.

Table 8: Listed Airport Charges and Estimated Non-Aeronautical Revenue per Passenger of Airports

Airport	Listed Airport Charge (Inclusive of GST)*	Estimated Domestic Non-Aeronautical Revenue Per Passenger**
Sydney	$19.26	$17.48
Melbourne	$10.00	$13.22
Brisbane	$21.43	$30.66
Perth	$28.66	$34.19
Adelaide	$15.29	$16.48
Gold Coast	$25.25	$27.35
Hobart	$19.27	$20.88
Darwin	$51.00	$40.18
Cairns	$20.28	$21.96

*The listed airport charge is not the actual charge paid by airlines. These are typically negotiated at a lower rate than the listed price.

Estimated domestic non-aeronautical revenue per passenger is obtained by using the formula *(% revenue non-aeronautical x aero revenue per pax)/(1 – % revenue non-aeronautical)***. The use of this formula assumes that non-aeronautical revenue as a percentage of total revenue for the airport is the same as domestic non-aeronautical revenue as a percentage of total domestic revenue.

Multiplying the assumed number of passengers that no longer fly in ***Table 7*** by the listed airport charges in the second column of ***Table 8*** yields the estimated lost domestic aeronautical revenue of the key Australian domestic airports in response to the cancelled flights over the 12 months to December 2024 – refer to ***Table 9*** below. ***Table 9*** indicates the following lost aeronautical revenue as a result of the cancellation of domestic flights:

- Sydney Airport would expect to lose between A$1.4m and A$5.5m per year;
- Melbourne would expect to lose between A$0.7m and A$2.8m per year;
- Brisbane would expect to lose between A$0.7m and A$2.6m per year;
- Perth would expect to lose between A$0.5m and A$2.1m per year;
- Adelaide would expect to lose between A$0.2m and A$0.7m per year;
- Gold Coast would expect to lose between A$0.2m and A$0.8m per year;
- Hobart would expect to lose between A$65k and A$259k per year;
- Darwin would expect to lose between A$42k and A$166k per year; and
- Cairns would expect to lose between A$216k and A$865k per year.

Table 9: Estimated Impact of Domestic Cancellations on Aeronautical Income at Australian Airports

	Estimated impact on Aeronautical Income			
	5% Non-Flying	10% Non-Flying	15% Non-Flying	20% Non-Flying
Sydney	$1,385,725	$2,771,449	$4,157,174	$5,542,898
Melbourne	$693,380	$1,386,770	$2,080,150	$2,773,530
Brisbane	$651,733	$1,303,465	$1,955,176	$2,606,909
Perth	$516,130	$1,032,289	$1,548,420	$2,064,550
Adelaide	$181,164	$362,314	$543,478	$724,627
Gold Coast	$202,282	$404,538	$606,820	$809,077
Hobart	$64,889	$129,758	$194,647	$259,536
Darwin	$41,613	$83,225	$124,838	$166,451
Cairns	$216,254	$432,508	$648,763	$865,017

Multiplying the assumed number of passengers that no longer fly in ***Table 7*** by the estimated domestic non-aeronautical revenue per passenger in the third column of ***Table 8*** yields the estimated lost domestic non-aeronautical revenue of the key Australian domestic airports in response to the cancelled flights over the 12 months to December 2024 – refer to ***Table 10*** below.

Table 10: Estimated Impact of Domestic Cancellations on Non-Aeronautical Income at Australian Airports

	Estimated impact on Non-Aeronautical Income 2024			
	5% Non-Flying	10% Non-Flying	15% Non-Flying	20% Non-Flying
Sydney	$1,258,330	$2,516,660	$3,774,991	$5,033,321
Melbourne	$916,810	$1,833,633	$2,750,442	$3,667,252
Brisbane	$932,650	$1,865,301	$2,797,920	$3,730,571
Perth	$615,630	$1,231,295	$1,846,926	$2,462,556
Adelaide	$195,272	$390,527	$585,799	$781,054
Gold Coast	$219,139	$438,250	$657,388	$876,500
Hobart	$70,296	$140,572	$210,868	$281,164
Darwin	$32,786	$65,572	$98,358	$131,143
Cairns	$234,275	$468,551	$702,826	$937,102

Table 10 indicates the following lost non-aeronautical revenue as a result of the cancellation of domestic flights:

- Sydney Airport would expect to lose between A$1.3m and A$5.0m per year;
- Melbourne would expect to lose between A$0.9m and A$3.7m per year;
- Brisbane would expect to lose between A$0.9m and A$3.7m per year;
- Perth would expect to lose between A$0.6m and A$2.5m per year;
- Adelaide would expect to lose between A$195k and A$781k per year;
- Gold Coast would expect to lose between A$219k and A$877k per year;
- Hobart would expect to lose between A$70k and A$281k per year;
- Darwin would expect to lose between A$33k and A$131k per year; and
- Cairns would expect to lose between A$234k and A$937k per year.

The results presented in Tables 9 and 10 indicate that Australian domestic airports are estimated to lose a considerable amount of aeronautical and non-aeronautical revenue in response to airlines cancelling services.

7.3 Passengers

7.3.1 Leisure and Visiting Friends and Relatives

When an airline cancels a service there are several potential costs borne by the passenger. If the passenger's first notification about the cancellation occurs on arrival at the airport, then there are costs incurred in responding to the cancellation. If the passenger decides not to travel as a result of the flight cancellation and has already arrived at the airport, then the passenger faces the out-of-pocket costs associated with travel between home and the airport, and between a hotel and the airport. The passenger also faces the opportunity cost, or the cost of time, associated with this travel.

If the passenger booked the entire trip, the passenger must also cancel other components of the trip that require bookings, including accommodation, car rental, land transport and other leisure activities. While the passenger is likely to receive a refund for the flight cancellation, particularly if the reason for the flight cancellation is within the airline's control, there is less certainty about receiving a refund for other travel expenditure, such as on accommodation, car rental and land transport. If the passenger has travel insurance, it is more likely that the passenger will receive a refund.

