InterVISTAS
a company of Royal HaskoningDHV

REPORT

The Impact of Airport Charges on Airfares

PREPARED FOR
Australian Airports Association

PREPARED BY
Inter*VISTAS* Consulting Inc.

2018

Executive Summary

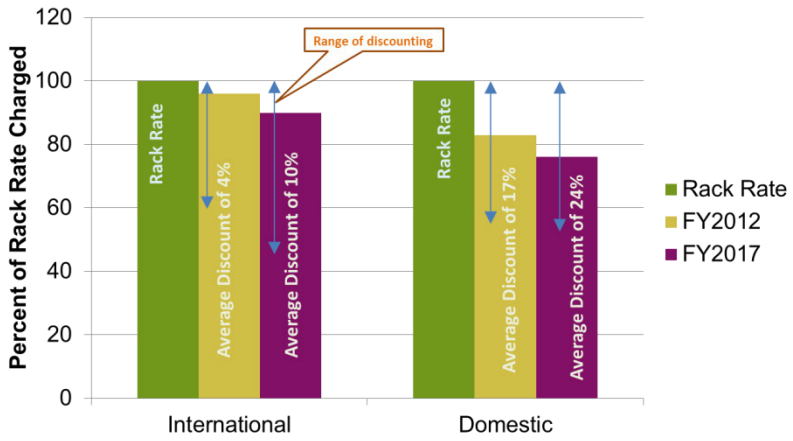
Aviation is an important sector of the Australian economy, given Australia's geography (long distances between many of its population centres), and its reliance on global trade and tourism. Since air transport is of critical importance to the Australian economy, a key government objective is to ensure air transportation is well-positioned to deliver services in an efficient and affordable manner.

This study addresses the question of the response of passengers to changes in airport charges. This analysis focuses on how changes, rather than levels, ultimately impact airfares and hence traffic. Decreases in airport charges do not necessarily equate to savings for consumers through lower airfares, and increases in airport charges do not necessarily mean higher airfares and hence lower demand.

Inter*VISTAS* developed an all-in fare model to estimate the impact of airport charges on airline fares. The use of an average "all-in" airfare rather than use only the base fare is critical for assessing airport charges, as the all-in airfare is the basis on which the passengers actually makes their travel decision. The four key components are the base fare, ancillary charges from the airline (e.g., baggage fees, advanced seat selection, etc.), government taxes & charges, and airport charges. We also utilize average base fares paid by Australian travellers over the course of a year, rather than fares in specific fare classes (such as full fare economy and lowest available fare) on one day in a month. This better reflects what is actually being paid by all travellers, rather than a handful of travellers on specific fares and dates.

In measuring airport charges, there is a complicating factor, given the move towards commercial agreements in Australia. Airlines generally negotiate airport charges which are lower than the published rates posted by airports. To deal with this, we adjust the published rates downward based on the average actual discount observed at nine of the ten major Australian airports.[1] For domestic flights, the average discount on airport rates is now 24%, and it is 10% for international flights.

Figure E-1
Discounting at Australian Airports



Source: Data received from Australian Airports Association

[1] It should also be noted that airlines, when reporting their costs typically include air navigation fees in with airport charges, which again overstates the amount they pay to airports.

In addition, our assessment of airport charges as a percentage of the all-in fare is based only on the charges of Australian airports and while we report the foreign airport charges paid on illustrative routes, they are not controllable by Australian policy.

Australian airport charges represent about 8% of the average *domestic* Australian all-in airfare. On *trans-Tasman* services, airport charges represented about 7% of the average all-in airfare. On *international services*, airport charges also represented about 7% of the average all-in airfare. These percentages include an adjustment for discounting present at Australian airports and are exclusive of GST.

Based on the demand elasticities of air travel with respect to airfare developed for IATA, this translates into a price elasticity of demand with respect to airport charges of a range between -0.11 and -0.14.

These are low price elasticities: changes to airport charges will have a relatively limited impact on traffic volumes – e.g., a 5% increase in airport charges would lead to a traffic decline of only 0.6%; and a 10% increase in airport charges would lead to a decline of traffic of about 1.2%.

It should be noted that these are theoretically expected responses if the air carriers were to pass through the entire cost increase (or cost decrease) to the passengers and therefore likely portray the maximum impact. In practice, there has been mixed responses from air carriers to changes in input costs. Airlines do not always pass through increases in costs to passengers, nor do they necessarily pass through savings in the form of reduced airfares.

There are a number of reasons the theoretically expected response of the air carriers is highly likely to overstate the actual impact of an increase in airport charges on passenger traffic. These include the airline's extensive use of price discrimination of their own services, incentive airport charges, the use of commercial contracts, and common airline pricing among routes.

Based on the case studies presented, there are a variety of outcomes in response to increased airport charges. In some cases, increases had a limited negative impact (Toronto), in others, the impact was more significant (e.g., Osaka) although the Osaka increase in fees was timed with a major Asian financial crisis. Where airport charges in Australia increased around the time of the Productivity Commission's 2002 review, there was no discernible impact on demand for air travel.

The case studies also show that even when airlines react to increases in airport charges in the short-run by reducing the number of services offered, eventually traffic levels tend to recover. Airlines and passengers adjust to the new prices, but the fundamentals that drove growth in the past tend to reassert themselves. Carriers re-establish service or new carriers enter the market with replacement capacity.

Historically increased charges are often linked to capacity expansion which is necessary to meet demand which by facilitating competition may put downward pressure on fares as well. In cases where increases in airport charges were related to capacity expansions, the airlines' operating and customer service costs resulting from congestion may decline. As capacity expansions are necessary to accommodate growth, and to facilitate competition between airlines, the net effect may be to support ongoing demand growth and a reduction, rather than increase, in airfares.

Contents

1 Introduction

1.1 Airport Charges and Consumer Response

Australia has the seventh largest domestic aviation market, as measured by one-way seats.[2] The six nations it trails all have populations that far exceed that of Australia.[3] Indeed, if one measures one-way seats per capita, Australia ranks first in the world, ahead of the US and Canada, and well ahead of Japan and the rest of the world.[4] This points to the high degree of reliance Australia has on air transportation. This is due both to its geography (long distances between many of its population centres), and to its reliance on global trade and tourism for its high level of prosperity. Since air transport is of critical importance to the Australian economy and the well-being of its people, a key government objective is to ensure air transportation is well-positioned to deliver services in an efficient and affordable manner.

On the airline side, the industry has benefitted from a number of developments that have enabled it to improve efficiency and deliver services at ever-decreasing costs. Technological improvements to aircraft and their engines have enabled costs per seat-mile to drop significantly. New business models that developed after deregulation have also enabled carriers to deliver services at lower costs. Improvements in air navigation services allowed aircraft to fly more efficient routings with less fuel consumption (resulting in lower emissions and fuel costs). Labour represents a relatively high proportion of total airline costs, and airlines have managed to increase efficiencies in this area as well. In real terms, the price of flying is far below what it had been 50 years ago, and the price continues to fall.

On the airport side, however, there have been no technological developments that have significantly lowered the cost of operating and maintaining runways, taxiways, aprons and terminals. Certainly, some improvements (e.g., lower cost airfield lighting, common use rather than airline proprietary facilities, etc.) have enabled airports to improve efficiency, but these changes have had nowhere near the impact that modern aircraft and engines etc. have had on airline operations. If anything, the cost of operating airports has increased over time. This is due to the need to meet increasingly stringent safety and security regulations, provide longer and stronger runways and taxiways for larger aircraft, and provide terminals with greater ambience for passengers and that have more widely separated gates to handle modern large aircraft. While there have been changes in the business models for airports such as privatization that have enabled airports to access the large amounts of capital needed to fund the facilities to accommodate airline growth, we have not seen any outside technological changes that have led to dramatically lower airport costs.

Airports charge airlines various fees to cover their costs. Airport charges paid by airlines in turn become part of their cost base. The impact of changing airport charges on aviation activity thus becomes a key question - are changes in airport charges in Australia having a negative impact on the level of aviation activity and economic welfare more generally? Or, more to the point, would policy measures designed to restrain airport charges actually lead to net benefits to consumers and the economy more broadly? If changes in Australian airport charges are disproportionately impacting airfares, policy change is likely warranted. If changes in Australian airport charges, however, are not significantly impacting airfares and hence volumes, and increases are largely associated with investment to accommodate growth and higher security/safety, then perhaps policy changes might do more harm than good.

---

[2] Airline Network News and Analysis (ANNA) article accessed on 29 November 2017 at http://www.anna.aero/2017/11/22/the-us-and-china-have-by-far-the-largest-domestic-networks-in-2017-but-australia-offers-more-seats-per-capita-and-middle-east-markets-are-growing-fast/?utm_source=anna.aero+newsletter&utm_campaign=0b210cee12-anna_nl_221117&utm_medium=email&utm_term=0_ecdbf41674-0b210cee12-86957185

[3] These are the US, China, Japan, India, Indonesia and Brazil.

[4] Ibid.

1.2 Objective of this Report

This report was commissioned by the Australian Airports Association to provide a better understanding of the response of passengers to changes in airport charges. The question addressed in this report is not about the *level* of charges at airports, but how *changes* (increases and decreases) ultimately impact airfares and hence traffic. [5] Decreases in airport charges do not necessarily equate to savings for consumers through lower airfares, and increases in airport charges do not necessarily mean higher airfares. This report examines the impact that changes in airport charges have on airfares, and shows that while airport charges have increased, they have not impeded growth in aviation traffic volumes in Australia.

1.3 Outline

This report is divided into two parts.

Part I is focused on airfares. It includes five sections:

- Section 2 provides an overview of the components of Australian airfares, including base fare, airline ancillary charges, government taxes and charges and airport charges;
- Section 3 reviews trends in base airfares in Australia;
- Section 4 reviews trends in ancillary airline charges;
- Section 5 discusses airport charges, particularly the difference between the "rack rate" (the published charges) and the lower amount airlines actually pay;
- Section 6 examines the all-in fare that passengers actually pay, and the limited share of this price that is represented by Australian airport charges.

Part II is focused on the impact that Australian airport charges have on air travel demand. It includes three sections:

- Section 7 provides an overview of the concept of elasticity of demand as well as the literature on the topic related to aviation;
- Section 8 is a summary of the results of the elasticity analysis on the impact of charges on airfares;
- Finally, Section 9 provides examples of the impact of airport charging practices in practice, including several short case studies of what happened elsewhere when airport charges changed.

[5] This report examines the impact of changes in airport charges have on airfares and hence traffic. A companion report, *Australian Airports: A Performance Benchmarking Study*, covers the level of airport charges of Australian airports relative to their peer airports. It finds, in general, that airport charges in Australia are broadly consistent with their international peers.

Part I: Airfares

2 The Components of Australian Airfares

Summary: Airfares are not simply what the airline receives as revenue (i.e., the base fare). There are other components that the consumer faces when purchasing air travel. These include fuel surcharges (not currently charged in Australia), ancillary charges from the airline (e.g., baggage fees, advanced seat selection, etc.), government taxes & charges, and airport charges. It is important to look at not only the base fare, but the "all-in" airfare, which is a better indication of what the consumer actually pays.

2.1 The All-In Air Fare Should be the Basis for Analysis

Much marketing focus and attention is paid to the base fare offered by airlines. However, while the base fare is indeed a factor, it is but one of a number of elements that the consumer faces. The base fare is not the total of what the consumer pays.

What consumers actually pay when they take a trip by air transportation has five main components:

- Base airfare;
- Fuel surcharges (when in use);
- Ancillary airline charges;
- Government taxes & charges; and
- Airport charges.

This study analyses the impact of airport charges relative to all-in airfares, which are the sum of the five components above. It is the all-in fare that forms the basis of consumer decisions about consumption. In Australia, the law requires airlines to advertise their all-in fares, not merely the base fare. (See sidebar.) The use of all-in fares has become particularly important due to the growth of ancillary revenues charged by airlines, as well as some growth in taxes and charges.

2.2 Base Airfare

Trends in base airfares are examined in Section 3.[6] This sub-section addresses a key conceptual issue.

Misleading Fares

The Australian Consumer Law has clear rules regarding pricing practices. Under section 48 "businesses that choose to advertise a part of the price of a particular product or service must also prominently specify a single total price."

Air Asia Berhad was fined $200,000 in 2012 by the Federal Court in Melbourne in a case brought before it by the Australia Competition and Consumer Commission. The carrier was found guilty of violating section 48 of the Australian Consumer Law by advertising only part of the price and not clearly displaying the total amount to be paid by the customer (see ACCC v AirAsia Berhad Company [2012] FCA 1413).

Reasoning behind the judgement included the anticompetitive nature of misleading customers; by not showing the full fare to be paid, the airline would have an advantage over the other airlines which correctly displayed their prices (ACCC v AirAsia Berhad Company [2012] FCA 1413, para 31).

Source: ACCC (2012)

[6] Sabre provides origin-destination air passenger estimates with detail specific to the route and airline, including travel class. Ticket revenue is included, allowing for the calculation of average fares at several levels of detail and for any sector of travel. We use Sabre data to examine both base and "all-in" airfares. In addition, BITRE provides an index of domestic Australian airfares. The fare data is collected monthly from airline internet booking websites. We also present BRITE trends in airfares in Section 3.

In the past, a discussion of the base airfare was not required. Airlines bundled a number of services together and charged a fare for the package. What a consumer actually paid for an airline trip corresponded to the airfare that was cited.

That is no longer the case. Many airlines have unbundled their services and now charge separately for each of these services. For these airlines the base airfare essentially now often covers only the seat. If you want a meal, you pay separately. If you want to pre-select a seat, you pay separately. If you want to check an extra bag (or even a single bag in some cases) you pay separately.

There is good economics behind this, as consumers only pay for the services they value and want. If you do not want to have a meal on a flight, your airfare does not include this – you can in fact avoid this cost by not purchasing this aspect of the product. It is not included in your airfare.

There are, however, issues with this approach at least as far as analysis of the demand response to airfares is concerned. A focus on the base fare may significantly understate how much money will come out of a typical passenger's wallet. Measuring other costs (e.g., government taxes) against the base airfare will portray them as a much larger component of airfares in percentage terms than they actually are, taking all the services a passenger buys from an airline into account.

2.3 Fuel Surcharges

Another airline add-on component to the base fare is fuel surcharges. In the past, when fuel prices were high, some (if not most) airlines have added a fuel surcharge to the base fare. In these cases, the fuel surcharge is not an optional purchase and differs in that sense from ancillary revenues. When used by carriers, they should be added to construct the all-in fares.

Airline fuel surcharges are generally no longer in effect within/to/from Australia and thus are not part of the construction of all-in fares in this report. Fuel surcharges had been used in the past and at that time represented about 10% of the "all-in" airfare.[7] They should be included if in use by air carriers.

2.4 Ancillary Airline Charges

Concept and Importance

As noted above, the unbundling of services and charging separately for each of them is an increasingly common approach among airlines. Many commercial airlines have been monetizing amenities that had previously been included in the base airfare, especially low-cost carriers. A recent article in the Journal of Air Transport Management indicates that globally, ancillary revenues had grown 121% from 2010 to 2014 to US$50 billion.[8] The most recent figure for ancillary revenue is US$82 billion,[9] 65% growth in only three years. The US$82 billion represents 11% of global airline revenues of roughly US$775 billion. In 2010 this was only 5% of global revenues.[10]

Some care must be taken with incorporating ancillary revenues into computation of an all-in fare, as not all these revenues derive directly from passengers. In addition to ancillary revenues earned directly from passengers for thing such as baggage, meals, priority boarding, etc. (which are referred to by some as a la carte revenues), airlines also earn revenues from sale of frequent flyer reward

---

[7] See example from: Australian Business Traveler, *Fees and Charges Exploded: where your airfare actually goes*, Dan Warne, 17 March 2011.

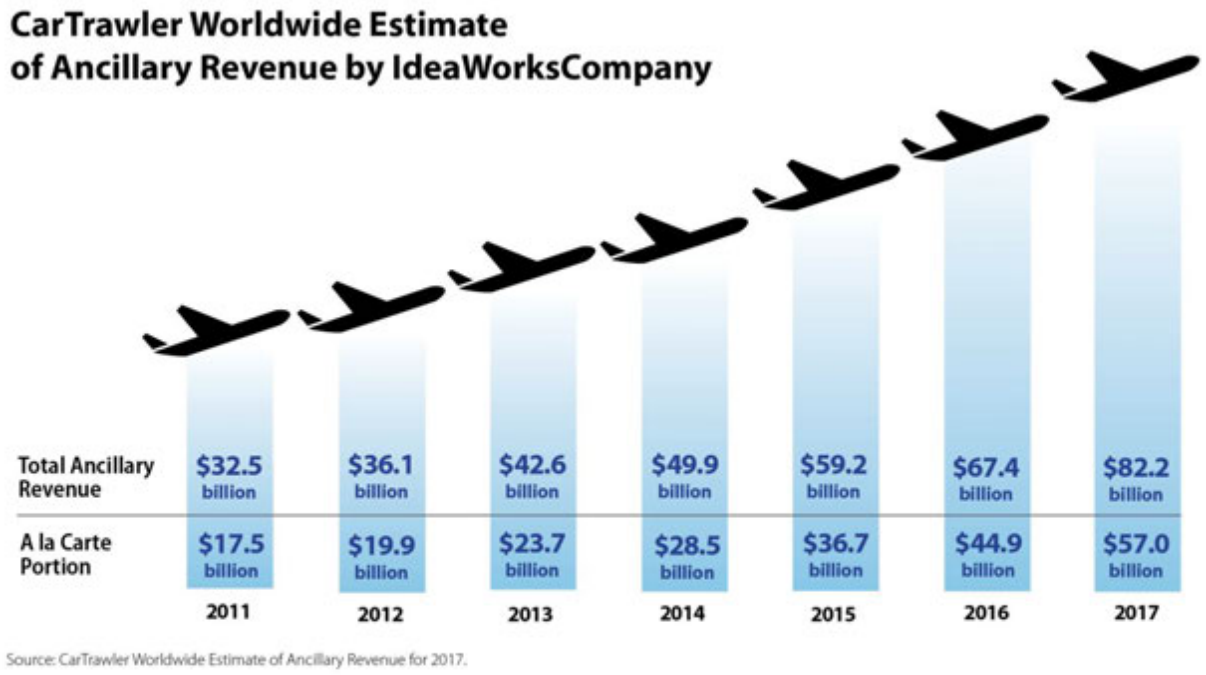
[8] D. Warnock-Smith, J. O'Connell, and M. Maleki (2017), "An analysis of ongoing trends in airline ancillary revenues" *Journal of Air Transport Management,* (64) pp. 42-54. The source of their data on total ancillary revenues is IdeaWorks (2014) "The Car Trawler Yearbook of Ancillary Revenue," accessed at http://info.cartrawler.com/AncillaryYearbook2014.