If the passenger does not wish to cancel the flight and has not used a travel agent to book the flight, then the passenger will need to contact customer service or the sales desk at the airport to organise another flight. Alternatively, the passenger may wish to organise another flight via the airline's website, depending on the queue at the customer service desk at the airport, which will presumably be lengthy if the passenger was informed of the flight cancellation on arrival at the airport. Once a flight has been reorganised, the passenger will either stay at the airport or close to the airport to wait for the new flight, which usually involves a longer wait than the original flight. If the passenger cannot be rebooked on a flight on the same day and at an adjacent time to the original flight, then the passenger may have to return home or book into a hotel that is near the airport to take a flight the following day.

If the passenger stays at the airport, the implicit cost borne by the passenger is the additional waiting time multiplied by the price of time of the passenger. The price of time that is used by Transport for NSW is A$15.14 for leisure and visiting friends and relatives travel (Australasian Transport Research Forum 2015 Proceedings page 2).[27] This is a 2013/14 value. The estimated 2022/23 value is determined by escalating the 2013/14 value according to the growth in Australian Weekly Earnings – total earnings by persons between 2013/14 and 2023/24. The growth in average weekly earnings indicates that leisure earnings rose by 32.4% between 2013/14 and 2023/24, resulting in a price of time estimate of A$20.06 for leisure and VFR passengers in 2023/24. For example, if the passenger must wait an additional 5 hours at the airport because of the flight cancellation then the opportunity cost of time for the leisure and the VFR passenger is A$100.28.

If the passenger returns home as the re-booked flight takes place the following day or much later on the same day, the explicit cost to the passenger includes the cost of the transport home and the return trip to the airport. This will depend on the distance between the airport and the residence of the passenger. If the passenger stays at a hotel near to the airport, which is more likely to be the case for inbound passengers returning home, this cost would typically be borne by the airline along with a stipend that is used to contribute towards paying for food and beverages. It is also likely that the airline will pay for a shuttle bus between the airport and the hotel. Some airlines, however, may not be as generous, and the hotel, food and beverages and shuttle bus may be expenses that are borne by the passenger, particularly if the passenger doesn't have travel insurance.

If the passenger cannot fly on the same day as the flight that is cancelled, then the passenger will need to reorganise other elements of the travel package, such as accommodation, car rental, land transport and other leisure activities on arrival. The passenger may not be able to reorganise or re-schedule some of these other elements of the travel package. For example, the passenger may not be able to push the start date for accommodation back a day and extend the stay by one day because the hotel is fully booked, in which case the passenger may lose a day of accommodation. The same applies to car rental, land transport and other leisure activities that are booked. This generates an out-of-pocket expense for the passenger because the passenger has paid for goods and services that are not consumed.

When an airline cancels a flight, it is withdrawing seats or supply from the market. For those passengers wishing to book a flight after the cancellations take place, there are fewer seats to choose from. If the demand for flying by these passengers is strong, this will place upward pressure on airfares. These passengers are therefore likely to pay higher airfares than they otherwise would if there had not been flight cancellations. In response, the passengers may decide not to travel which has an adverse welfare effect on the passenger, or they decide to pay the higher airfare which also lowers the welfare of the passenger.

27 Accessed November 15, 2021 and available at *https://www.transport.nsw.gov.au/sites/default/files/media/documents/2017/Value%20of%20Travel%20Time%20Revisited%20%E2%80%93%20NSW%20Experiment.pdf*.

7.3.2 Business

In the case of passengers travelling for business purposes, a cancelled flight on arrival at the airport may require the passenger to reorganise meetings, or the arrival time at a convention or conference. This may be more difficult to organise because it will depend on the likelihood that other meeting attendees can attend at the reorganised time. At short notice and for a meeting with multiple attendees this is likely to be difficult. In this case it is more likely that the business-purpose passenger will decide not to travel to the destination and enter the meeting as an on-line participant. The additional cost to the business purpose passenger includes the out-of-pocket expenses associated with getting to and from the airport, such as by taxi or ride-share, as well as the implicit cost associated with the time it takes to get to and from the airport.

Transport for New South Wales use a price of time for business travel that was estimated at A$48.45 per hour in 2013/14. If this is escalated at average weekly earnings, the 2023/24 figure for the price of time is 32.4% higher at A$64.26. This means that if the journey from the home or office to the airport for a business-purpose passenger is an hour, then two hours opportunity cost is valued at A$128.52.

If the business-purpose passenger decided to take a later flight that is not cancelled, it may indeed be the case that a later meeting or attendance at a conference may force the business-purpose passenger to stay overnight at the destination as opposed to attending the meeting or conference and returning home on the same day. This conversion from a day trip to overnight travel is more expensive for the business-purpose passenger's employer because it will require the passenger to stay overnight at the destination in accommodation, which comes at an out-of-pocket expense for the employer of the passenger. It is also likely to be the case that the business-purpose passenger is more likely to need transport between the airport and the hotel and the hotel and the meeting/conference rather than just between the airport and the meeting/conference. The passenger is also likely to consume more meals, which is again at the additional expense of the employer.

Business-purpose passengers are also more likely to book flights at the last minute. If an airline cancels flights and therefore withdraws seats from the market, this raises airfares as discussed previously. Business-purpose passengers are more likely than other passenger types to buy these more expensive post-cancellation seats, resulting in an additional out-of-pocket expense for business-purpose passengers.

7.4 The Economy

The impact on the economy depends on the proportion of passengers that cancel their trip, and the estimated tourism expenditure that is foregone as a result of that cancellation. ***Table 11*** below presents in column (2) the spending per trip of overnight visitors that reside in the cities presented in column (1) over the 12 months to September 2024.

Table 11: Estimated Spending per Trip for Overnight Visitors by Home Region

Airport	Estimated Spending per Trip (A$)
Sydney	$937
Melbourne	$848
Brisbane	$1,045
Perth	$1,147
Adelaide	$1,009
Gold Coast	$1,006
Hobart	$968
Canberra	$993
Darwin	$1,789
Cairns	$1,095

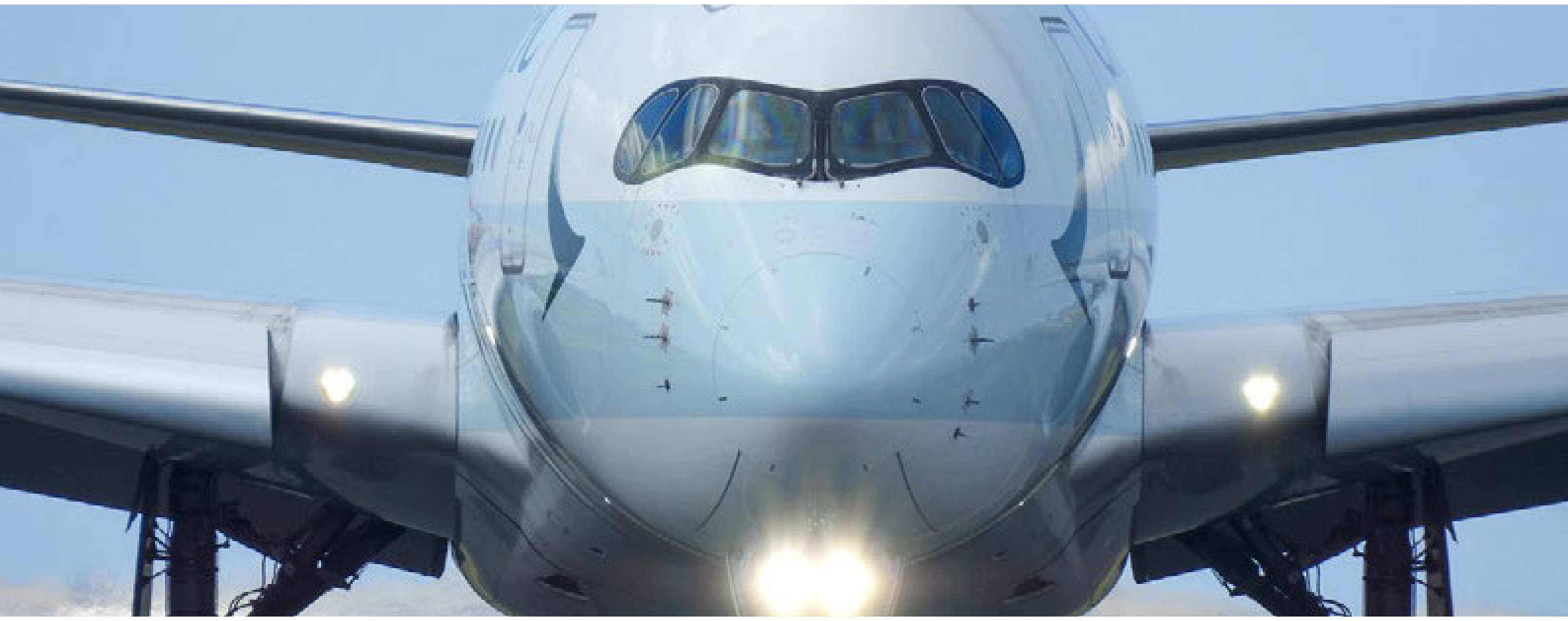
Source: *National Visitor Survey via the Tourism Research Australia online Database*

We can multiply the entries in column (2) of ***Table 11*** by the entries in the last four columns of ***Table 8*** to obtain an estimate of the likely impact on tourism across Australia as a result of flight cancellation in the domestic Australian aviation market – refer to ***Table 12*** below.

Table 12: Estimated Impact on Domestic Tourism Spending of Flight Cancellations by Home Region

	Estimated impact on Tourism Expenditure			
	5% Non-Flying	10% Non-Flying	15% Non-Flying	20% Non-Flying
Sydney	$67,433,079	$134,866,158	$202,299,237	$269,732,316
Melbourne	$58,798,878	$117,597,757	$176,396,635	$235,195,514
Brisbane	$31,783,414	$63,566,828	$95,350,241	$127,133,655
Perth	$20,653,226	$41,306,452	$61,959,678	$82,612,904
Adelaide	$11,952,210	$23,904,421	$35,856,631	$47,808,842
Gold Coast	$8,058,664	$16,117,327	$24,175,991	$32,234,654
Hobart	$3,258,966	$6,517,931	$9,776,897	$13,035,862
Canberra	$8,083,020	$16,166,040	$24,249,060	$32,332,080
Darwin	$1,459,824	$2,919,648	$4,379,472	$5,839,296
Cairns	$11,683,650	$23,367,300	$35,050,950	$46,734,600

Table 12 indicates that domestic cancellations at Sydney Airport is estimated to reduce domestic overnight tourism expenditure by between A$67m and A$269m per year. In the case of cancellations at Melbourne Airport, this is estimated to reduce domestic overnight tourism expenditure by between A$59m and A$235m. In the case of Brisbane Airport, the reduction in domestic overnight tourism spending as a result of domestic flight cancellations is estimated to be between A$32m and A$127m per year. For Perth Airport the estimated reduction in domestic overnight tourism spending is between A$21m and A$83m. The impact on domestic overnight tourism spending in the case of Adelaide Airport is between A$12m and A$48m. In the case of the Gold Coast Airport, domestic cancellations are estimated to reduce domestic overnight tourism spending by between A$8m and A$32m. For Hobart airport the impact is much smaller at between A$3m and A$13m, while it is between A$1.5m and A$5.8m for Darwin Airport. In the case of Cairns Airport, domestic cancellations are estimated to reduce domestic overnight tourism expenditure in Australia per year by between A$11.7m and A$46.7m.