[9] IdeaWorks (2017) "The Car Trawler Yearbook of Ancillary Revenue," accessed at: http://www.ideaworkscompany.com/wp-content/uploads/2017/11/Press-Release-123-Global-Estimate.pdf.

[10] Ibid., p. 1.

points (typically to credit card providers, but also to others such as hotels), and from commissions earned on selling other travel products (primarily hotels, rental cars and insurance). In 2017, the a la carte portion[11] of airline ancillary revenues was just under 70% (69.3%) of total ancillary revenues, a portion that has been growing.[12] Figure 2-1 charts the dramatic growth in global airline ancillary revenues, including the amount from a la carte services paid by passengers.

Figure 2-1
Growth in Global Airline Ancillary Revenues
2011-2017
Current US Dollars



Source: CarTrawler Worldwide Estimate of Ancillary Revenue for 2017.

This graphic depicts the annual worldwide ancillary revenue estimates for 2011 through 2017. Two numbers are offered for each year, the total ancillary revenue and the portion represented by a la carte activities. The latter consist of the amenities consumers can add to their air travel experience, such as: 1) onboard sales of food and beverages, 2) checking baggage and excess baggage, 3) assigned seats or better seats within the same cabin, 4) call center support for reservations, 5) fees charged for purchases made with credit cards, 6) priority check-in and screening, 7) early boarding benefits, 8) onboard entertainment systems, and 9) wireless internet access.

Source: IdeaWorks[13]

Ancillary revenues as a share of the all-in-fare paid by passengers vary by type of carrier, market (primarily intercontinental versus domestic) and by geography, with some global regions experiencing higher use of ancillary charges by airlines than others. In Australia, the primary amenities that are broken out of the base fare with separate charges are checked baggage, seat pre-selection and meal

[11] A la Carte revenue includes onboard sales of food & beverage, checked and excess baggage, seat selection or upgrades, reservation call centre support, credit card fees, priority check-in, screening and boarding, onboard entertainment systems and wireless internet access.

[12] Supra note 9, p. 2.

[13] IdeaWorks, 28 November 2017, press release.

options.[14] These are offered as optional services that passengers can choose to add on to their airfare, either at the time of ticket purchase or added later at the time of flight. Post-booking revenue occurs when a passenger makes an ancillary purchase from the airline prior to or at check-in, at the airport before boarding, or on board during the flight.

Details of Computation of Australia Ancillary Revenues
Australia's four major domestic airlines, Qantas, Virgin Australia, Jetstar and Tigerair, offer amenity purchase options to passengers during ticket purchase, mainly:

- Checked baggage;
- Seat pre-selection;
- Meal pre-purchase; and
- Priority boarding.

Each airline has its own pricing structure, but the charges tend to be similar.

When building an "all-in" airfare, it is important to include all travel-related purchases a passenger makes prior to landing and exiting the plane. For the purposes of this study, we created a passenger profile that includes typical airline travel-related purchases, including an assumption as to what percent of travellers purchase the add-ons. This profile is used to compute the ancillary charges to be added to the base fare and other items to compute the all-in fare.[15] The "typical passenger" profile includes an economy base fare,[16] applicable government taxes and airport fees provided by Sabre, plus airline ancillary fees for:

- One checked bag (with weight restrictions)
- Seat pre-selection ("Standard" seat or equivalent)
- Meal pre-purchase (A$15 voucher).
- Priority boarding[17]

Figure 2-2 presents the ancillary fees (that are not included as part of the base fare) for the above amenities by region and airline.[18] The larger full-service carriers Virgin Australia and Qantas include more amenities in the base fare than low-cost carriers Tigerair and Jetstar. Of interest is that while low-cost carriers often offer cheaper base fares, the ancillary fees for these broken-out amenities can add not-insignificant cost to the full airfare ("all-in" airfare) paid by passengers. This underlines the importance of using an "all-in" airfare when conducting comparative analysis.

[14] Priority boarding tends to be included in higher fare classes rather than presented as an ancillary purchase option. Tigerair offers a $3 option for priority boarding, so it is included in the amenities list for our analysis of Australia all-in-fares.

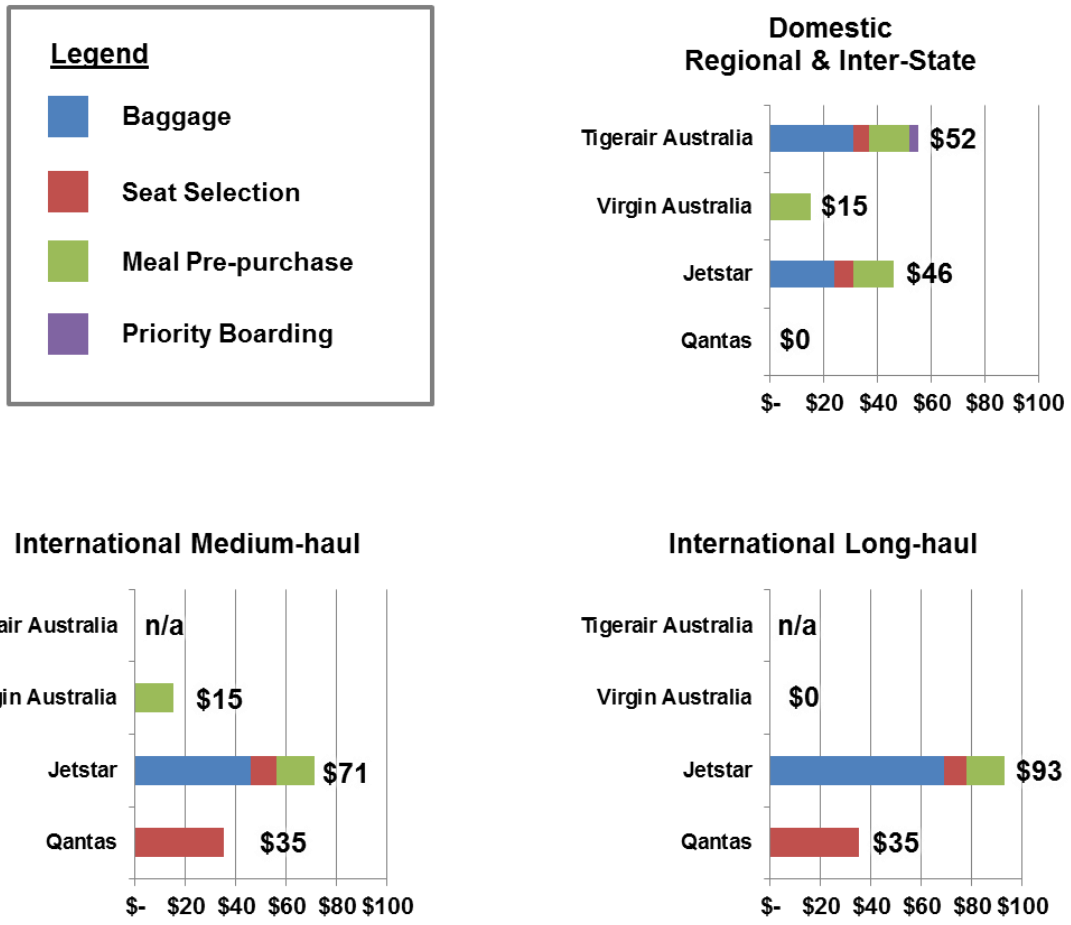
[15] Duty free and airport retail purchases are not being included. If the carrier offers duty free sales on board (or via internet ordering) it is not included in our computation of the base airfare.

[16] The analysis presented in this report is based on economy fares, and as such, the analysis overstates the share of airport charges in business fares when they are offered.

[17] Only one of the four selected Australian airlines, Tigerair, offers priority boarding as a fare add-on, while the others bundle priority boarding into the upper fare classes (premium economy, business, first, etc.)

[18] Charges were categorized by the carriers. We used each carrier's own definition when categorizing fees into the "medium-haul" or "long-haul" categories. For carriers with a separate category for Trans-Tasman/New Zealand destinations, those have been grouped into the "medium-haul" category.

Figure 2-2
Airline Ancillary Fees Example
for a One-Way Economy Ticket
2017 Prices



Source: Airline websites & booking pages accessed September 2017. Charges for 1 checked bag, seat pre-selection, $15 meal voucher and priority boarding where available on an economy class ticket.

Notably, the low-cost carriers (Jetstar, Tigerair) have broken out and monetized all four of the above amenities, while the full service carriers (Qantas, Virgin) still include some amenities in the base fare on certain sectors. For example, Qantas domestic flights include one checked bag, seat selection and meal service amenities in the ticket price, while Tigerair charges for all three of these amenities on these flights and offers priority boarding as an additional add-on. Similarly, Virgin Australia does not charge ancillary fees on its international long-haul operations, but Jetstar typically gains nearly $100 in such charges with its international long-haul operations.[19]

To incorporate the ancillary fees with the airfare data, average ancillary fees were calculated using the above charges multiplied by the estimated number of passengers making ancillary purchases.

Not all passengers will purchase ancillary amenities; therefore a propensity-to-purchase percentage must be applied in the calculation of the average charge. Figure 2-3 shows the inputs used in this

[19] International Medium-Haul: International flights that under 4,000 mi or 6,400 km; International Long-Haul: International flights over 4,000 mi or 6,400 km

calculation, based on our best professional judgement. For the case of international long-haul, one checked bag and meals are included in the fare paid by the customer, and are not additional purchases.

Figure 2-3
Adjusted Ancillary Fees per Passenger from Passenger Profile (A$)

Passenger Profile Assumptions for Ancillary Fees				
Region	**Baggage (1 bag)**	**Seat Selection**	**Meal Voucher (A$15)**	**Priority Boarding**
Domestic	50%	33%	33%	0%
International Medium-haul	50%	33%	67%	0%
International Long-haul	50%	33%	67%	0%

The inputs for the average ancillary fees calculation are shown in Figure 2-4. Average fees were calculated for domestic, international medium-haul and international long-haul routes. The calculation takes into account the airline ancillary fees per passenger discussed above, the passenger profile purchase assumptions in Figure 2-3, and the airline shares of origin-destination passengers within each route region. This results in the average ancillary fee per passenger.

Figure 2-4
Weighted Average Ancillary Fees per Passenger
Selected Australian airlines
2017 Ancillary Fees

Domestic Australia (Australian Airlines Only)			
Airline	**Ancillary Fees per Pax from Pax Profile (A$)**	**Airline Share of Domestic Pax (%)**	**Extension (A$)**
Qantas	$0.00	36%	$0.00
Virgin Australia	$5.00	29%	$1.43
Jetstar	$19.33	26%	$5.00
Tigerair Australia	$22.50	9%	$2.10
		Average Ancillary Fee per Pax	***A$8.52***

International Medium-haul (Australian Airlines Only)			
Airline	**Ancillary Fees per Pax from Pax Profile (A$)**	**Airline Share of International Medium-haul Pax (%)**	**Extension (A$)**
Qantas	$11.67	50%	$5.81
Virgin Australia	$10.00	22%	$2.22
Jetstar	$36.33	28%	$10.16
		Average Ancillary Fee per Pax	***A$18.19***

International Long-haul (Australian Airlines Only)			
Airline	**Ancillary Fees per Pax from Pax Profile (A$)**	**Airline Share of International Long-haul Pax (%)**	**Extension (A$)**
Qantas	$11.67	84%	$9.81
Virgin Australia	$0.00	11%	$0.00
Jetstar	$47.50	5%	$2.40
		Average Ancillary Fee per Pax	***A$12.21***

Sources:
Ancillary Fees: Australian airline websites, Qantas, Virgin Australia, Jetstar, Tigerair Australia, ITA Software by Google accessed September 2017.
Airline Shares: Sabre Origin-Destination Passenger traffic, selected airlines only (Qantas, Virgin, Jetstar, Tiger).

2.5 Taxes & Government Charges

Aviation taxes and fees are charged by the government and are assessed based on travel sector and whether a passenger is departing or arriving at an airport:

- **Goods and Services Tax**
  10% tax on most goods and services purchased in Australia. It applies to domestic but not international airfares.

- **Passenger Movement Charge**
  Levied on all passengers departing Australia on international flights. In 2017, the charge was A$60 per departing international passenger. This is a government tax, not a passenger service charge of an airport. The latter are dealt with in the next sub-section.

2.6 Airport Aeronautical Charges

Airport charges appear as separate charges when booking airfares through airline websites.

- **Passenger Services Charge, Domestic**
  This charge is applied to both arrivals and departures. *For example, a round trip airfare between SYD-PER will incur the SYD departure charge, PER arrival charge, PER departure charge, and SYD arrival charge.*

- **Passenger Services Charge, International**
  Levied on both arrivals and departures at Australian airports from international flights. *For example, a round-trip airfare between SYD-HKG will incur the SYD departure charge and the SYD arrival charge.*

- **Airport Safety & Security Charge, Domestic/International**
  There is a per-passenger (or per departing passenger) safety and security fee for all departures from Australian airports.

In general, in Australia airport charges are largely based on passenger numbers and the airports generally no longer assess landing fees on the basis of aircraft weight for scheduled passenger flights.[20] We note that there are some subtleties in charging of airport passenger fees. The airlines are explicit in the charge they add when quoting a fare for a flight to/from a specific airport. This might reflect the airport's posted passenger fee (which we and others refer to as the "rack rate"), or it might not reflect the rack rate. Airports and individual airlines typically negotiate a fee package that may include various incentives for new services or quantity discounts.[21] The airlines might average the passenger service charge across all routes or use some other method to establish the airport charge they add when quoting a fare to customer. If the airport charge under represents the actual charge paid by the airline to the airport, then the balance is included in the base fare. This is discussed further in Section 5, which provides details on the computation of airport charges for the construction of all-in fares.

2.7 A Comment on Terminal Navigation and Aircraft Rescue & Firefighting

The provision of services for terminal navigation and aircraft rescue & firefighting (ARFF) varies at airports around the world. Some airports provide one or both of these services, and would charge for these services either through landing fees, terminal charges, passenger charges, or a separate charge to the airlines. In Australia, terminal navigation and ARFF are provided by Airservices Australia.[22] The fees for these services are charged directly to the airlines by Airservices. The airlines do not separate out these charges when a customer is purchasing a ticket, and as such, these charges are included in the base fare.

---

[20] Landing fees may be assessed on cargo flights, and on flights of occasional carriers to an airport, where such carriers have not entered into a formal fee agreement with the airport.

[21] Since airport costs have a large fixed element, the use of quantity discounts rather than linear charges has some economic merit.

[22] Airservices Australia, (2017), http://www.airservicesaustralia.com/services/charges-and-costing/.

3 Trends in Base Airfares

Summary: BITRE developed indices of Australian airfares. In general the BITRE index, reported in real values, shows 2017 fares were lower than 2003 fares but there has been a slight upward trend since 2012. The index gives a long-term view of the trends in domestic fares, but its usefulness is limited. A number of fare types are reflected on representative domestic routes, rather than an average of what passengers actually pay, as it does not have information about airline ancillary charges (which have been growing significantly). Government taxes & fees and airport fees are included, but are as reported by the airlines. This report instead uses average fares in the Australian market, which are a better representation of what passengers actually spend on air travel. On this basis, nominal average fares actually paid have fallen since 2012.

3.1 Bureau of Infrastructure, Transport and Regional Economics (BITRE) airfare index

BITRE provides an index of domestic Australian airfares. The fare data is collected monthly from airline internet booking websites. The lowest available fare for travel on the last Thursday of the month is collected for each class of travel and is weighted over selected routes. The data is indexed using a Fisher Ideal Price Index where July 2003 = 100, and CPI-adjusted.[23]

The BITRE fares do include taxes and other charges, but they do not state whether or not airline ancillary charges are included[24].

Figure 3-1 presents the BITRE indices from 2003 through June 2018. It shows variations over time in each of the four fare classes.

- While there are different trends across the fare classes, an overall decline in real fares for three of the fare classes is apparent.
- The exception was the growth in the real full economy fare. However the index of full economy fares was discontinued in 2015, as this particular fare class was not actually being purchased by many passengers.
- Even the index of business class fares showed a slight decline, although it has had periods of increases and others of decreases.
- While there has been an overall decline in inflation adjusted restricted economy fares since 2003, these fares have increased since 2011.[25]

A problem with the BITRE index is that it tracks four select fare-class categories (now three) on one particular day of the month. This is a small number of specific fare classes and is not necessarily representative of the actual fares paid by consumers. Few seats might be available at the lowest fare. Further, the real best discount fare on given route will vary by day and vary by specific flights on a given day. Underlying a fare label such as Red-e-Deal is a multiplicity of internal fare classes used by an airline. These fare classes (and hence the fare that will be displayed) are opened and closed,

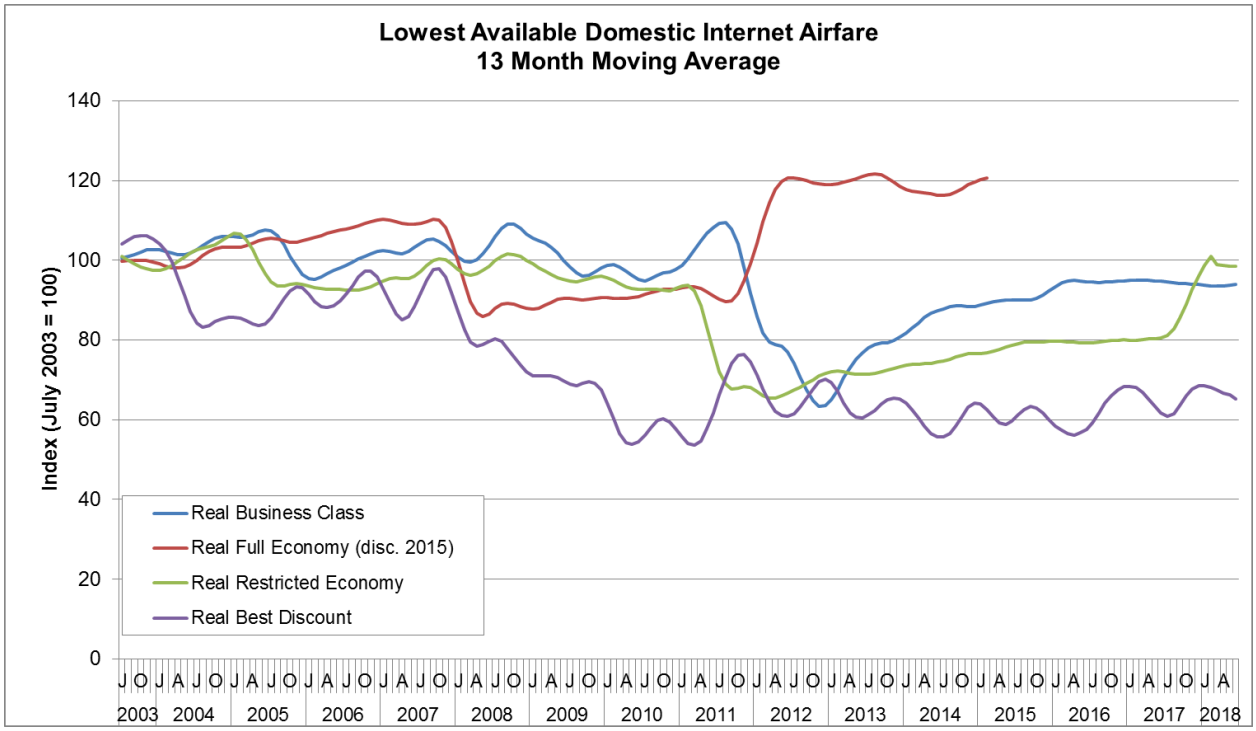
[23] BITRE, 2018, https://bitre.gov.au/statistics/aviation/air_fares.aspx

[24] BITRE, 2018, https://bitre.gov.au/statistics/aviation/air_fares.aspx

[25] BITRE notes that the jump in the real restricted economy fares is due to an adjustment to their methodology.

sometimes minute by minute, as bookings and other factors change. There may be few actual tickets sold at the particular fare displayed on an airline's website on the last Thursday of the month. Most travellers may be paying much different fares based on seat availability, popularity of particular dates, promotions by airlines, how much in advance the traveller books the ticket, how many tickets are booked at once, etc.