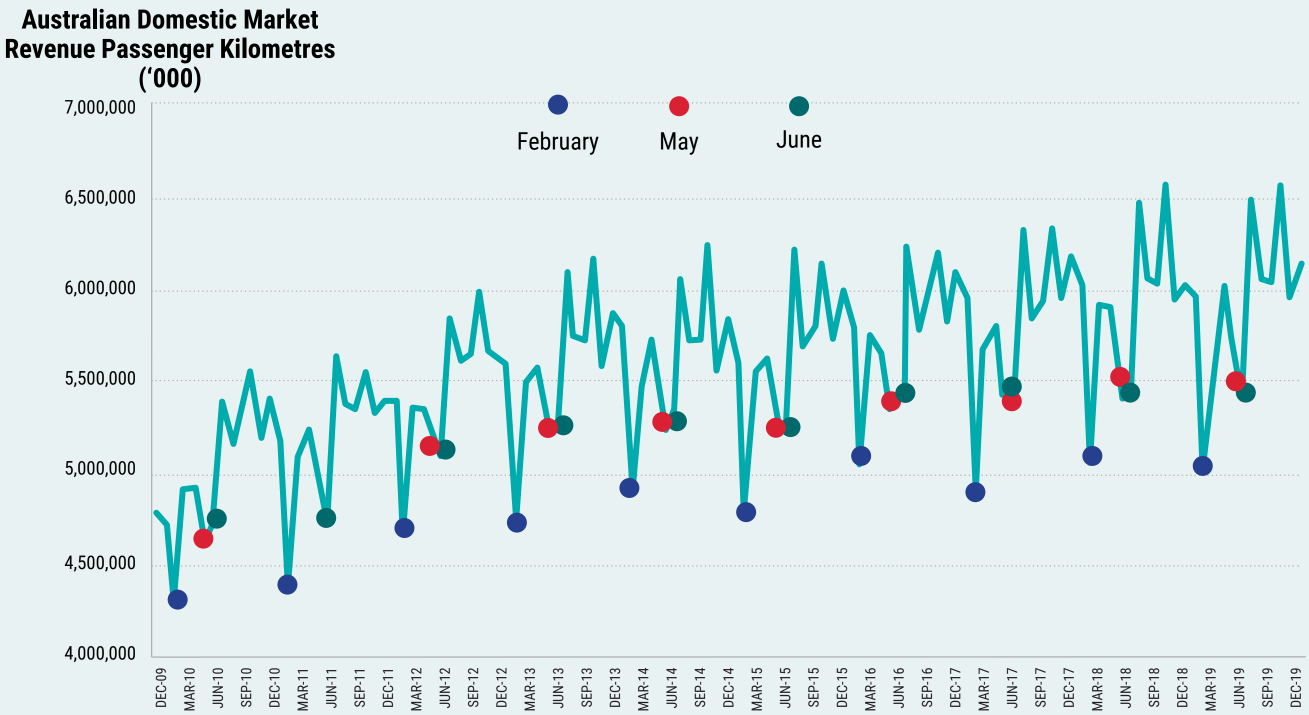
8. Economic Benefits of Moving to a 95/5 Rule

Under an 80/20 rule, a particular slot, such as 12pm every Monday morning, must be used approximately 42 times per year otherwise the airline must give up the slot to a competitor. This means that the airline is permitted to cancel this particular flight around 10 times per year while still retaining the right to use that slot.

When is the airline likely to cancel services throughout the year? The answer to this question is when demand is lower than expected and/or costs are higher than expected, and this is likely to tip a route from being EBITDAR positive to EBITDAR negative. Those routes that are likely to be most affected by this tipping point are those which operate well outside of the morning and afternoon demand peaks and have a high frequency of services over the day so that passengers on cancelled services are more likely to be rebooked on same-day flights.

Airlines are likely to have a strong understanding of the seasonality in the domestic Australian market. On the basis of the monthly movement in Australian domestic revenue passenger kilometres presented in ***Figure 36*** below, it is clear that the absolute seasonal off-peak month is February, as indicated by the blue-filled circle in ***Figure 36***. For most parts of Australia, late January and early February are the months in which schools return from Christmas holidays, and businesses begin to ramp-up again after the December and January festive period. It is therefore of little surprise that February is a seasonal lull in domestic air travel demand in Australia.

Figure 36: Australian Domestic Market Monthly Revenue Passenger Kilometres – Dec-09 to Dec-19

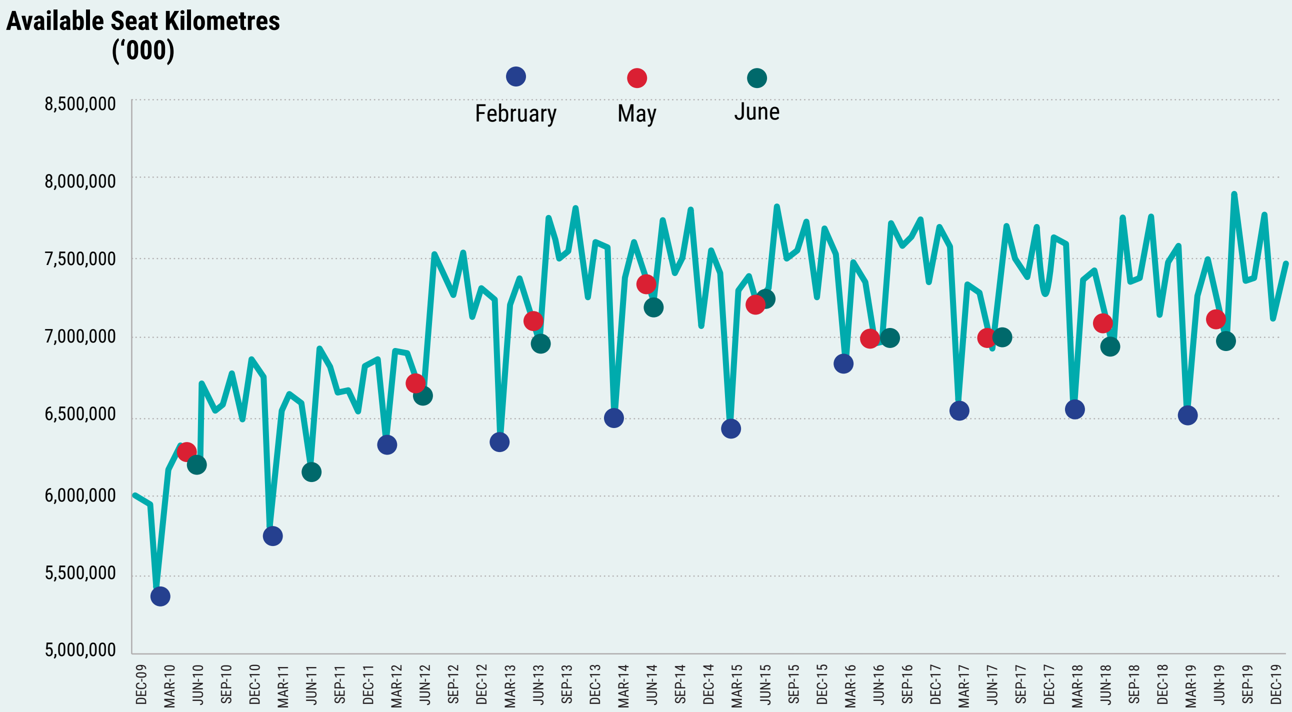


Source: *Bureau of Infrastructure, Transport and Regional Economics: Domestic Monthly Performance Database*

The shoulder off-peak months in the Australia domestic aviation market are May and June, as indicated by the purple and green-filled circles respectively. May and June are cooler months along Australia's east coast, with May the last month of Autumn and June the first month of winter. Winter is globally recognised as the off-peak period for air travel around the world. Over both May and June most Australian students are still in school, with school holidays taking place in the second month of winter, which is July.

Knowing the clear seasonal off-peaks in Australian domestic air travel, Australian airlines attempt to build into their schedules capacity off-peaks that coincide with the off-peaks in demand. As indicated in ***Figure 37*** below, the airlines have clearly built into their domestic capacity strong off-peaks during February, as well as shoulder off-peaks during May and June. The point of introducing this seasonality into the schedule is to generate as much seasonal stability in the passenger seat factor, yields and earnings as possible. It is almost impossible, however, for airlines to perfectly match the seasonal off-peaks in demand with the seasonal off-peaks in the schedule. It is for this reason that we see significant seasonality in the Australian domestic market seat factor – refer to ***Figure 38*** below.

Figure 37: Australian Domestic Market Monthly Available Seat Kilometres – Dec-09 to Dec-19

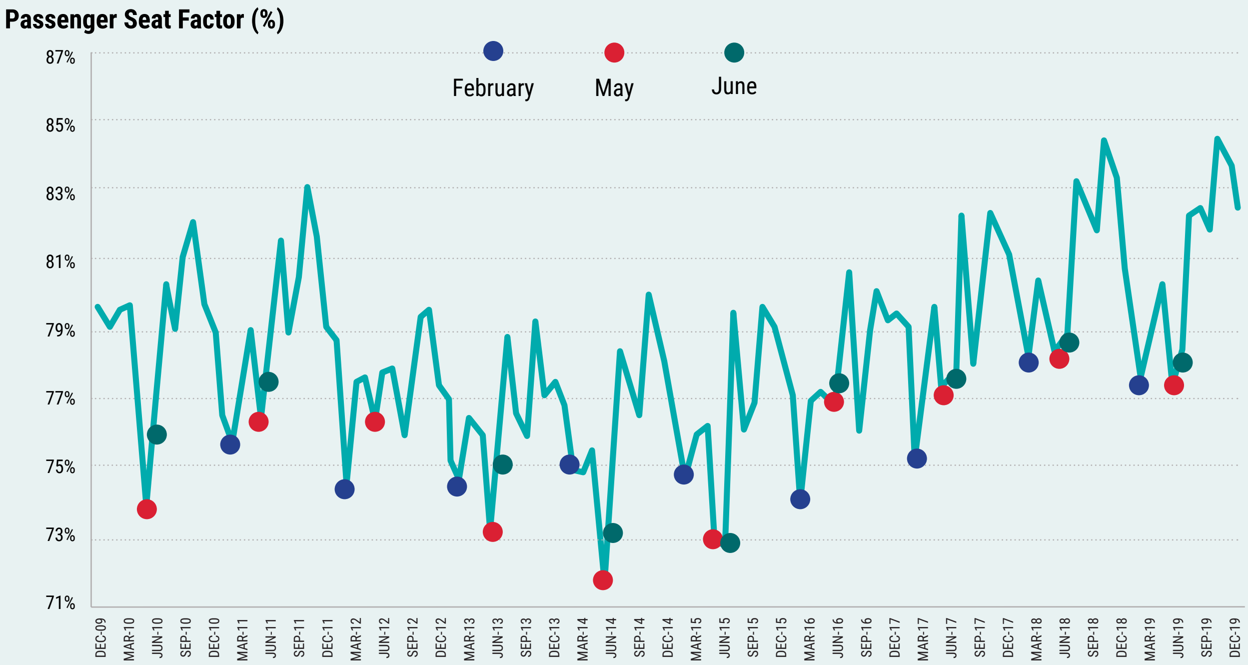


Source: *Bureau of Infrastructure, Transport and Regional Economics: Domestic Monthly Performance Database*

In ***Figure 38*** we continue to see strong seasonal off-peaks in February, May and June, although the absolute peak is no longer necessarily February. The fact that strong seasonality continues to exist in the seat factor means that airlines are unable to perfectly match the seasonal lows in demand with seasonal lows in supply.