Figure 3-1
BITRE Airfare Index, real values
13 Month Moving Average
July 2003 – June 2018



Source: BITRE Domestic Airfares Index. Note: Prior to July 2003, BITRE airfare data was sourced from Sabre. Full documentation can be found on BITRE's website.

3.2 Using Average Airfares

In our view, a more meaningful measure of base airfares is the average fare paid by travellers in markets. There are commercial sources of average fares, and although there are some limitations in the data, it is much more reflective of what Australian consumers are actually paying for base fares than the BITRE index.

For this study, we have obtained average fares from the commercial database provided by Sabre Airline Solutions.[26] This dataset is based on actual tickets booked through air ticket distribution channels using the Global Distribution Systems (GDS). Most tickets booked through travel agents, whether online or through bricks and mortar outlets, are sold through GDS channels, as are some direct airline ticket sales. To account for tickets sold via other distribution channels, Sabre uses other information on total passengers flown, total airline revenues and a number of other sources to

[26] There are some limitations to airfare data from Sabre and other vendors of airline origin-destination traffic and fare data. Nevertheless it has been a reasonably reflective data source and is widely used not only by researchers but by the airlines themselves.

estimate the average fare paid in a market. Sabre provides origin-destination air passenger average fare estimates with detail specific to the route and airline, including travel class. Estimates are available for each month. Sabre provides data on both the number of passengers and on total ticket revenue, allowing for the calculation of average fares at several levels of detail and for any sector of travel.[27]

Passenger and revenue data is available back to 2010.

In 2012, Sabre added a dimension showing both the total ticket price, which includes federal/state taxes and airport fees,[28] and the base airfare price which removes the taxes and fees from the ticket price.[29,30]

Ancillary purchases, even those made at the time of booking, are not included in either the total or base price, as currently GDSs are not reporting ancillary purchases. Hence, we compute and add these charges to the base fare (discussed in Sections 4 and 6).[31]

3.3 Trends in Average Fares

Figure 3-1 summarizes average base and total fares in nominal values for Australian flights, as reported by Sabre.[32] Base Fares in all three sectors (Domestic, Trans-Tasman, and International) have generally declined year-over-year since 2012, each at a compound annual growth rate between -3% to -4%. This trend is mirrored in Total Fares (but excluding ancillary revenues) for all three sectors as well, except between 2014 and 2015 during which non-Base Fare revenue increased. The Trans-Tasman market saw the largest increase in average non-Base Fare revenue in this year (+8%).

Comparing the BITRE and SABRE data for 2012 to 2016 gives mixed results. The data from BITRE implies that while fares are down from 2003 levels, they have increased since roughly 2013; however, the average fare data indicates a continuing general downward trend in base fares since 2012. It is important to note again that the data from BITRE, while useful for a historical perspective, does not accurately represent what customers are paying to fly; as they are representative fares, it is not known how many passengers actually pay that price.

---

[27] InterVISTAS believes Sabre provides an accurate reflection of tickets sold through the GDS, and that it uses a reasonable approach to estimate those tickets outside the GDS. If Sabre's estimate for non-GDS traffic is out by 5%, this will provide only a 2% error in the total market estimate. We have used sources other than Sabre in the past, but generally prefer Sabre for assessing average airfares.

[28] As reported by each airline. Airlines choose whether or not to report taxes and fees separately from their base airfare, and Sabre provides both the base fare and total fare information. Ancillary revenue is not currently reported by Sabre in the total fare.

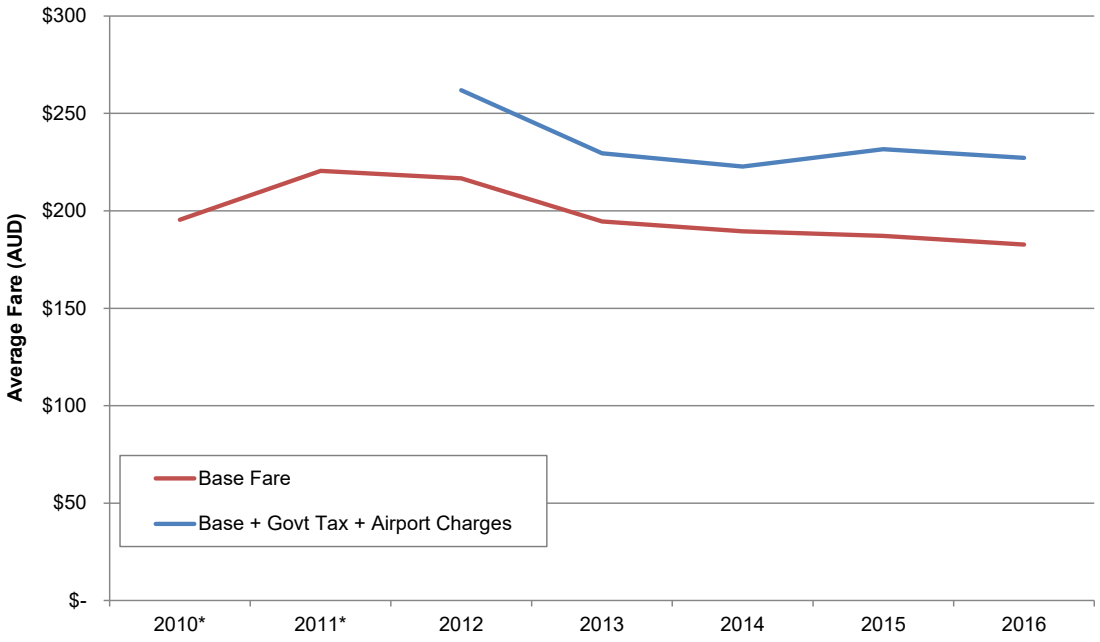
[29] It does not provide data on ancillary charges.

[30] The revenue data used by Sabre is carrier-reported revenue. If a carrier separates airport charges along with the government taxes and fees, then airport charges revenue will be removed from the "Total Revenue" by Sabre when creating the "Base Revenue" data. In Australia, many carriers are reporting the airport charges (also known as "aeronautical charges") separately. Hence, the difference between Sabre's Total Revenue and Base Revenue includes both government tax and airport charges.

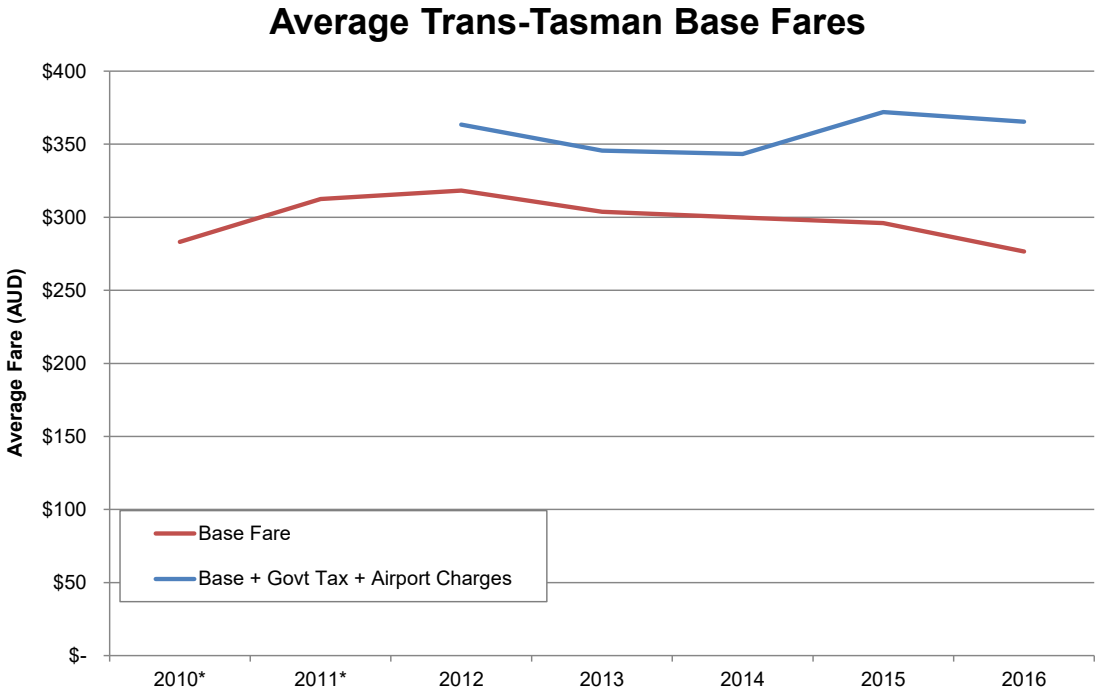
[31] Sabre is researching how to include ancillary data for future versions of the database.

[32] Average calculated by dividing total revenue reported by total passengers reported. The results are nominal values.

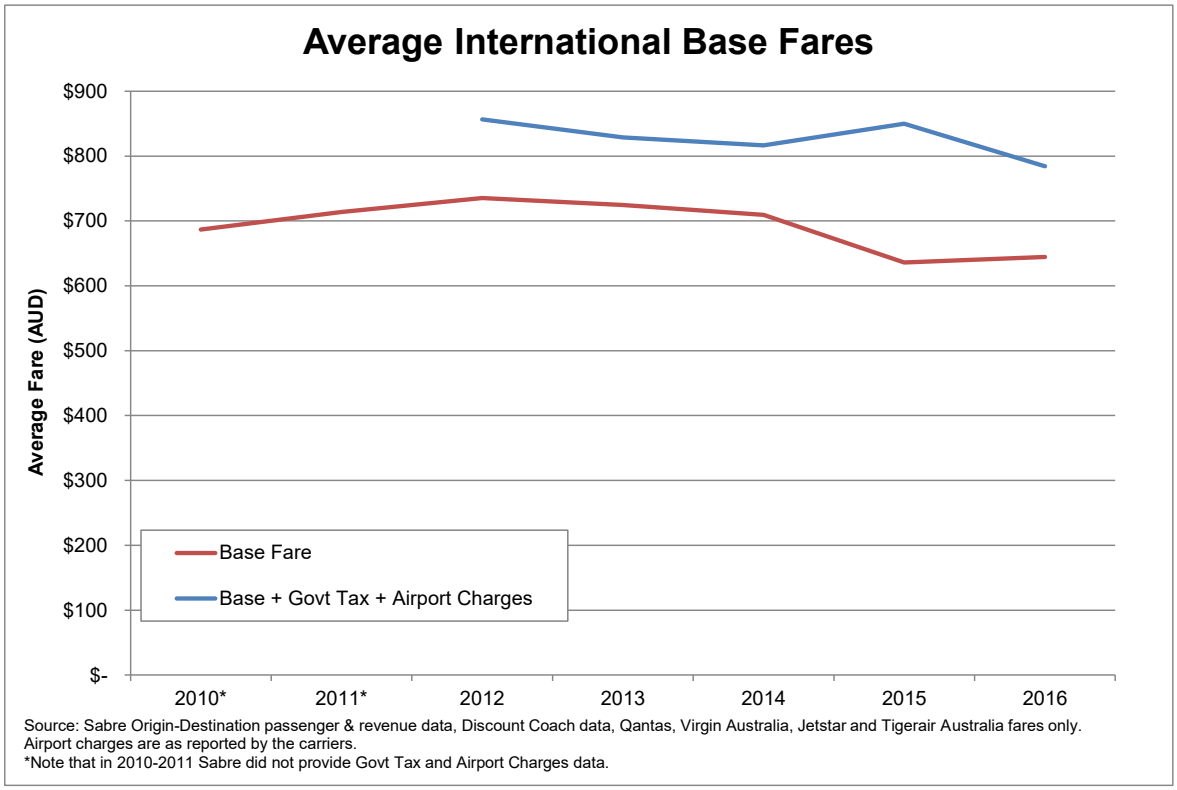
Figure 3-1
Sabre Average Fares for Australian Domestic/Trans-Tasman/International Flights, AUD 2010-2016, nominal values



Source: Sabre Origin-Destination passenger & revenue data, Discount Coach data, Qantas, Virgin Australia, Jetstar and Tigerair Australia fares only.
Airport charges are as reported by the carriers.
*Note that in 2010-2011 Sabre did not provide Govt Tax and Airport Charges data.



Source: Sabre Origin-Destination passenger & revenue data, Discount Coach data, Qantas, Virgin Australia, Jetstar and Tigerair Australia fares only.
Airport charges are as reported by the carriers.
*Note that in 2010-2011 Sabre did not provide Govt Tax and Airport Charges data.



Source: Sabre Origin-Destination passenger & revenue data, Discount Coach data, Qantas, Virgin Australia, Jetstar and Tigerair Australia fares only.
Airport charges are as reported by the carriers.
*Note that in 2010-2011 Sabre did not provide Govt Tax and Airport Charges data.

4 Ancillary and Airport Revenue Trends

Summary: There has been an increasing trend in the airline business towards unbundling of airfares (and increasing ancillary sales). Ancillary revenue typically refers to fees for baggage, seat selection, meals, and similar unbundled amenities including frequent flyer programs. It's been reported that globally, over 10% of airline revenue now comes from ancillaries. While base fares may be lower, passengers still pay for the ancillary charges as part of their fare.

At the same time, in Australia, there have also been real increases in airport charges to fund investment in new capacity that are generally commercially agreed upon with the airlines.

4.1 Trends in Airline Ancillary Charges

Historical revenues from ancillary fees are not readily available, which presents a challenge when attempting to examine trends in the "all-in" airfare. There does not appear to be a useful source of historical charges, even from the Airline Tariff Publishing Company (ATPCO), which collects and distributes airline fare data, nor from commercial vendors of average fare data such as Sabre. ATPCO has some ancillary fees data that is forward-looking, but no historical data is kept.

Idea Works Company prepares an annual collection of airline ancillary revenue data on behalf of CarTrawler, an Irish travel technology company. Idea Works collects the reported ancillary revenue figures from airline annual reports and income statements, and prepares a brief summary and discussion for each airline.

Ancillary revenue typically refers to fees for baggage, seat selection, meals, and similar unbundled amenities including frequent flyer programs. The Idea Works report provides detail, where available, on what airlines include in their respective "ancillary revenue" categories.

However, upon reviewing the Idea Works report entries for Australia's airlines, InterVISTAS learned that what the Qantas Group and Virgin Group[33] report as "ancillary revenue" is better categorized solely as "frequent flyer rewards program revenue", including credit card branding fees. Our understanding is that the ancillary revenue from unbundled amenities is included in the passenger revenue category for both airlines. Additionally, no break-out was included for their low-cost subsidiaries, Jetstar and Tigerair Australia.

While the ancillary revenue data from Idea Works for individual Australian airlines is not directly useful, a global average reported by Idea Works can give us insight into ancillary revenue trends. Idea Works estimates that in 2010 airline ancillary revenue was US$22.6 billion, representing 4.8% of global airline revenue. This figure has tripled to US$82.2 billion in 2017, representing 10.6% of global airline revenue and a 22% single year increase over 2016. This reflects the world-wide trend towards unbundling amenities traditionally included in the base fare. While on average the ancillary revenues are around11% of total revenues, this varies significantly by airline. Some carriers have ancillary revenues as high as 40% of their total revenues.[34]

[33] Qantas Group includes Jetstar, Virgin Group includes Tigerair Australia.

[34] Idea Works Company (2016).

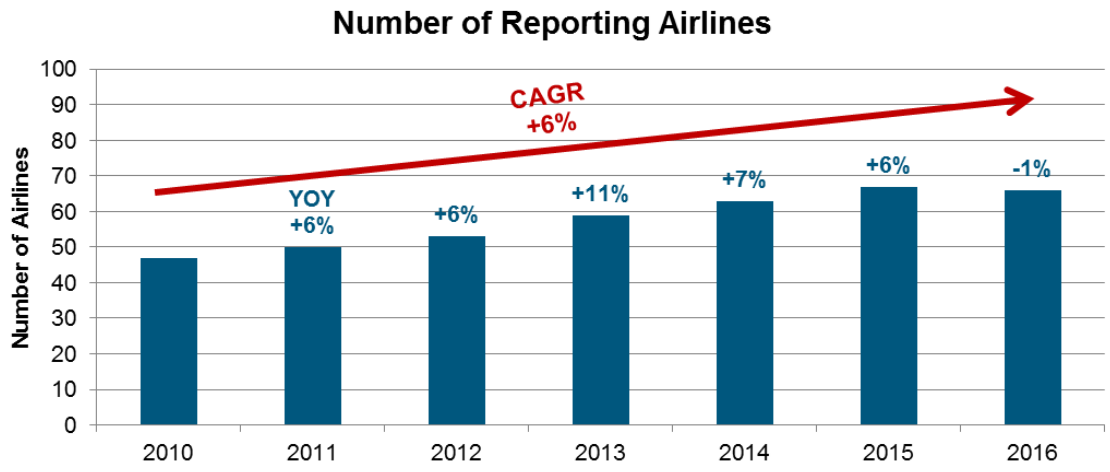
Figure 4-1
Global Estimate of Airline Ancillary Revenue, USD
2010-2017

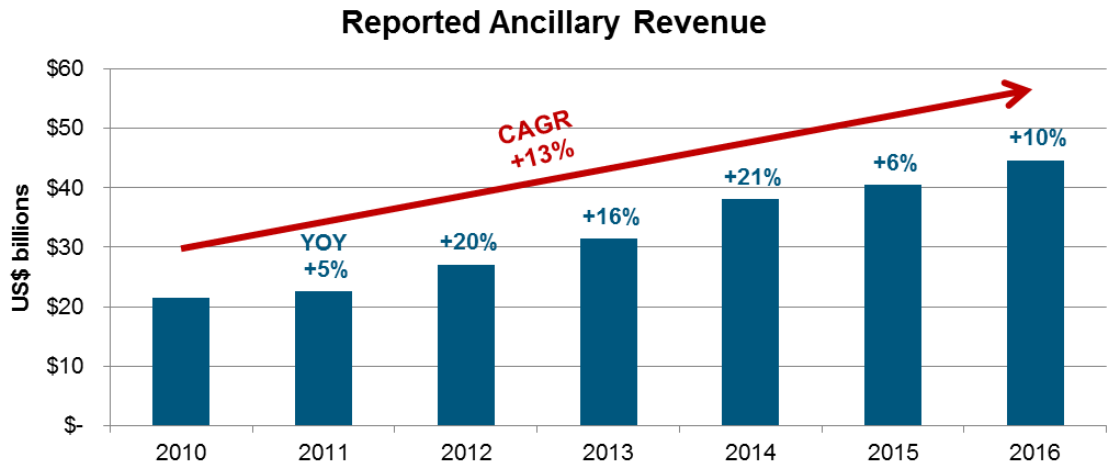
Year	2010	2011	2012	2013	2014	2015	2016	2017
Ancillary Revenue ($ billions)	$22.6	$32.5	$36.1	$42.6	$49.9	$59.2	$67.4	$82.2
Global Airline Revenue ($ billions)	$474	$577	$667	$708	$746	$763	$740	$776
Share of Total Revenue	4.8%	5.6%	5.4%	6.0%	6.7%	7.8%	9.1%	10.6%

Source: Idea Works Company, Press Release 29 November 2016.