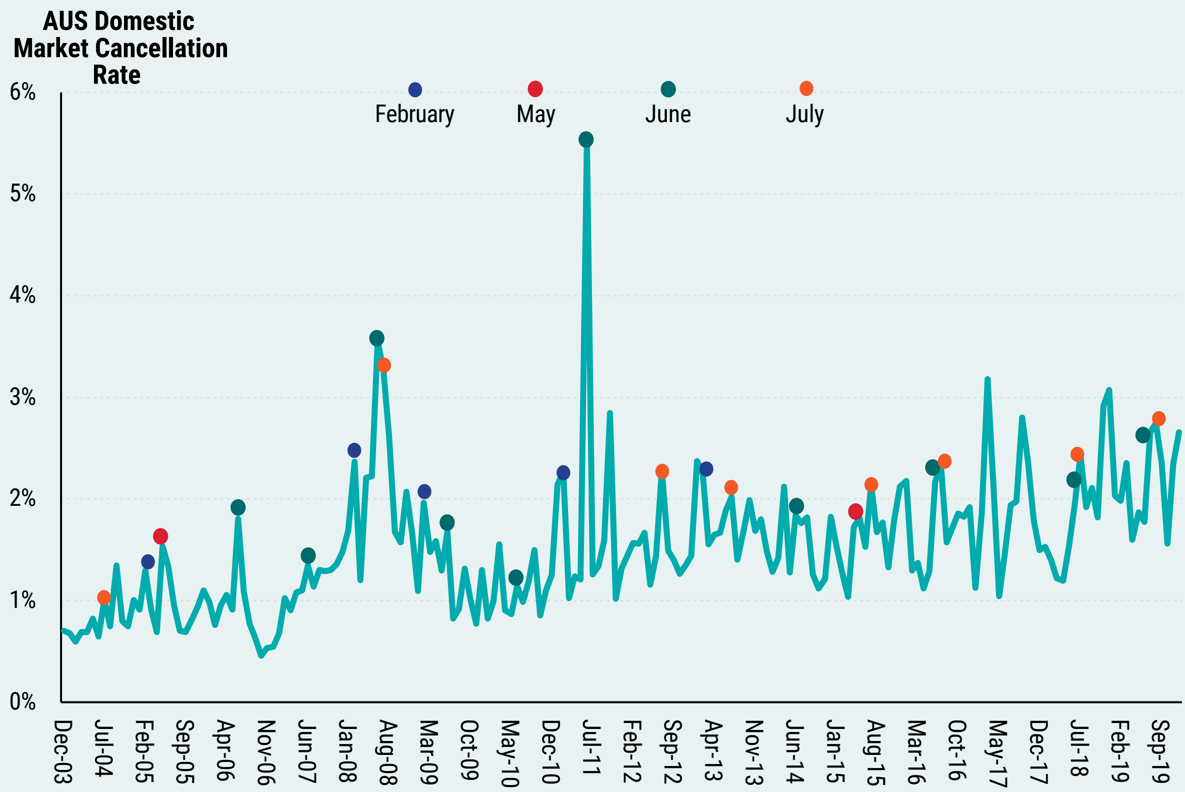
Do the seasonal lows in passengers carried and the passenger seat factor translate into seasonal highs in the Australian domestic cancellation rate? ***Figure 39*** below presents the visual evidence and this is later supported by statistical evidence. ***Figure 39*** indicates that there are several clear peaks in the cancellation rate series that take place during the winter months, especially June (green-filled circle) as well as July (orange-filled circle). There is some peakiness in May (purple-filled circle), but it isn't widespread, while there is strong peakiness in February (blue-filled circle). The monthly movements in the cancellation rate graph are therefore consistent with the belief that airlines are more likely to cancel services during the seasonal lows, particularly during the colder winter months.

Figure 38: Australian Domestic Market Monthly Passenger Seat Factor – Dec-09 to Dec-19



Source: *Bureau of Infrastructure, Transport and Regional Economics: Domestic Monthly Performance Database*

Figure 39: Australian Domestic Market Monthly Cancellation Rates – Dec-03 to Dec-19



Source: *Bureau of Infrastructure, Transport and Regional Economics: On-time Performance Database*

This conclusion is supported by multivariate regression modelling. We estimated the following multivariate time series regression model of the Australian domestic market cancellation rate:

$$\text{Cancellation Rate}_t = \alpha_0 + \alpha_1 \text{xJAN} + \alpha_2 \text{xFEB} + \alpha_3 \text{xMAR} + \alpha_4 \text{xAPR} + \alpha_5 \text{xMAY} + \alpha_6 \text{xJUN} + \alpha_7 \text{xJUL} + \alpha_8 \text{xAUG} + \alpha_9 \text{xSEP} + \alpha_{10} \text{xOCT} + \alpha_{11} \text{xNOV} + \alpha_{12} \text{xTrend} + \alpha_{13} \text{xTrend}^2 + \alpha_{14} \text{xTrend}^3 + \alpha_{15} \text{xGlobal Financial Crisis} + \text{Residual}_t$$

where **Cancellation rate$_t$** is the cancellation rate of the domestic Australian aviation market in month ***t***;

JAN is a seasonal dummy variable that takes on the number 1 during January and 0 otherwise;

FEB is a seasonal dummy variable that takes on the number 1 during February and 0 otherwise;

MAR is a seasonal dummy variable that takes on the number 1 during March and 0 otherwise;

APR is a seasonal dummy variable that takes on the number 1 during April and 0 otherwise;

MAY is a seasonal dummy variable that takes on the number 1 during May and 0 otherwise;

JUN is a seasonal dummy variable that takes on the number 1 during June and 0 otherwise;

JUL is a seasonal dummy variable that takes on the number 1 during July and 0 otherwise;

AUG is a seasonal dummy variable that takes on the number 1 during August and 0 otherwise;

SEP is a seasonal dummy variable that takes on the number 1 during September and 0 otherwise;

OCT is a seasonal dummy variable that takes on the number 1 during October and 0 otherwise;

NOV is a seasonal dummy variable that takes on the number 1 during November and 0 otherwise;

Trend is a constructed variable that takes on the positive integer series 1, 2, 3, 4, ……;

GFC is a constructed dummy variable that is equal to positive integer variables during the impact of the GFC and 0 otherwise (constructed data available upon request); and

Residual$_t$ is the value of the regression residual in month ***t***.

This cancellation rate multivariate regression is estimated over the monthly timeframe November 2003 through to December 2019. The summary results of this estimation are presented in ***Table 13*** below. The focal points of ***Table 13*** are the statistical significance of the seasonal dummy variables. A seasonal dummy variable is statistically significant, that is, it has been found to statistically cause cancellation rates in the Australian domestic aviation market, when the entry in the last column of ***Table 13*** is less than 0.1, 0.05 or 0.01. The statistically significant seasonal dummy variables are shaded in light blue in ***Table 13***. We can see that both June and July are statistically significantly different from zero at the 2.9% and 6.4% levels of statistical significance respectively. Both coefficients attached to these variables are positive indicating that the cancellation rate is higher during these winter months. In fact, ***Table 13*** finds that the cancellation rate on average is 0.75% higher in June than the month of December, and the cancellation rate is 0.9% higher in July than the month of December. September also features as a month in which the cancellation rate is statistically significant, although at a higher significance level (8.4%), while the warmer months of January, February and March are statistically significant but in a negative way, meaning that these months are seasonally low in the cancellation rate.