Idea Works also presents the total annual ancillary revenue for only those airlines that report ancillary revenue in their financial statements. Below are two charts: one showing the number of airlines reporting ancillary revenue since 2010 and one showing the total revenue reported by these airlines. The number of airlines reporting ancillary revenue increased from 47 in 2010 to 66 in 2016, and the total amount of ancillary revenue recorded by these airlines more than doubled from just over USD $20 billion in 2010 to nearly USD $45 billion in 2016, a compound annual growth of 13 percent annually.

Figure 4-2
Airlines Reporting Annual Ancillary Revenue
in Idea Works' Report
2010-2016





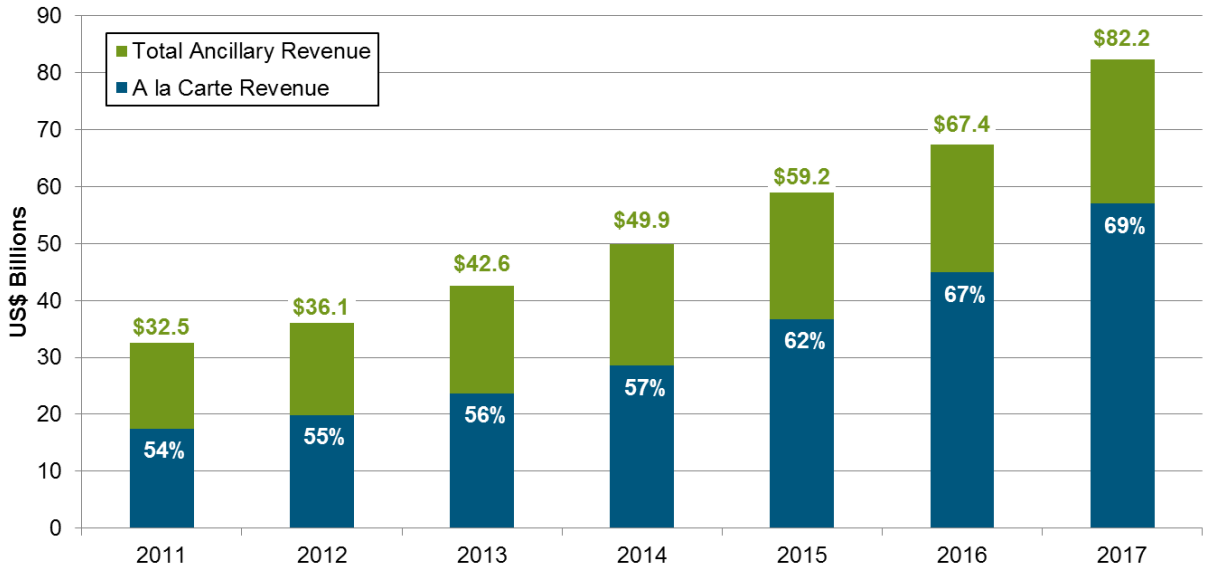
Source: Idea Works Company, Ancillary Revenue Reports press releases, 2010-2017. 2017 figures for airlines not yet available.

Idea Works also provided a split of ancillary revenues, detailing the a la carte portion of total ancillary revenues. While total ancillary revenue includes frequent flyer programs and hotel/car rental, a la carte revenue includes only that from "amenities consumers can add to their air travel experience".[35] Idea Works forecasted that in 2017 the a la carte revenues will rise to be 69% of airlines' global ancillary revenues, detailed in the recently released 2017 estimates.[36]

[35] A la Carte revenue includes onboard sales of food & beverage, checked and excess baggage, seat selection or upgrades, reservation call centre support, credit card fees, priority check-in, screening and boarding, onboard entertainment systems and wireless internet access.

[36], November 28, 2017 Press Release.

Figure 4-3 A la Carte Revenue as Percent of Total Ancillary Revenue 2011-2017

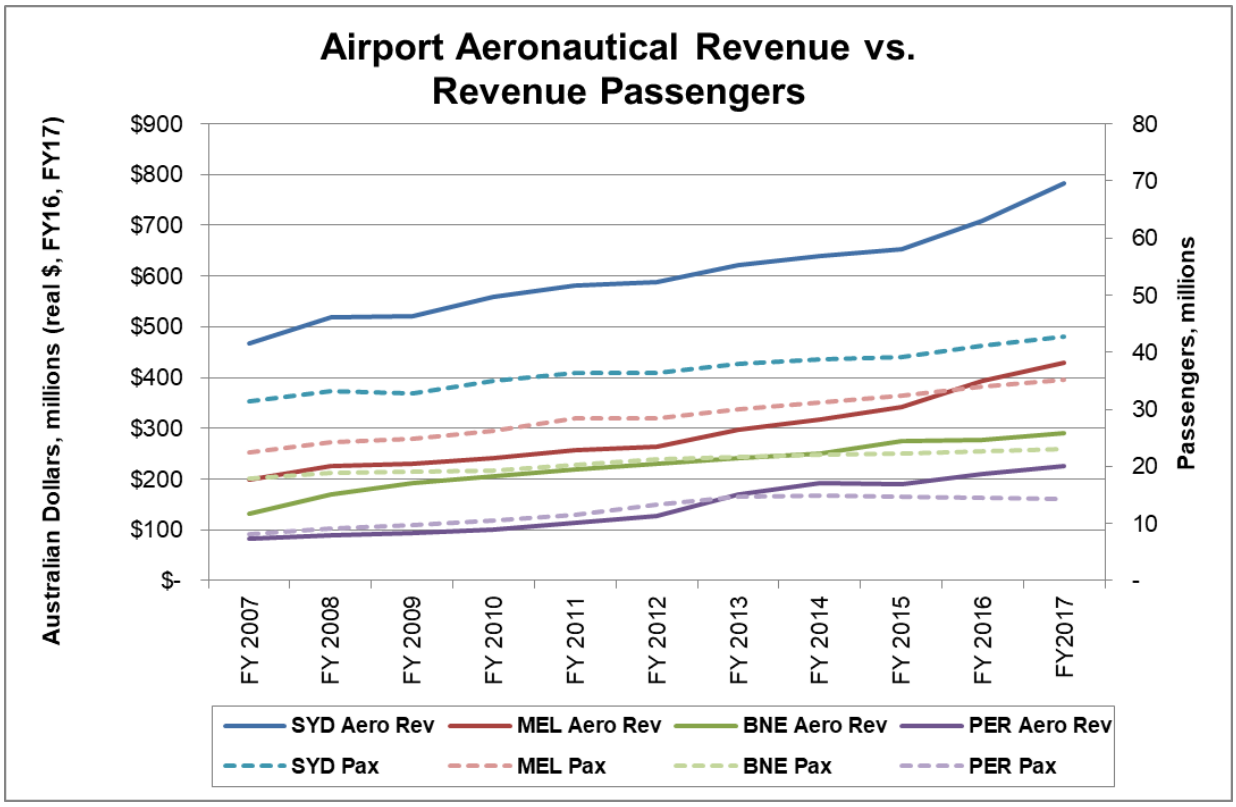


Source: Idea Works Company and CarTrawler, Worldwide Estimate of Ancillary Revenue for 2017.

4.2 Change in Airport Aeronautical Revenue

As shown in Figure 4-4, between FY 2011 and FY 2017, aeronautical revenue at the top four airports increased by 47 percent, or 7 percent per year (CAGR) in real terms. Passenger traffic increased 20% during the same period (3% per year CAGR). Perth experienced the highest increase in revenue (97%) as well as the fastest annual rate of growth (12% per year CAGR). Melbourne experienced the highest change in dollar amount, increasing aeronautical revenue by A$170 million between 2011-2017, or an average of A$28 million per year, followed closely by Sydney. Passenger traffic growth at Australia's four major airports has been slower than growth in aeronautical revenue, though there has been growth at all 4 airports over the period.

Figure 4-4
Annual Airport Aeronautical Revenue (real values) vs. Annual Passengers
2006/07 – 2016/17



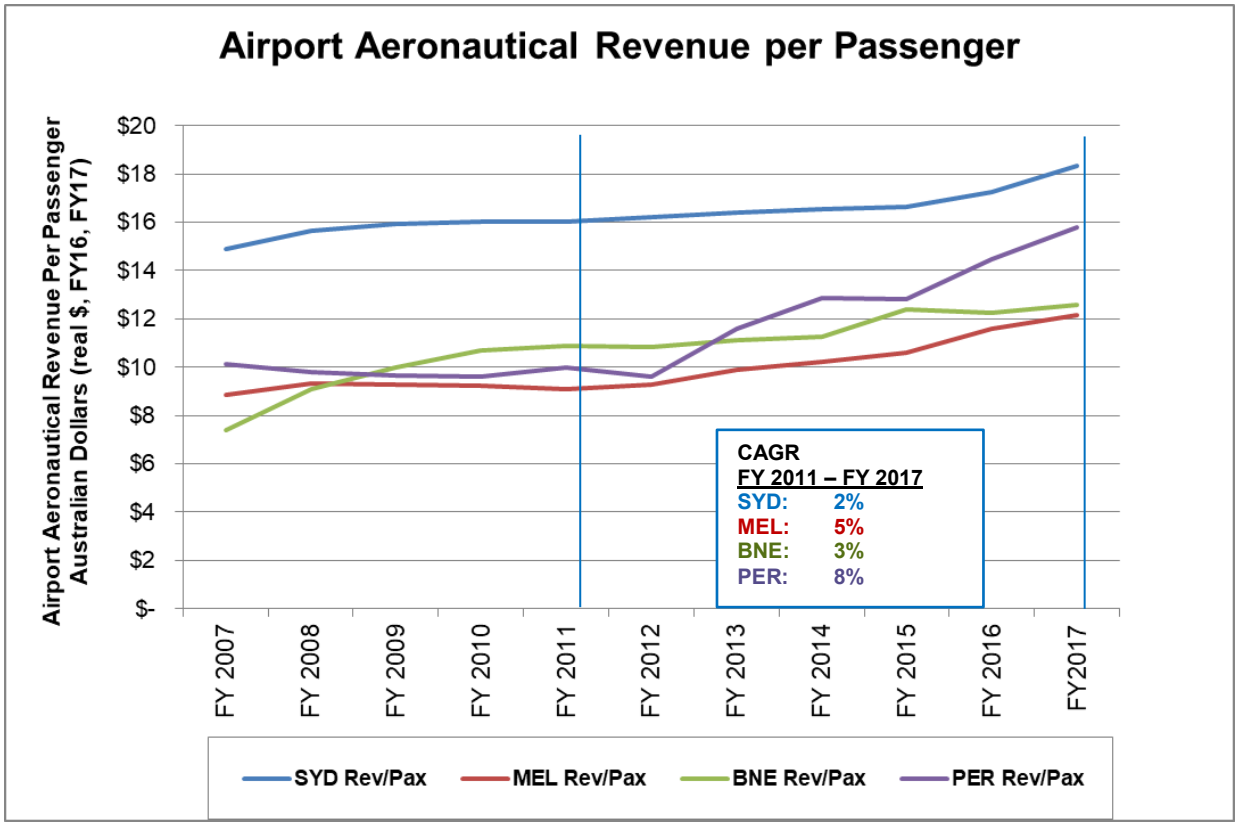
Source: ACCC Airport Monitoring Reports, 2015-16 and 2016-17.

Figure 4-5 shows the growth in aeronautical revenue per passenger at the 4 airports, a commonly used proxy for average airport charges. Based on the data, airport charges have increased over the period, in real terms. The largest compound annual growth was 8% at Perth over the last 6 years, which is consistent with the growth in revenue and traffic from Figure 4-4.

There is an issue with using aeronautical revenues per passenger as a proxy for airport charges however. The higher aeronautical revenue could be tied to more rapid growth in international passengers, which incur higher terminal charges. Thus, changes in traffic mix may distort an assessment of movements in airport charges if undertaken using average aeronautical revenue per passenger. This issue can be mitigated by looking at the charges for a specific aircraft on a specific route.

As well, comparisons between airports (and even in different years at the same airport) may be distorted because at some airports airlines self-provide some services (such as baggage handling), or the airport may include more services (such as air navigation or security) than in other jurisdictions where governments or other agencies/companies provide services. These are not issues for comparisons between Australian airports.

Figure 4-5
Airport Aeronautical Revenue per Passenger in real values
2006/07 – 2016/17



Source: ACCC Airport Monitoring Reports, 2015-16 and 2016-17.

5 Assessing Airport Charges

Summary: A key aspect of the analysis in this report is how airport charges are to be measured. Australian airports publish official rates, but these "rack rates" do not represent the charges paid by airlines as they are able to negotiate charges lower than these published rates. Thus, the rack rates overstate the actual revenue the airport receives.

While we do not have data on individual Australian airports discounting of aeronautical revenues relative to rack rates, the Australia Airports Association collected data made available to us the average discount from rack rates for nine out of the ten major Australian airports. The average discount based on this sample is 24.2% for domestic routes and 9.8% for international routes. The analysis in later sections of the importance of airport changes in the all-in fare will utilize these average discounts to more accurately represent the overall percent of airport charges in the "all-in" airfare.

5.1 Introduction: Choosing the Airport Charges to Use for Comparison to Airfares

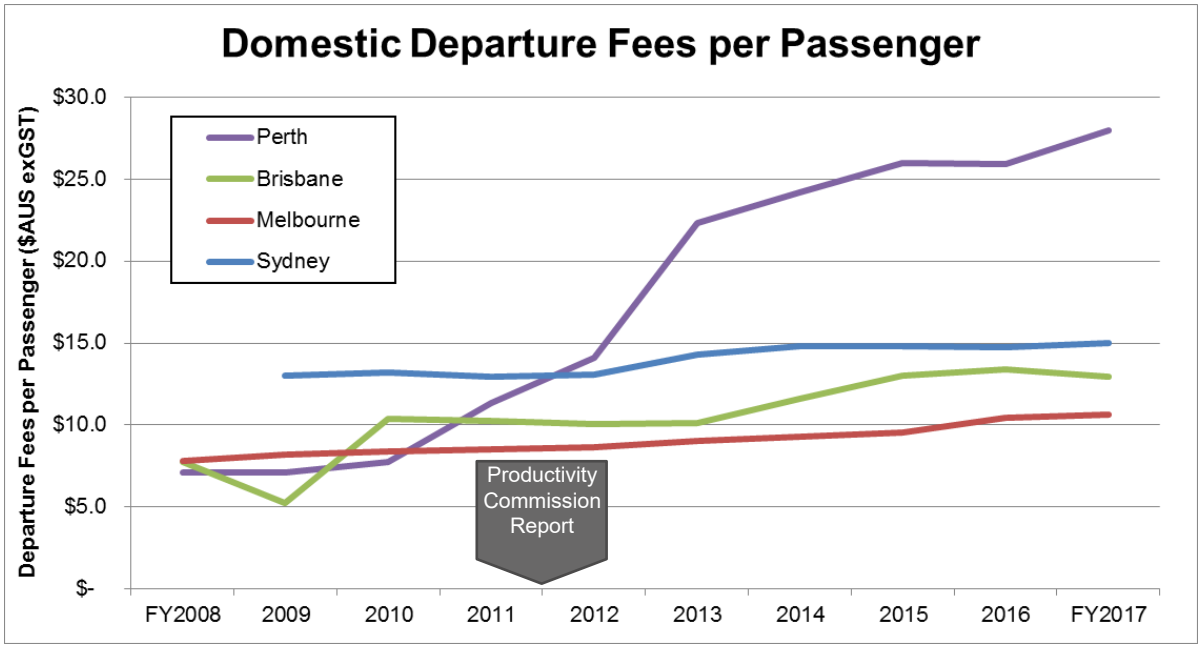
It may seem straightforward to calculate airport charges when examining flight costs or airfare components; however care must be taken as there are multiple sources for airport charges. This section discusses each source of airport charges, and Figure 5-4 provides an example of how the sources differ. The section begins by describing the trend in airport rack rate charges since the last Productivity Commission Review.