Table 13: Summary of the Estimated Multivariate Cancellation Rate Regression Australian Domestic Aviation Market

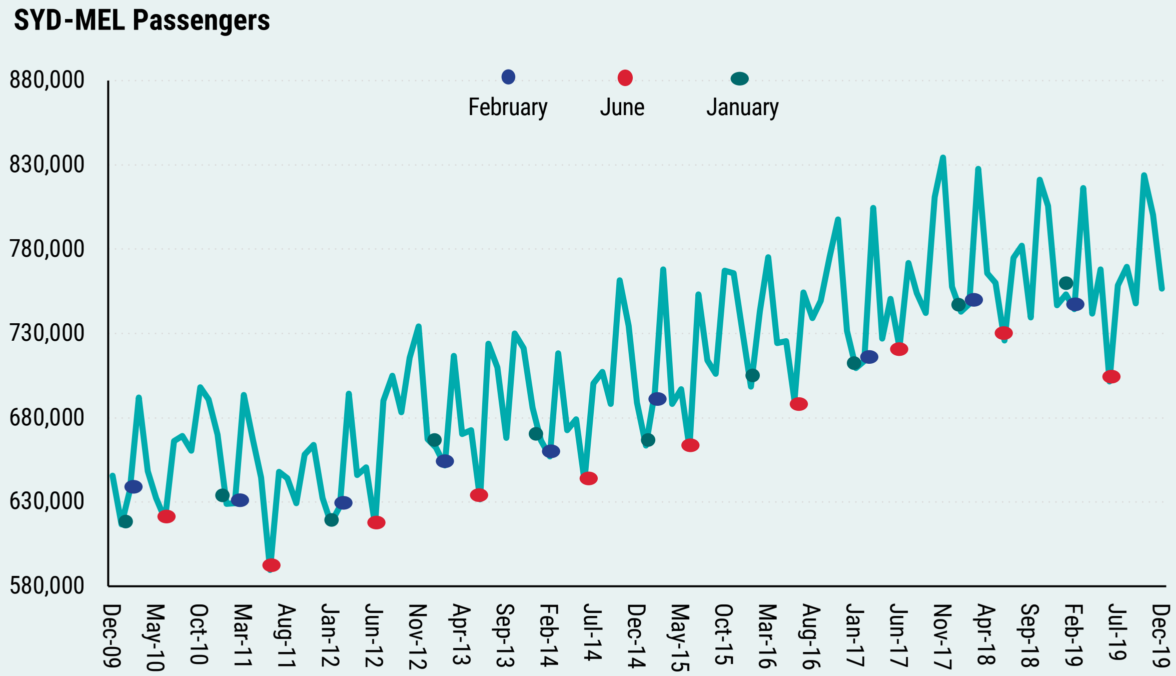
Variable	Coefficient Estimate	Standard Error	t-Statistic	Probability
Intercept	0.016501	0.004249	3.883232	0.0001
JAN	-0.007967	0.004039	-1.972707	0.0501
FEB	-0.008722	0.004043	-2.157296	0.0323
MAR	-0.007126	0.004037	-1.764872	0.0793
APR	-0.000124	0.004038	-0.030804	0.9755
MAY	-0.000311	0.004038	-0.077121	0.9386
JUN	0.007547	0.004054	1.861808	0.0643
JUL	0.008885	0.004046	2.195853	0.0294
AUG	0.002514	0.004041	0.622125	0.5347
SEP	0.007028	0.004038	1.740621	0.0835
OCT	0.000555	0.004038	0.137394	0.8909
NOV	-0.004380	0.003973	-1.102304	0.2718
GFC	0.013469	0.001488	9.049966	0.0000
Trend	0.000596	0.000159	3.756907	0.0002
$Trend^2$	-0.00000770	0.00000192	-4.009084	0.0001
$Trend^3$	0.0000000315	0.00000000648	4.850765	0.0000
R^2 = 64.1%				

The modelling does confirm, however, that during the colder, seasonally off-peak months we are more inclined to see a higher rate of cancellation. The 80/20 rule enables the airline to increase the cancellation rates for every week in these months and still maintain the slots for the following year. The advantage of changing the 80/20 rule to a 95/5 rule is that this reduces the number of times in the year that an airline can cancel a slot from 10 to between 2 and 3. This means that the airline would only be able to choose 2 to 3 weeks during the winter months where it could feasibly increase cancellation rates without jeopardising losing its slots. This is likely to reduce the costs associated with cancelling services for travel agents, passengers, airports and the economy.

The same seasonal analysis was also applied to the Sydney-Melbourne route, which is easily the biggest route in Australia by most volume-related metrics. We can see in ***Figure 40***, which presents the monthly movement in passengers carried between December 2009 and December 2019, that the absolute peak in this case is June (green-filled circle), with a sub-peak in January (grey-filled circle) and February (blue-filled circle). There is a somewhat similar seasonal pattern in the seats carried on Sydney-Melbourne as presented in ***Figure 41***, however the seasonality is not as clear cut. It is for this reason that we continue to see some 'residual' seasonality in the passenger seat factor in ***Figure 42***, with May and June continuing to be off-peak months on several occasions, although on fewer occasions than the season June peak in passengers.