5.2 Trends in Australian Airport Departure Fees per Passenger (Rack Rates)

This section updates trends in departure fees per passenger. We note that these trends are based on rack rates published by the airports and are not corrected for discounting by airports, as will be discussed in sub-section 5.7. Nationally Australian airports' actual charges are considerably less than their rack rates, and the degree of discounting has been increasing. However, since we lack data on discounting by individual airports and do not have discount information by year, we begin by showing trends in rack rates (airport departure fees per passenger) by year since 2008. In the first diagram we present, there is an indication of the dividing point between information available for the previous Productivity Commission Review, and updated information, so as to highlight the updated information. Figure 5-1 and Figure 5-2 provide data on the departure fee per passenger for each of the four largest airports. Separate charts are provided for domestic and international. The data are nominal rates published by the airports. I.e., they are not adjusted for inflation, which was 9.8% (1.9% per annum) from 2011 to 2016.[37]

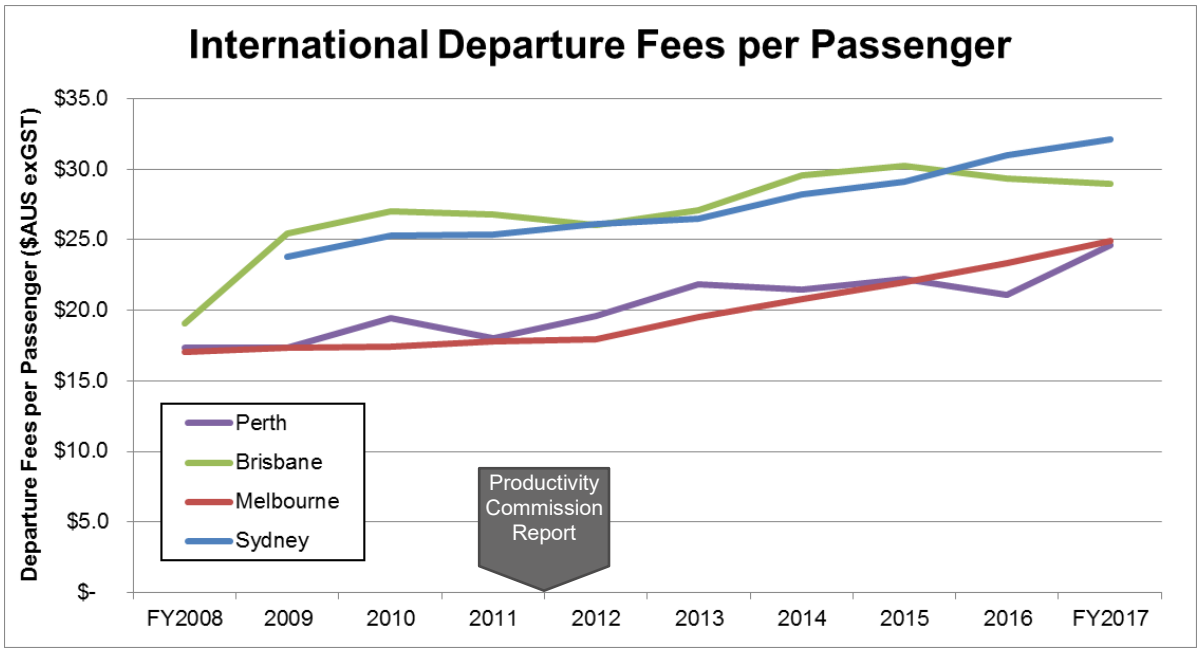
[37] Source: online inflation calculator of Reserve Bank of Australia. Note that the BoA calculator does not yet have figures for 2017. Assuming a similar rate of inflation, then the increase in general prices from 2011 to 2017 would be in the range of 11.7%.

Figure 5-1
Departing Fees per Passenger – Domestic (nominal values)
Top 4 Australian Airports
2007/08 – 2016/17



Source: Airport Aeronautical Charges, collected from individual airports by the AAA.
Notes: For 2016 and 2017, Melbourne is 2015 domestic terminal charge, inflated by CPI; Includes security charges

Figure 5-2
Departing Fees per Passenger – International (nominal values)
Top 4 Australian Airports
2007/08 – 2016/17



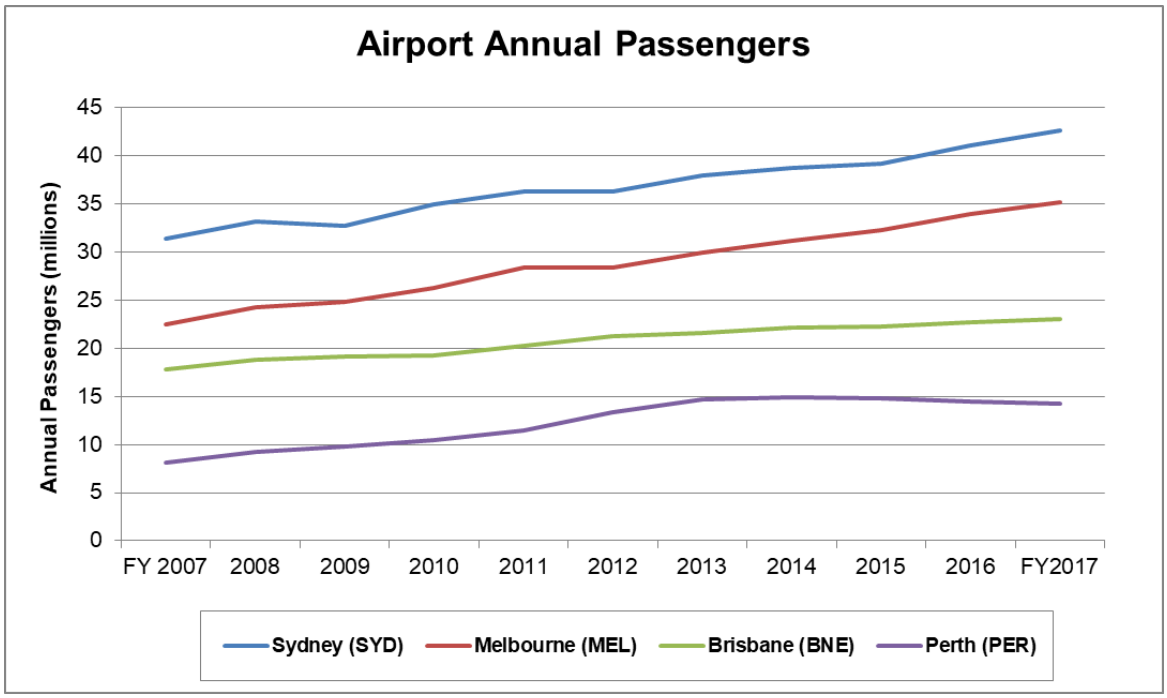
Source: Airport Aeronautical Charges, collected from individual airports by the AAA.
Notes: Includes security charges

Three of the airports had *domestic* fee increases somewhat above inflation. Fees at Perth grew 16% annually on average between FY 2011 and FY 2017, largely reflecting the recovery of costs associated with new *domestic* terminal infrastructure costing $320m.[38] Meanwhile, passenger traffic at Perth has grown 4% annually on average, as illustrated in Figure 5-3.

During this period, all four of the airports experienced real international charges increases while experiencing significant traffic growth.

We caution that the trends in the two preceding figures are for rack rates, unadjusted for discounting. As will be seen in Section 5.7, on average domestic airport charges are discounted by 24% relative to rack rates, and this has grown from 17% discounting in 2012, a 40% increase in discounting. For international, the discount rate has grown from 4% to 10%.

Figure 5-3
Annual Revenue Passengers
Top 4 Australian Airports
2006/07-2016/17



Source: ACCC, 2015-2016 Monitoring Report and data provided by AAA.

5.3 Public Rack Rates

We now contrast three different concepts of (and sources of information on) airport charges in Australia. We begin with the concept of rack rates for which trends were provided in the previous section.

Most airports publish an aeronautical charges document (typically available on the airport's website), detailing landing, terminal, aircraft parking, and other usage charges. These are the "public rack rates"

[38] Australian Airports Association (2017)

for an airport. However, airlines will often negotiate charges lower than the "rack rates". Airports might offer discounts for new carriers or key unserved routes or encourage competition on an existing route. They may also offer discounts if carriers exceed certain aggregate volume levels, a form of quantity based discount pricing. Given that airports have a substantial fixed costs, quantity based charges have some desirable economic elements by better matching revenue and cost structures. Further, a meaningful part of Australia's domestic traffic uses terminals that are operated under lease arrangements that are not treated as aeronautical income. The effect of these factors is not publicly available. The rack rates that are publicly available thus overstate the actual revenue the airport receives. For assessing the impact of airport charges on all-in fares and air traffic, we thus require a more representative measure of airport charges.

5.4 Airline Add-on Fees for Airport Charges

Most airlines detail the charges, fees and taxes added to the base fare a passenger pays when they purchase a ticket related to airport fees. Examination of these airport fee add-ons to the passenger fare revealed that often they do not match the airport rates published by the airports themselves, and that they can differ by airline for a given airport. We are advised that they may not match with the amount the airline actually pays the airport.

5.5 Actual Airport Fees Paid by Airlines

The actual fee paid by airline to the airport is typically confidential, a result of a commercial negotiation between the airline and the airport. The Productivity Commission has previously cited the benefits evident from the evolution of airport charges being increasingly set via commercial negotiations. The 2011 Productivity Commission report discusses that commercial agreements, overall, are working well at some airports, but there is still some room for improvement in the contract process:

> *Commercial negotiation.*
>
> *FINDING 8.1: Commercial agreements are the basis for the relationships between airports and most airlines. Reflecting that commercial negotiation in a light-handed environment only began after 2002 and that commercial agreements typically are for five years or more (and up to 15 to 17 years for some terminal agreements), the opportunity for the parties to iterate to more comprehensive and refined agreements has been limited.*
>
> *FINDING 8.2: Commercial agreements now incorporate features that airlines considered were absent or deficient in 2006. But despite these advances, airlines assert that commercial negotiations with some airports are one-sided and dysfunctional.*
>
> *FINDING 8.3: Problems with commercial negotiation are not symptomatic of system-wide failure, but appear to reflect different practices across airports. Sydney airport in particular attracts more criticism than other airports. The variations between airports demonstrate that commercial negotiation can, but may not always, work well.*
>
> *FINDING 8.4: The divergence in the observations and assertions made by airports, on the one hand, and their airline customers on the other, seems to reflect 'positioning' to either protect or change the distribution of profits between them. Ultimately, the claim and counter claim nature of the evidence means it is not possible to make a definitive call that greater regulatory intrusion is warranted. There is considerable scope to improve commercial negotiation — particularly with regard to contract formation — as it has not yet achieved the level of maturity envisaged with the lifting of price regulation nearly a decade ago.*[39]

[39] Productivity Commission (2011), pp. XLVIII-XLIX

5.6 An Example Comparison of Rack Rates, Airline Charges on Tickets and Actual Fee Paid by Airline

While the actual fee paid by an airline to an airport is commercially sensitive, in our discussions with a number of airports we learned that

- The published rack rate is typically not the rate paid by most airlines with regular service to an airport.
- The actual rate paid is almost always less than the rack rate.
- The actual rate paid by the airline will differ by airline. The difference is a function of a number of dimensions, including the mix of traffic served by the airline (e.g., domestic vs. international), the airline use of large incentives for targeted air services (such as new routes), airlines' relative bargaining power and skill and the overall scale of service of the airline and its commitment to cover a minimum level of revenue for the airport, in part reflecting the airport's fixed costs.
- Airlines will typically add to their tickets an additional charge for airport charges even though the obligation to pay the charges falls on the airline, not the passenger. We observe that a) this airline charge is sometimes reflective of the airport's published rack rate and sometimes not, and b) sometimes but not always differs among the carriers at the airport. Again, the difference may reflect differences between the carriers for various incentives, and perhaps for other commercial pricing reasons.

Figure 5-4 provides an example of differing airport charges shown when booking an airline ticket on a given route from an airport, the published rack rate, and some suggested values for the actual fee paid. The latter are somewhat hypothetical, but reflects the information provided by the AAA on discounting from rack rates, and discussions with airports that airlines do not pay the same actual rate per passenger.

Figure 5-4
Airport Charges Vary by Reporting Source

Note: actual fee paid is an estimate by InterVISTAS.

5.7 Adjusting the Rack Rates to Actual Fee Paid and Share of Airport Charge

Based on consultation with airports, using the published Rack Rate will overstate airport charges as percent of all-in fare on average. To deal with this, we have first computed each airport's fee using its

published rack rate, then adjusted downward by the AAA's estimate of actual rates paid as a percentage of the rack rates. The latter discount rate was provided by AAA as an average over all airports for each sector (domestic and international).[40]

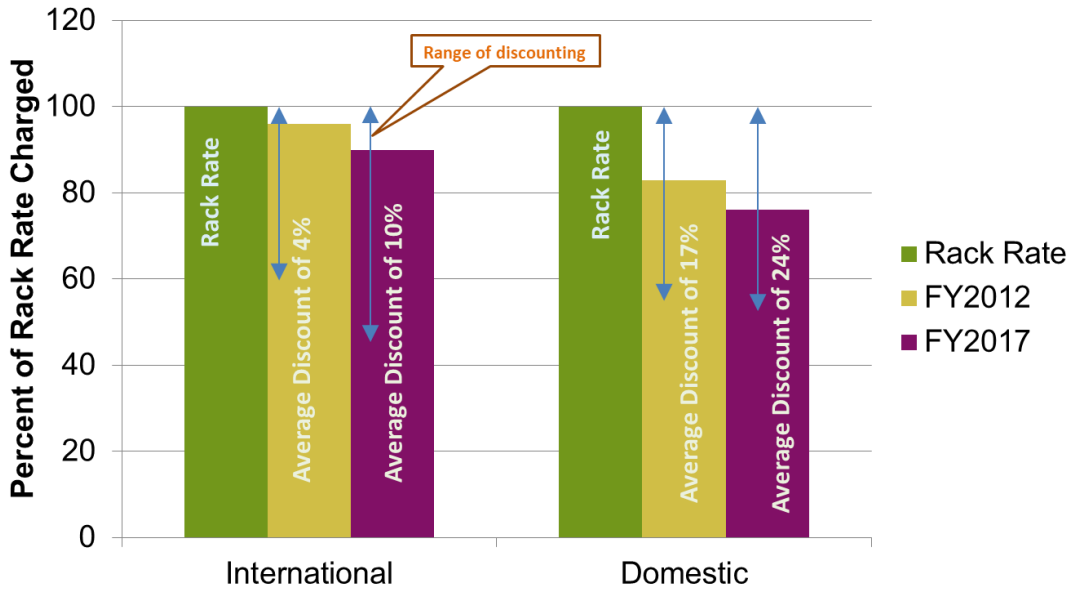
The average 2017 discount provided by AAA is 24.2% for domestic routes and 9.8% for international routes.[41] (See Figure 5-5.) AAA also provided the average discount for 2012. As can be seen, there has been significant and increasing discounting over time.

The AAA also provided the range of discounting percentages from the airport responses and this is shown by the blue arrows in Figure 5-5. Discount will vary among the airports for a number of reasons, including marketing success in attracting new carriers and new routes with the larger discounts.

This analysis by AAA of the confidential rates also reveals that there does not appear to be a simple linear relationship between airport size and the level of discounting.

The next section will use the information on the high discounting of airport charges in Australia to compute all-in fares, including airport charges.

Figure 5-5
Significant and Increasing Discounting of Airport Charges
Australian Airports
FY 2012-2017



Source: Data received from Australian Airports Association

[40] Limited information on actual rates is available from airport financial statements, but for a few airports we can observe actual airline/passenger fees, and these are broadly consistent with the national average provided by the AAA. The AAA average is for large and medium sized airports.

[41] FY 2017 rates. Canberra has been excluded as their rack rates have not been reset in many years and are irrelevant to their commercial practice. Hobart has been excluded from the international data as they had no international passengers in FY 2017

6 “All-in” Airfare

Summary: The “all-in” airfare is the total final amount paid by the passengers for travel, including the base fare and all other airline (fuel surcharges and ancillary) charges, government taxes and fees, and airport charges. The all-in fare is not reported by airlines, so the amounts must be estimated. Australian airport charges represented about 8% of the average domestic Australian all-in airfare. On trans-Tasman services, Australian airport charges represented about 7% of the average all-in airfare. On international services, Australian airport charges also represented about 7% of the average all-in airfare. These percentages include an adjustment for discounting present at Australian airports and are exclusive of GST. It is most appropriate to examine airport costs relative to the all-in fare as it is the all-in fare that is the basis on which the passenger actually makes their travel decision. Passengers do not decide whether or not to travel after looking at a base fare. A base fare may attract someone’s attention, but it is only once all the costs are factored in that the passenger’s decision to purchase, or not purchase, is made.

Comparing across the five largest Australian airports shows a consistent result. Airport charges represent 6% of the average all-in domestic airfare at Perth, 7% at Sydney and 8% at Melbourne, Brisbane and Adelaide. Airport charges represent 3% of the average all-in international airfare at Melbourne and Adelaide, 4% at Sydney and Perth and 5% at Brisbane.

6.1 Introduction

The “all-in” airfare is the total final amount paid by the passengers for travel, including the base fare, other airline charges (fuel surcharges – not currently in use in Australia, and charges for unbundled ancillary services), government taxes & fees, and airport charges. Each passenger’s total all-in fare is not reported by airlines to any public agency or commercial data reporting service, so the amounts must be estimated in this report.

Because this analysis focuses on the effect that changes in airport charges might have on passenger all-in ticket prices, it excludes other transportation costs of the trip, such as taxi, parking and public transit that might arguably be counted as part of an individual’s “total cost of travel.” These vary widely and there is no reliable and consistent source of them nor information that captures or samples how passengers arrive at the airport. That leaves this analysis to focus on the final all-in ticket price the passenger faces when booking air travel.

To refresh, the all-in fare is computed from five components:

- The base fare
  We use average fares to better reflect what passenger pay, rather than isolated fareclasses that may be used by few passengers.

- Airline fuel surcharges
  which presently are not used in Australia, hence zero.

- Ancillary airline charges
  which are estimated using an average passenger profile by sector (domestic, medium haul international, long haul international) on amount spent and percent of passengers purchasing ancillary services.

- Government taxes & charges
  discussed in Section 2.5.

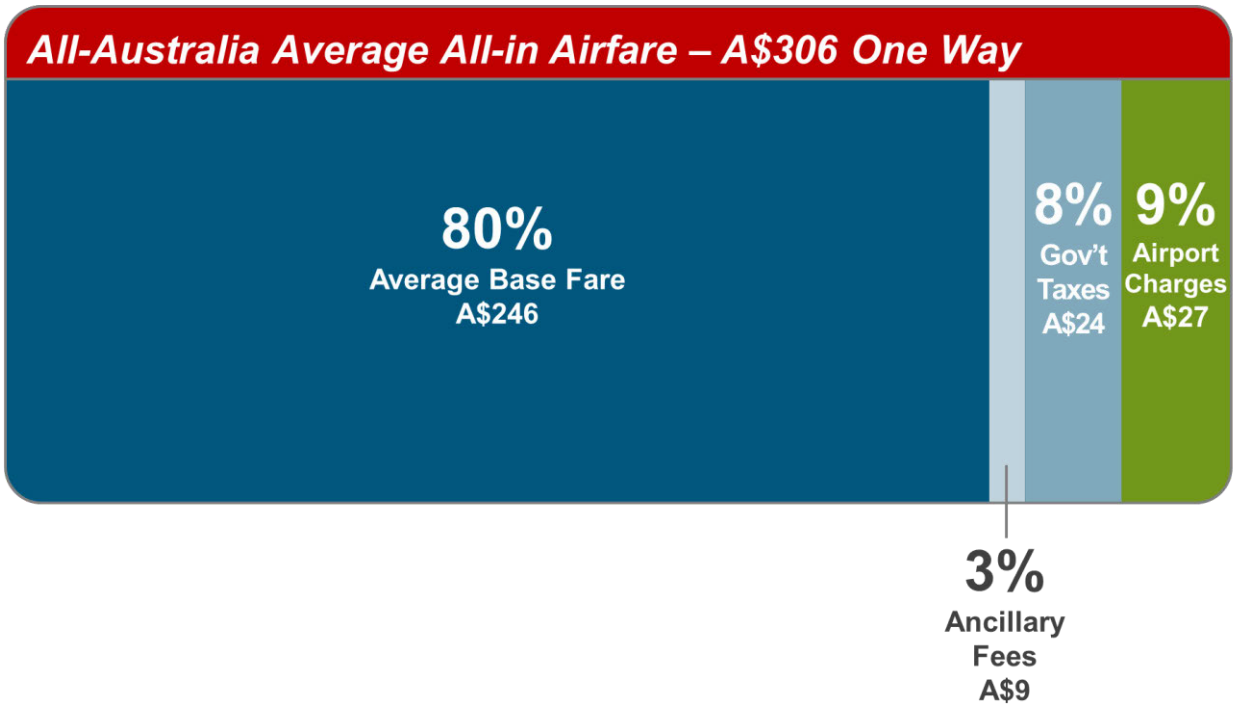
- Airport charges
  Discussed in Section 5.