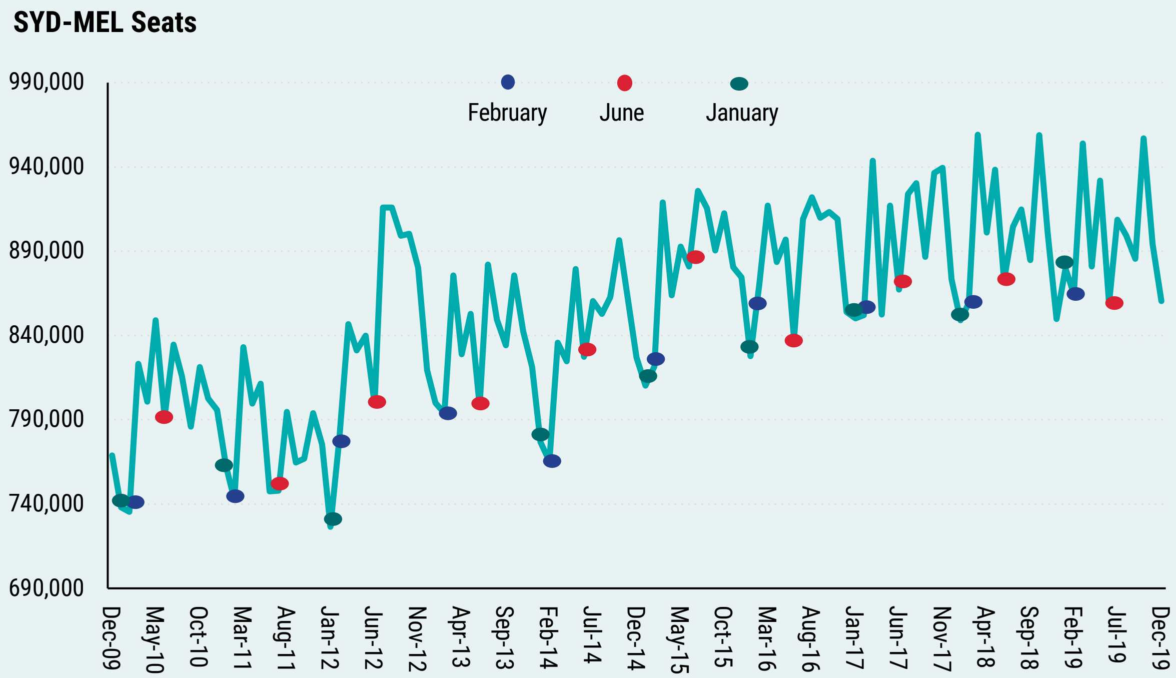
The fact that May and June stand out as the seasonally off-peak months for Sydney-Melbourne and that this very high frequency route is likely to be a target for the airlines in terms of cancellation, confirms the views presented early that airlines will target the winter months for cancellations for commercial reasons and this will likely take place on high frequency routes like Sydney-Melbourne. A 95/5 rule is likely to be highly effective in constraining the ability to cancel services on Sydney-Melbourne during the winter months of May and June because cancelling most off-peak services over these months is likely to result in the airline losing some of its slots. The airline will need to be significantly more selective in the way that it cancels its winter services in the case of a 95/5 slot rule.

Figure 40: Sydney-Melbourne Market Monthly Passengers carried – Dec-09 to Dec-19



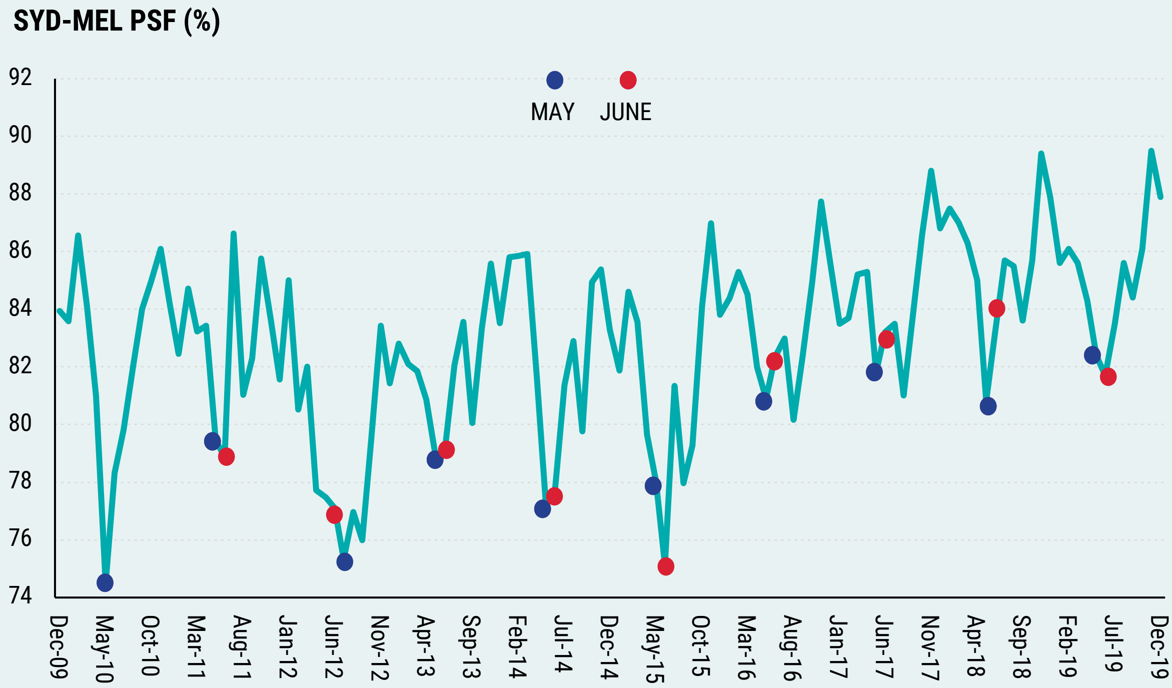
Source: *Bureau of Infrastructure, Transport and Regional Economics: Top Routes Database*

Figure 41: Sydney-Melbourne Market Monthly Seats Carried – Dec-09 to Dec-19



Source: *Bureau of Infrastructure, Transport and Regional Economics: Top Routes Database*

Figure 42: Sydney-Melbourne Market Monthly Passenger Seat Factor– Dec-09 to Dec-19



Source: *Bureau of Infrastructure, Transport and Regional Economics: Top Routes Database*