6.2 Australia – All Destinations Average Airfare

We begin by showing the composition of an average all-in fare for all-Australia (meaning averaged over all routes and sectors). It consists of

- An average base fare of A$246 (80% of the all-in fare);
- No fuel surcharge;
- Average ancillary fees of A$9 (3% of all-in fare);
- A$24 in government taxes and fees (8%); and
- A$27 in airport charges (9%), computed by applying the average discount to airport rack rates.

Figure 6-1
Australia – All Destinations Airfare:
Average All-in Airfare with Airport Charges, Government Taxes, and Ancillary Fees
nominal values
2016 fares and taxes with 2017 Ancillary Fees



Sources:
Average of Domestic, Trans-Tasman and International average fares, weighted by O&D Passengers
Base Airfare, taxes, charges: Sabre Origin-Destination Passenger Data, Australia outbound, 2016. Includes only Qantas, Jetstar, Virgin Australia and Tigerair Australia data. Discount Economy fares only, representing over 90% of the total O&D passenger market size.
Taxes & Charges split: Australian, Canadian & B.C. government taxes, ITA Matrix Software. Canadian aviation taxes used as estimate for average international tax, as these are higher than U.S. taxes and lower than UK taxes. Australian airport charges adjusted from rack rates to estimate the actual amount carriers pay. Residual charges moved into Base Fare.
Ancillary Fees: Average of all sectors. Collected from airline websites (Qantas, Jetstar, Virgin Australia and Tigerair Australia), adjusted with passenger purchase behaviour estimates.

Airport charges are calculated to be on average 9% of the “all-in” airfare paid by passengers travelling to, from or within Australia. It should be noted that the 9% of the all-in-fare represented by airport charges includes not only those by Australian airports but also those by airports outside of Australia (i.e., it includes the charges international passengers pay at the foreign airports in their itinerary). If foreign airport charges were to be excluded, the portion of the all-in fare attributable to Australian airport charges would be less than the 9% shown in Figure 6-1 above.

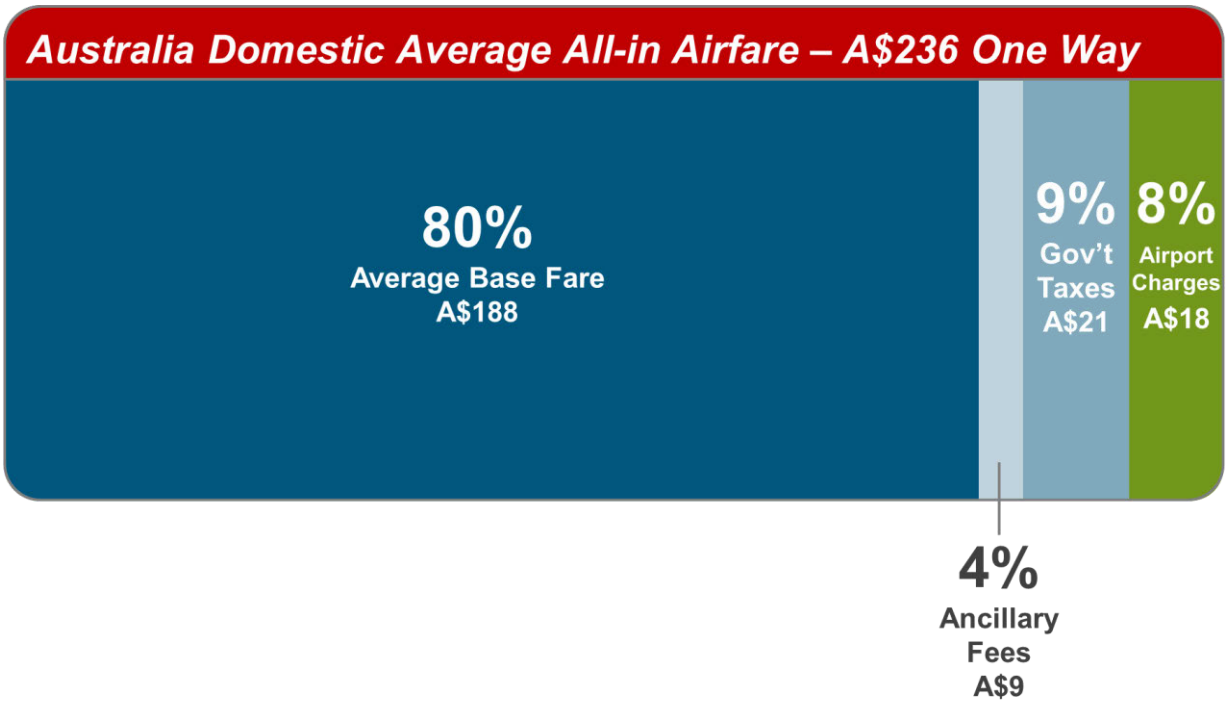
6.3 Australia Average All-in Airfare for Domestic Sector

We now turn to proving the percent of airport charges on a more detailed basis. We show the components of the all-in fare for average domestic trips, and then for some selected individual routes. For the individual routes we can show the individual components of all-in fares, including line item break-out of the individual airport charge components. This is done using a map as a graphical element and allows us to show charges for each of the origin and destination airports.

Because airport charges will differ in each direction, the detailed computations (on the map diagram) show the base fare, airport charges, taxes, etc. in each direction. The box in the lower right corner summarizes the information by direction, and provides an average of airport charges for a round trip.

Figure 6-2 illustrates the four components of the average domestic all-in average airfare. Airport charges represented 8% of the all-in average fare of A$236 for one-way travel.

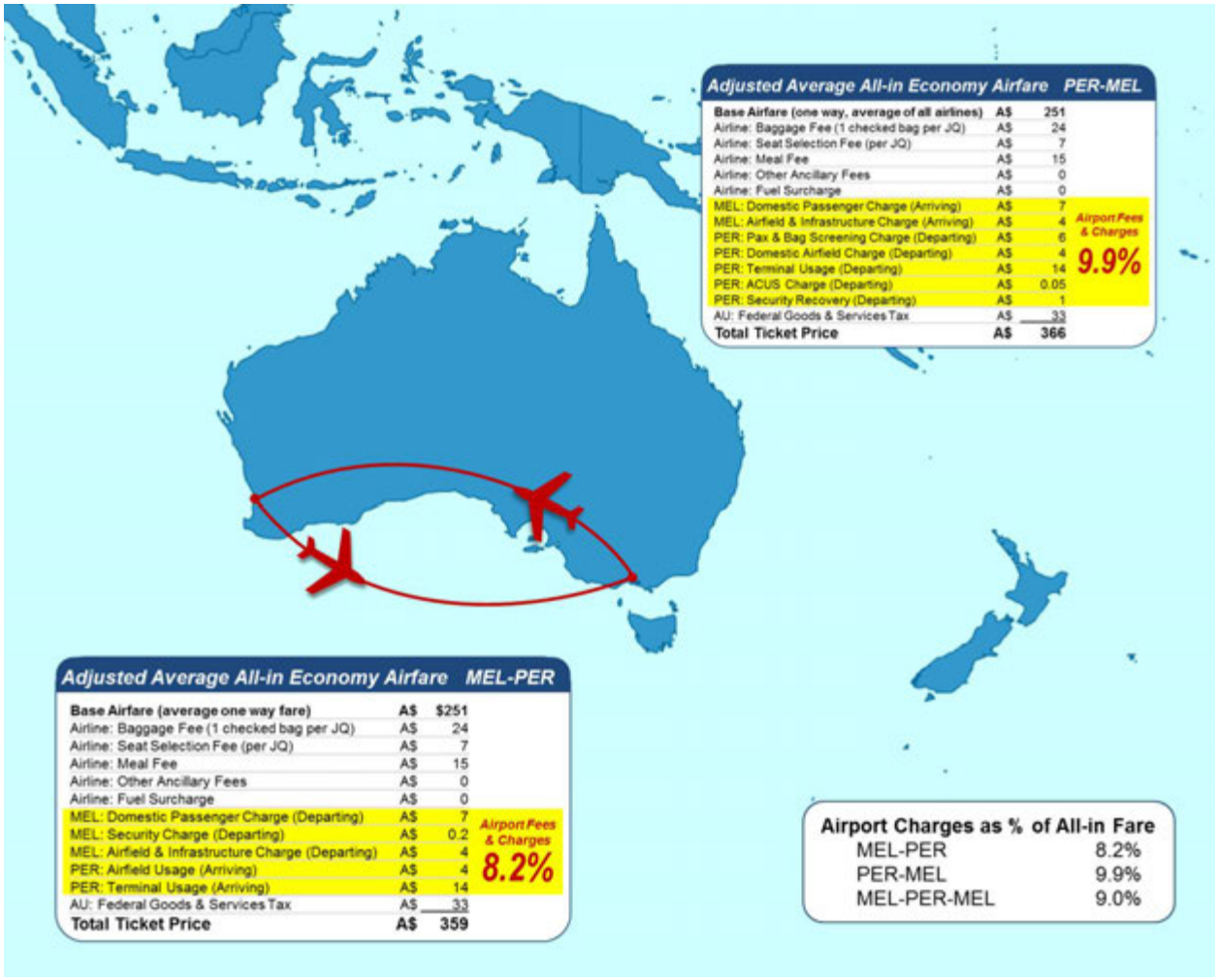
Figure 6-2
Domestic Australia
Average All-in Airfare with Airport Charges, Government Taxes, and Ancillary Fees
nominal values
2016 fares and taxes with 2017 ancillary fees



Sources:
Base Airfare, taxes, charges: Sabre Origin-Destination Passenger Data, 2016. Includes only Qantas, Jetstar, Virgin Australia and Tigerair Australia data. Discount Economy fares only, representing over 90% of the total O&D passenger market size.
Taxes & Charges split: Australian GST, ITA Matrix Software. GST calculated as 10% of Base fare + airport charges. Australian airport charges adjusted from rack rates to estimate the actual amount carriers pay. Residual charges moved into Base Fare
Ancillary Fees: Sector average. Collected from airline websites (Qantas, Jetstar, Virgin Australia and Tigerair Australia), adjusted with passenger purchase behaviour estimates.

Example of a specific route: MEL-PER
A breakdown of the individual charges, taxes, and fees is provided using Melbourne – Perth as an example domestic route. Figure 6-3 shows (using a map) the shares of each fare component for this route, for comparison to the domestic average all-in fare diagram in Figure 6-2 above. Note that the MEL-PER airfare and charges on the map are on a round-trip basis rather than a one-way basis used in the sector average. We have also assumed that the MEL-PER traveller purchased all of the ancillary amenities (checked bag, seat, meal). Airport charges in the MEL-PER sample represent 9% of the all-in fare compared to the domestic average share of 8%. We note that PER has undertaken significant terminal works, which would likely impact airport charges.

Figure 6-3
Melbourne – Perth: Breakdown of All-in Economy Airfare
nominal values
2016 fares and taxes with 2017 ancillary fees

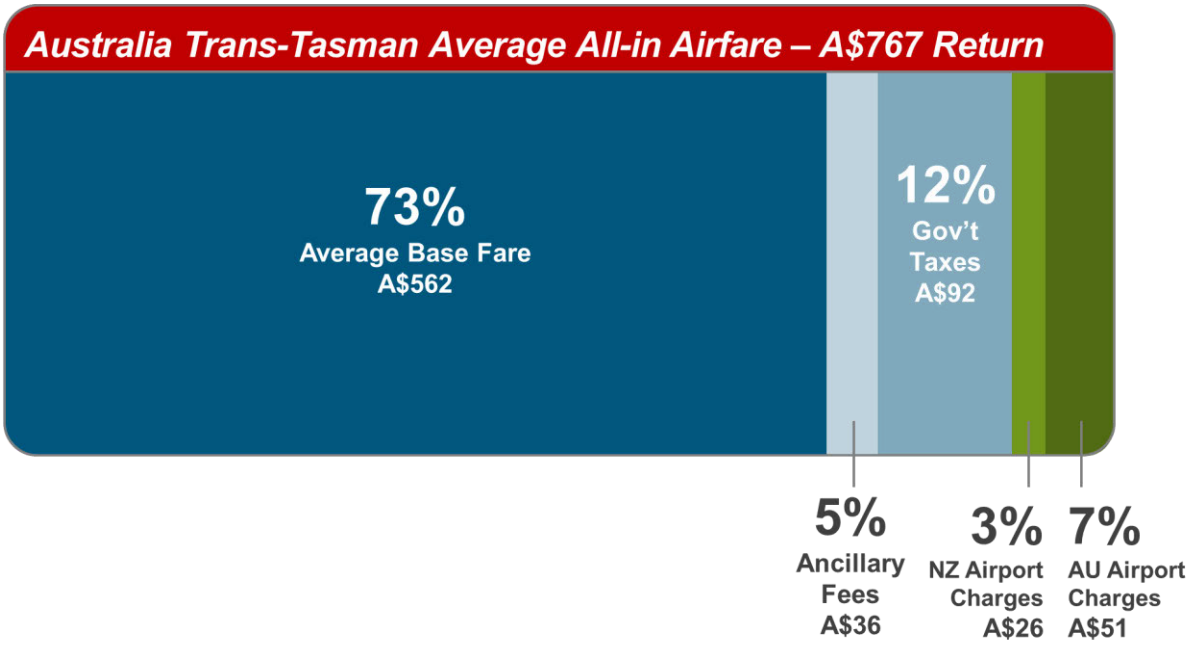


Sources:
MEL-PER base fare: Sabre Origin-Destination Passenger Data, 2016. Includes only Qantas, Jetstar, Virgin Australia and Tigerair Australia data. Discount Economy fares only, which represent over 90% of the total O&D passenger market size.
Taxes & Charges: MEL and PER airport charges documents, ITA Matrix Software, Australian GST. Australian airport charges adjusted from rack rates to estimate the actual amount carriers pay.
Ancillary Fees: Collected from airline websites with no adjustment for passenger purchase behaviour estimates.

6.4 Trans-Tasman Average All-in Fare

Figure 6-4 illustrates the components of the average Trans-Tasman fare. Airport charges represent 10% of the average all-in Trans-Tasman fare. This includes airport charges for both countries (7% for Australian charges and 3% for New Zealand charges). It should be noted that some security services provided at New Zealand airports that are funded by taxes are provided by airports in Australia and funded by airport charges.

Figure 6-4
Trans-Tasman
Average All-in Airfare with Airport Charges, Government Taxes, and Ancillary Fees
nominal values
2016 fares and taxes with 2017 ancillary fees

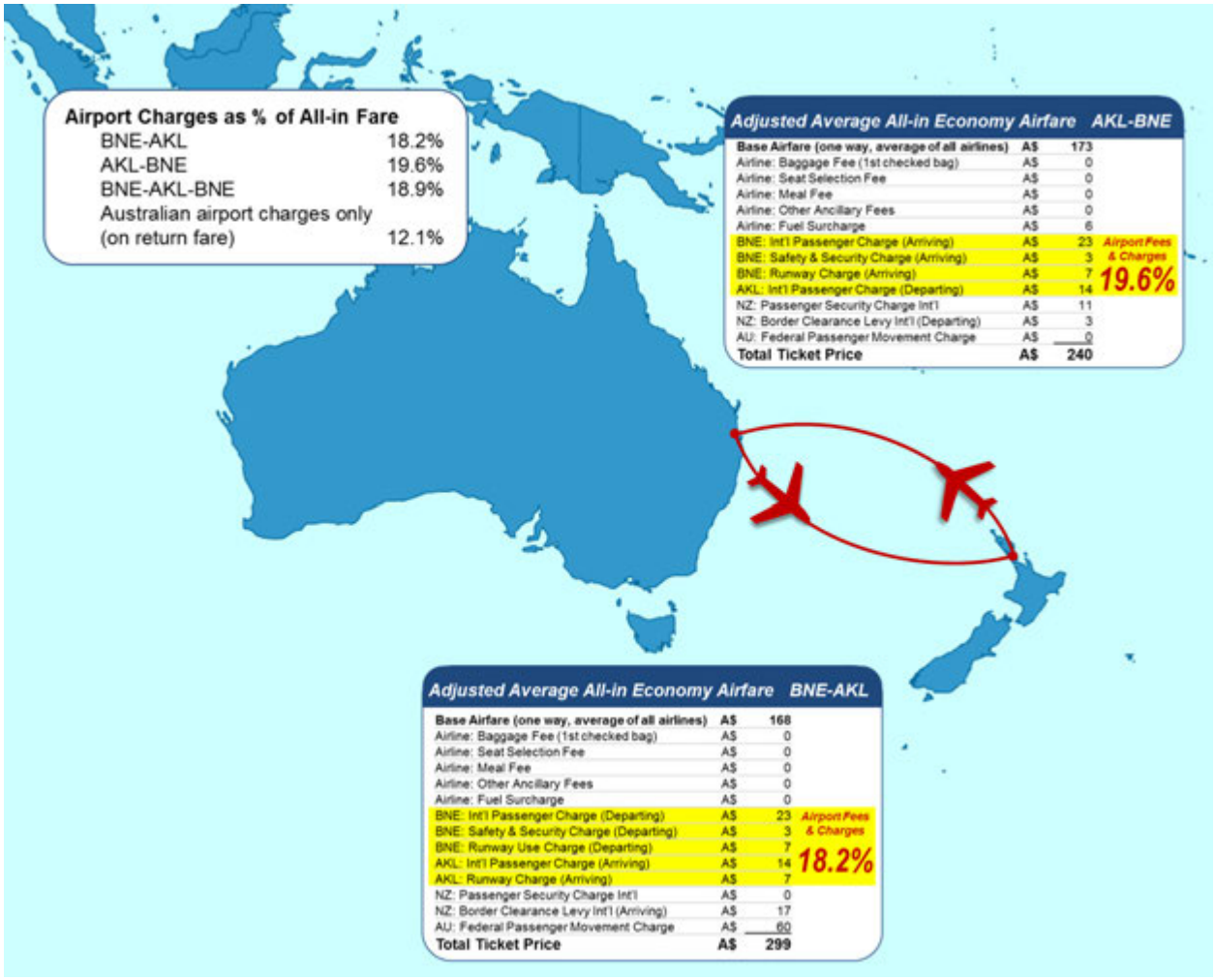


Sources:
Base Airfare, taxes, charges: Sabre Origin-Destination Passenger Data, Australia outbound to New Zealand, 2016. Includes only Qantas, Jetstar, Virgin Australia and Tigerair Australia data. Discount Economy fares only, representing over 90% of the total O&D passenger market size.
Taxes & Charges split: Australian & New Zealand. government taxes, ITA Matrix Software. Australian airport charges adjusted from rack rates to estimate the actual amount carriers pay. Residual charges moved into Base Fare.
Ancillary Fees: Sector average. Collected from airline websites (Qantas, Jetstar, Virgin Australia and Tigerair Australia), adjusted with passenger purchase behaviour estimates.

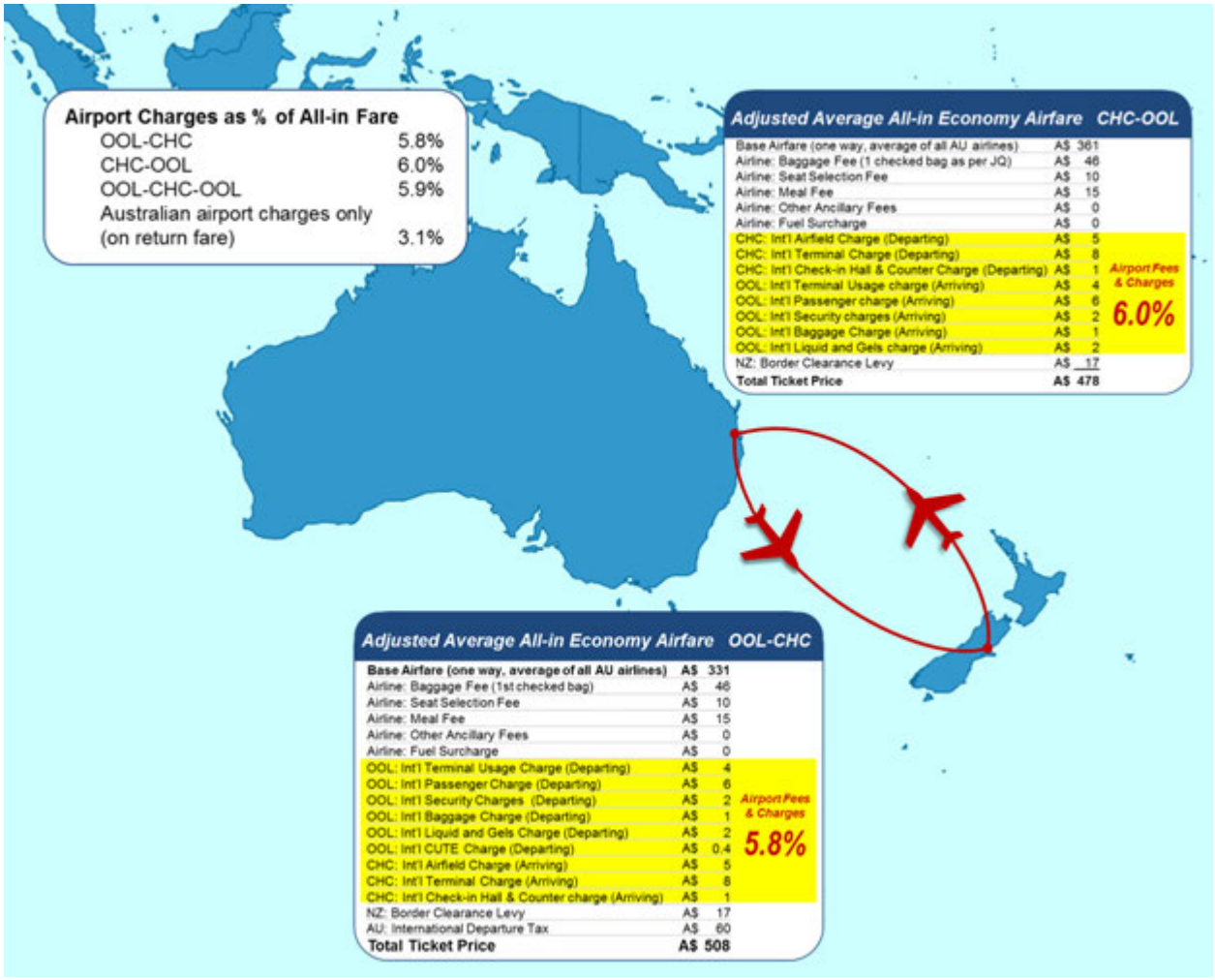
Figure 6-5 illustrates the breakdown of fares, charges, taxes, and fees on two sample routes, Brisbane – Auckland and Gold Coast – Christchurch, by direction. Note that the sample airfare and charges are on a round-trip basis rather than a one-way basis, and we have assumed that the Trans-Tasman traveller has purchased all of the available ancillary amenities (checked bag, seat, meal). Airport charges in the BNE-AKL sample represent 19% of the all-in fare compared to the average

Trans-Tasman share of 10%, and the OOL-CHC share is just under 6%.[42] It should also be noted that the New Zealand passenger security charges cover services provided by the New Zealand Government that in Australia would be provided by the airports.

Figure 6-5
Trans-Tasman Round-Trip Samples of All-in Airfare with Airport Charges, Government Taxes, and Ancillary Fees:
Brisbane – Auckland & Gold Coast – Christchurch
nominal values
2016 fares and taxes with 2017 ancillary fees



[42] Australian airport charges have been adjusted for discounting.



Sources:
Trans-Tasman base fares: Sabre Origin-Destination Passenger Data, 2016. Includes only Qantas, Jetstar, Virgin Australia and Tigerair Australia data. Discount Economy fares only, which represent over 90% of the total O&D passenger market size.
Taxes & Charges: BNE, AKL, OOL & CHC airport charges, ITA Matrix Software, Australian & New Zealand government charges. Australian airport charges adjusted from rack rates to estimate the actual amount carriers pay.
Ancillary Fees: Collected from airline websites with no adjustment for passenger purchase behaviour estimates.

Given that the above is based on discount economy fares only, the proportion for airport charges would be lower for the higher fare classes.

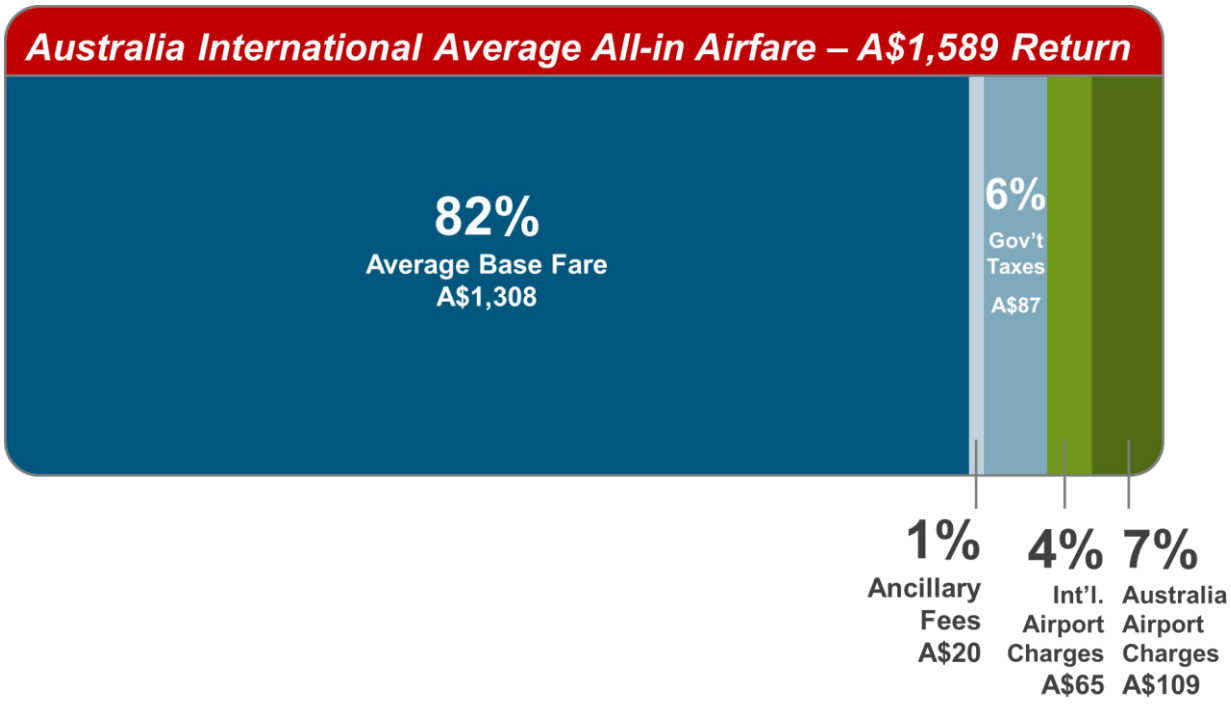
6.5 International Average All-in Fare

Figure 6-6 illustrates the share of airport charges on the average international fare (excludes New Zealand data). Airport charges represent 11% of the all-in average international fare. The international example includes both Australian airport charges (7%) and foreign airport charges (4%). In order to break out the government taxes from airport charges (these are combined in the Sabre data), Canadian airport charges have been used to approximate international averages.[43] Canadian

[43] It should be noted that some security services provided at Canadian airports that are funded by taxes are provided by airports in Australia and funded by airport charges.

charges and taxes can be used to represent average foreign airport charges, as they are both higher than those in the United States (on the low end globally) and lower than those in the United Kingdom (on the high end globally).

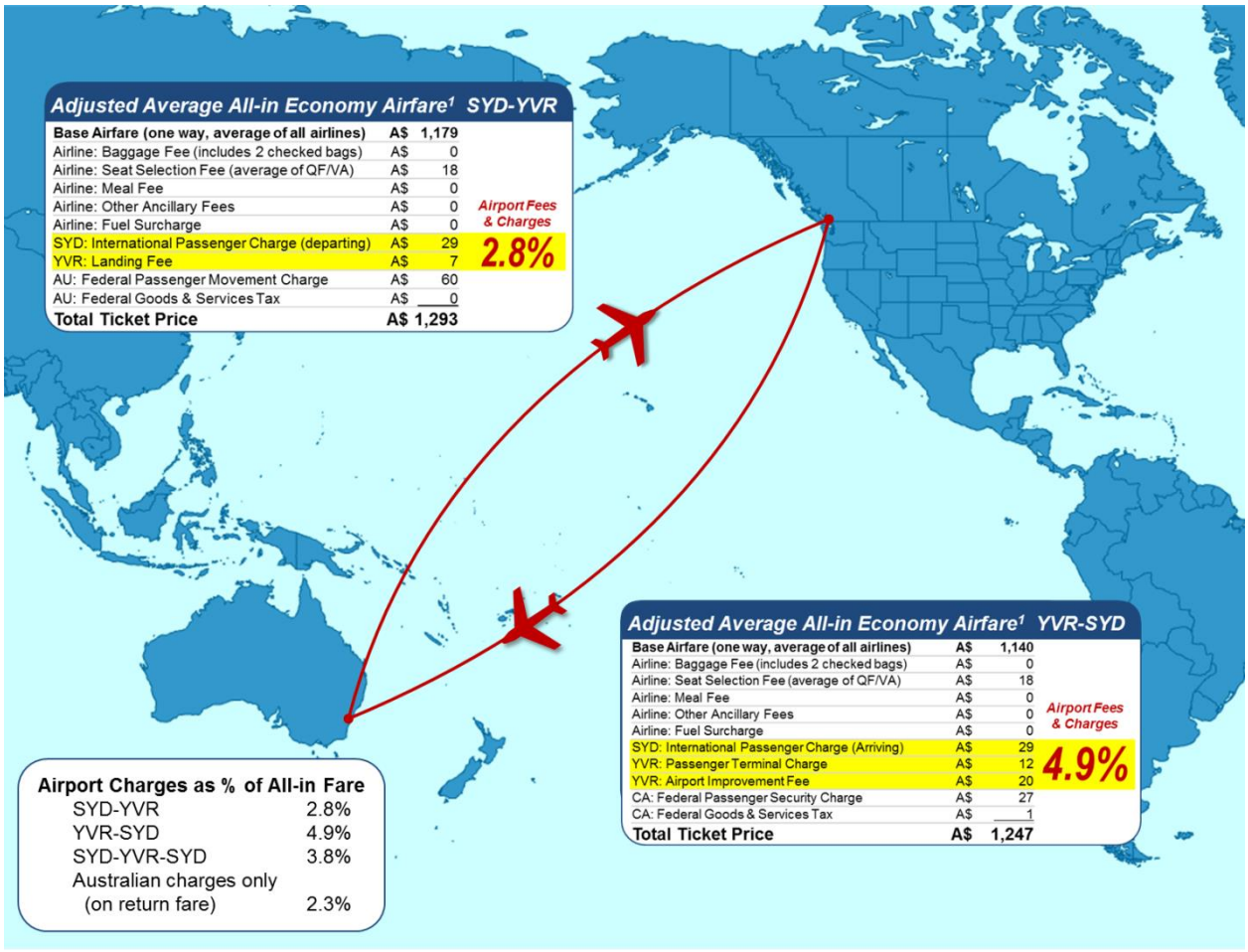
Figure 6-6
International (excludes New Zealand)
Average All-in Airfare with Airport Charges, Government Taxes, and Ancillary Fees
nominal values
2016 fares and taxes with 2017 ancillary fees

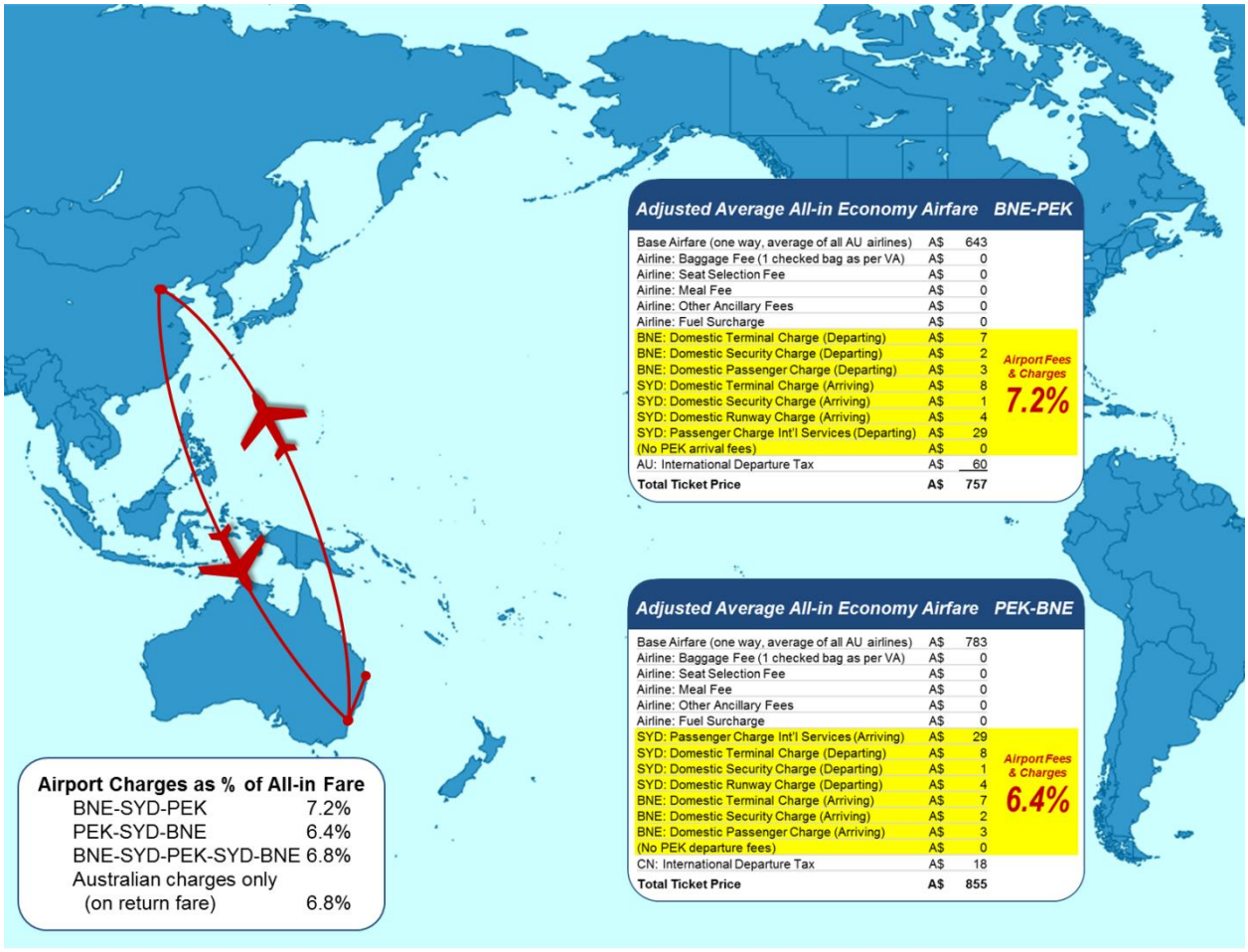


Sources:
Base Airfare, taxes, charges: Sabre Origin-Destination Passenger Data, Australia outbound excluding New Zealand, 2016. Includes only Qantas, Jetstar, Virgin Australia and Tigerair Australia data. Discount Economy fares only, representing over 90% of the total O&D passenger market size.
Taxes & Charges split: Australian, Canadian & B.C. government taxes, ITA Matrix Software. Canadian aviation taxes used as estimate for average international tax, as these are higher than U.S. taxes and lower than UK taxes. Australian airport charges adjusted from rack rates to estimate the actual amount carriers pay. Residual charges moved into Base Fare.
Ancillary Fees: Sector average. Collected from airline websites (Qantas, Jetstar, Virgin Australia and Tigerair Australia), adjusted with passenger purchase behaviour estimates.

Figure 6-7 illustrates the individual breakdown of charges, taxes, and fees for Sydney - Vancouver and Brisbane – Beijing average fares, by direction. Note that the sample airfares and charges are presented on a round-trip basis rather than a one-way basis of the average fares. Additionally we have assumed that the international traveller purchased all of the available ancillary amenities (checked bag, seat, meal). Airport charges in the SYD-YVR sample represent just 4% and in the BNE-PEK sample represent nearly 7% of the all-in fare compared to the average international share of 11%.

Figure 6-7
International Round-Trip Samples of All-in Airfare with Airport Charges, Government Taxes, and Ancillary Fees
Sydney – Vancouver & Brisbane – Beijing
nominal values
2016 fares and taxes with 2017 ancillary fees





1 Base airfare adjusted to remove YVR airport charges not shown separately on tickets.
Sources:
SYD-YVR base fare: Sabre Origin-Destination Passenger Data, 2016. Includes only Qantas, Jetstar, Virgin Australia and Tigerair Australia data. Discount Economy fares only, which represent over 90% of the total O&D passenger market size.
Taxes & Charges: ITA Matrix Software, Australian GST. Australian airport charges adjusted from rack rates to estimate the actual amount carriers pay.
Ancillary Fees: Collected from airline websites with no adjustment for passenger purchase behaviour estimates.

The above sample fare figure illustrates an important point; the airport charge share (of the all-in airfare) is sensitive to the base fare. As illustrated in the SYD-YVR fare (Figure 6-7) the airport charges on this route are the highest dollar amount of the three sectors (A$101) yet represent only 4% of the all-in fare, while the BNE-AKL airport charges of A$105 represent 20% of the all-in fare (Figure 6-5).

The example routes included here show that the Australian airports included have higher charges compared to their international counterparts. This differs from the results found in the companion report *Australian Airports: A Performance Benchmarking Study* which finds that the Australian airports are within range of their international peers. The main difference in findings is due to the sampling included. The examples in this report happen to be airports with lower airport charges, while the companion report includes a variety of comparator airports (the main difference is sampling). The key result of this analysis, however, is focused on how charges have limited impact on airfares.

6.6 Top 10 Airports Average All-in Fares

Average airfares have also been calculated for Australia's top ten airports, ranked by passenger volume.

SYD's domestic airport charges in FY 2016 represented an estimated 7% of the average SYD fare, or about A$14 per passenger, while international fares represented 4% of the average SYD fare, or A$28. As observed in Figure 6-8 and Figure 6-9, airport charges for Sydney, Melbourne, Brisbane, Perth and Adelaide represent 6-7% of the average all-in fare at each airport.

Figure 6-8
Top 10 Airports Average Domestic All-in Airfare and Shares of Airport Charges, Government Taxes, and Ancillary Fees nominal values, 2016 fares and taxes with 2017 ancillary fees

Average Fare for Domestic Australia Destinations										
Airport	Adjusted Average Base Fare		Ancillary Fees		Government Taxes		Airport Charges		All-in Average Airfare	
	$ AUD	% of All-in Fare	$ AUD	% of All-in Fare	$ AUD	% of All-in Fare	$ AUD	% of All-in Fare	$ AUD	% of All-in Fare
Sydney	$168	*78%*	$9	*4%*	$24	*11%*	$14	*7%*	$215	*100%*
Melbourne	$176	*80%*	$9	*4%*	$19	*9%*	$17	*8%*	$221	*100%*
Brisbane	$175	*79%*	$9	*4%*	$19	*9%*	$18	*8%*	$220	*100%*
Perth	$291	*83%*	$9	*2%*	$31	*9%*	$22	*6%*	$353	*100%*
Adelaide	$178	*79%*	$9	*4%*	$20	*9%*	$18	*8%*	$225	*100%*
Cairns	$228	*83%*	$9	*3%*	$24	*9%*	$14	*5%*	$275	*100%*
Darwin	$340	*84%*	$9	*2%*	$36	*9%*	$21	*5%*	$406	*100%*
Hobart	$143	*79%*	$9	*5%*	$16	*9%*	$14	*8%*	$181	*100%*
Gold Coast	$134	*80%*	$9	*5%*	$14	*8%*	$10	*6%*	$166	*100%*
Canberra	$245	*80%*	$9	*3%*	$27	*9%*	$24	*8%*	$305	*100%*

Note: Airport charges are adjusted to include estimated discount
Sources:
Airfares: Sabre 2016 Origin-Destination Passenger Estimates,
Airport Charges: individual airport charge rates, includes security charges

Figure 6-9
Top 10 Airports Average International All-in Airfare and Shares of Airport Charges, Government Taxes, and Ancillary Fees nominal values, 2016 fares and taxes with 2017 ancillary fees

Average Airfare for International Destinations										
Airport	Adjusted Average Base Fare		Ancillary Fees		Government Taxes		Airport Charges		All-in Average Airfare	
	$ AUD	% of All-in Fare	$ AUD	% of All-in Fare	$ AUD	% of All-in Fare	$ AUD	% of All-in Fare	$ AUD	% of All-in Fare
Sydney - International	$564	*80%*	$14	*2%*	$98	*14%*	$29	*4%*	$706	*100%*
Melbourne - International	$547	*79%*	$12	*2%*	$113	*16%*	$23	*3%*	$695	*100%*
Brisbane - International	$497	*79%*	$12	*2%*	$87	*14%*	$30	*5%*	$626	*100%*
Perth - International	$448	*76%*	$11	*2%*	$108	*18%*	$21	*4%*	$588	*100%*
Adelaide - International	$645	*79%*	$11	*1%*	$133	*16%*	$25	*3%*	$814	*100%*
Cairns - International	$616	*87%*	$11	*2%*	$57	*8%*	$22	*3%*	$705	*100%*
Darwin - International	$528	*73%*	$11	*2%*	$151	*21%*	$32	*4%*	$722	*100%*
Hobart - International	*Hobart does not have international service currently.*									
Gold Coast - Trans Tasman*	$311	*75%*	$18	*4%*	$71	*17%*	$15	*3%*	$415	*100%*
Canberra - International	*Canberra does not provide its international airport charges, therefore we cannot calculate an average fare.*									

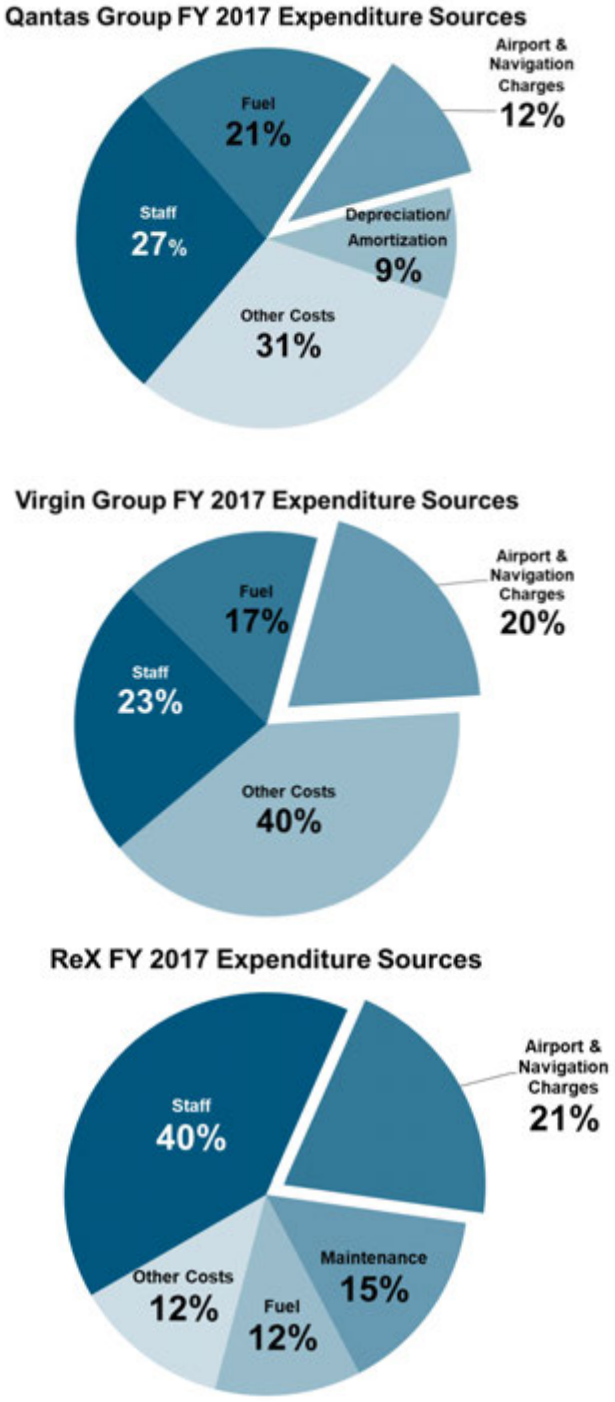
Note: Airport charges are adjusted to include estimated discount
Sources:
Airfares: Sabre 2016 Origin-Destination Passenger Estimates,
Airport Charges: individual airport charge rates, includes security charges
*Note: Insufficient data available for Gold Coast "Other International" destinations, average Trans-Tasman data shown only."

The results shown in Figure 6-9 represent one-way average airfares and include all international fares (both Trans-Tasman and other international). As such, the percentages in this figure will differ from the examples provided in Figure 6-4 and Figure 6-6.

6.7 Airport Cost Share as Reported in Airline Annual Reports

Aeronautical costs, including airport charges and navigation charges, at Australian airlines can be found in annual financial documents. These include navigation charges, airport landing and terminal charges and airport security charges. Below (Figure 6-10) is a chart showing aeronautical costs as a percentage of each airline's total costs:

Figure 6-10
Qantas Group, Virgin Australia Group and Regional Express (ReX)
Airport & Navigation Costs as a Percent of Total Expenditures
FY 2017



Sources: Qantas Data book FY 2017 (includes Jetstar), Virgin Australia Group Financial Report FY 2017 (includes Tigerair Australia), ReX Annual Report FY 2017. All three airlines report navigation charges with airport charges.

Airport costs are reported by all three airline groups as the third or second highest expense line. Qantas Group's airport costs represent 12% of the airlines' total expenses, while Virgin Australia's are 20% and ReX's are 21%.[44]

However, the airlines do not report navigation and airport charges separately, so the airport/navigation charges overstate airport charges. Moreover, the airport charges include fees paid to overseas airports and fire and rescue and air navigation service providers as well as Australian airports and Airservices Australia. This again overstates the proportion of airline expenses that are accounted for by Australian airports. For this reason, we prefer our approach which separates Australian airport charges, allowing for a policy assessment of the impact of these charges. (For example, Australian airport charges represent only 7% of all-in trans-Tasman and international fares, as shown in Figures 6-4 and 6-6.) From a global viewpoint, data from ICAO shows that in 2010, airport charges accounted for approximately 4.2% of airline operating expenses, while air navigation charges were roughly 3.4% (ICAO, 2013, p. 5). On this basis, airport charges would constitute 7% of Qantas' cost base, 11% of Virgin's and 12% of Rex's.

[44] Airport costs could also include charges for other airport related services, such as ground handling and CIP lounge rentals. This would depend, however, on how each specific airline categorizes expenses. Further, it Is not clear whether the published Qantas data treats lease fees and other costs associated with its domestic terminal in Australia as airport charges or not.

Part II: Impact of Airport Charges on Traffic

7 Elasticity of Demand: Concepts and Evidence on Air Fare Price Elasticities

Inter*VISTAS* surveyed a wide variety of sources for demand elasticity estimates, including the various estimates compiled by the Bureau of Infrastructure, Transport, and Regional Economics. The core of the elasticity analysis will be based on the demand elasticities estimated by Inter*VISTAS* in a 2007 study completed for IATA using three data sets covering different global geographies and using three different methodologies. This resulted in a set of elasticities by region and level of aggregation. The elasticities were tested for North America in a 2014 update to determine if any significant changes in the demand elasticities estimates had occurred. None were found.

We have also reviewed the current literature for any estimates that would differ from the core elasticities, but found the recent literature focused on specific regions (developing markets) or specific aspects related to changes in business strategies. The effect of ancillary fees (in this case, baggage fees) has been studied, and elasticities with respect to these charges have been estimated.

One way to analyse the impact of changes to airport charges is to look at how consumers are likely to react. This is primarily done through what is known as elasticity analysis. This section provides an overview of the concept of elasticities, a summary of the past and current literature, including a review of recent elasticity estimates, and research completed on the impacts of ancillary revenue (or the unbundling of airfares). Additionally, observations on how the findings in the literature may affect the analysis of the airport charges in Australia will be discussed.

7.1 The Concept of Price Elasticity

In economics, elasticity measures the response of one economic variable to a change in another economic variable. The price elasticity of demand is used to measure the sensitivity of a consumer to changes in price for a given good or service (in this case, airfare). It is formally defined as:

$$\text{Price Elasticity} = \frac{\%\ \text{Change in Quantity Demanded}}{\%\ \text{Change in Price}}$$

Since the quantity demanded generally decreases when the price increases, this ratio is usually expected to be negative. However, sometimes analysts report the *absolute* value and therefore the elasticity is often quoted as a positive number.[45]

As an example, suppose a good has a price elasticity of -0.6; a 10% increase in the price will result in a 6% decline in the quantity demanded. For a good with a price elasticity of -1.2, a 10% increase in the price will result in a 12% decline in the quantity demanded.

Goods with elasticities less than one in absolute value are commonly referred to as having inelastic or price insensitive demand – the proportional change in quantity demanded will be less than the proportional change in price. In this situation, increasing the price will increase the revenue of the producer of the good, since the revenue lost by the relatively small decrease in quantity is less than the revenue gained from the higher price.

[45] As the calculation uses proportionate changes, the result does not have a unit and does not depend on the units in which the price and quantity are expressed. Therefore, elasticities for different goods or markets can be directly compared.

Goods with elasticities greater than one in absolute value are referred to as having elastic or price sensitive demand - the proportional change in quantity demanded will be greater than the proportional change in price. A price increase will result in a revenue decrease to the producer since the revenue lost from the resulting decrease in quantity sold is more than the revenue gained from the price increase.

A number of factors affect the price elasticity of a good or service:

- **Availability of substitutes:** the more possible substitutes, the greater the elasticity. Note that the number of substitutes depends on how broadly one defines the product. For example, Chevrolet cars have a high price elasticity as they can be substituted by other brands of car (Ford, BMW, Honda, etc.). If one considers the market for cars as a whole, the elasticity for cars is lower as there are fewer substitutes (bus, taxi, cycling, etc.).

- **Degree of necessity or luxury:** goods that are necessities tend to have a lower price elasticity (i.e., a price increase will not result in a large decrease in demand) whereas luxury products tend to have greater elasticity.[46]

- **Proportion of the purchaser's budget consumed by the item:** products that consume a large portion of the purchaser's budget tend to have greater elasticity.

- **Time period considered:** elasticity tends to be greater over the long run because consumers have more time to adjust their behaviour. For example, short-term demand for gasoline is very inelastic (approximately -0.2)[47] as consumers have little choice but to continue consuming in order that they can travel to work, school, etc., although they can cut down on some leisure or discretionary trips or use other modes. The long-term elasticity is higher (about -0.7, still inelastic) as consumers can purchase smaller cars, move nearer to work and make other behavioural changes in order to reduce consumption.

- **Whether the good or service is demanded as an input into a final product or whether it is the final product (e.g., fuel is demanded as an input into production processes, transportation, etc.).** If the good or service is an input into a final product then the price elasticity for that good or service will depend on the price elasticity of the final product, its cost share in the production costs, and the availability of substitutes for that good or service.

7.2 Elasticity Estimates for Air Travel with Respect to Air Fares: IATA and BITRE Evidence

7.2.1 Elasticities Estimates Depend on Level of Aggregation: Evidence from the IATA study of airline fare elasticities

In air transportation, as in many other sectors of the economy, the context in which the elasticities are considered can affect the value of the elasticities. In particular, the elasticity can vary depending on whether there is a high level of aggregation (very general applicability) versus a low level of aggregation (very specific applicability). High level of aggregation tends to result in fewer alternatives for the buyer, and this is a relatively inelastic situation.

Five commonly cited levels of aggregation in air transport are summarized in Table 7-1.

[46] Luxury goods tend to have a higher elasticity of demand with respect to income. That is, as income rises, the demand for luxury goods increases.

[47] Gwartney, J.D. & Stroup, R.L., (1997) *Economics: Private and Public Choice*.

Table 7-1
Level of Aggregation and Air Transport Elasticities

Level of Aggregation	Description
Fare Class Level	This is the most disaggregated level. In this context, travellers are choosing between different fare classes (first class, business, premium economy, discount economy, etc.) on particular airlines. At this level, the elasticities are arguably the highest.
Carrier Level	The elasticities at this level reflect the overall demand curve faced by each airline on a given route. In situations where there are a number of air carriers serving the route, the demand elasticity faced by each carrier is likely to be fairly high – if an air carrier increases its fare unilaterally, it is likely to lose passengers to other carriers operating on that route.[48]
Route/Market Level	At the route or market level, the elasticity response might be expected to be generally lower than at the fare class or carrier level. Travelers faced with a fare increase on all carriers serving a route have fewer options for substitution.
National Level	At the national level, fare elasticities would be expected to be lower still, as travellers have even fewer options for avoiding a fare increase. For example, if a national government imposed a new or increased tax on aviation, travellers could only avoid this increase by using another mode, or not travelling (or possibly travelling elsewhere).
Pan-National Level	This represents the most aggregate level considered, in which a fare increase is imposed at some pan-national level. In this case, the options for avoiding a fare increase are even further reduced, so therefore the elasticity would be expected to be lower.

Source: Adapted from InterVISTAS Consulting Inc. (2007).

The estimates from the 2007 Inter*VISTAS* report on air travel demand elasticities completed for the International Air Transport Association are summarized in Table 7-2.[49] An update to the 2007 report completed in 2014 for ACI - North America cannot be used in the analysis in this report as estimates were only updated for North America, but the key findings are still applicable. In North America, there have been no fundamental changes to the nature of air travel demand elasticities. The estimates measured in 2007 still are relevant. This is likely to hold true for Australia as well; it is unlikely fundamental changes took place in Australia that were not replicated in North America.

In addition, the study indicated that care must be taken when choosing the appropriate elasticity estimate to use. If the fare change is applicable to only one route, a more elastic estimate should be used; conversely, if the fare change is common among all routes, a more inelastic estimate should be used. This stems from the greater number of substitutes available to travellers; if the fare change is common to all routes (or almost all routes) travellers will have fewer options for substitution, and thus are less responsive (less price elastic) towards the change. In addition, airlines with service networks involving many markets will price their product on a market basis, based on a broad revenue strategy, and not reflect such cost variations in the specific air fares they charge for a seat on a flight from a particular airport or on a particular route. Such considerations are particularly relevant in the

[48] Even in a situation where the air carrier has a monopoly on a route, it may still face a fairly high demand elasticity as connecting options can also act as a substitute.

[49] Inter*VISTAS* Consulting Inc. (2007), "Estimating Air Travel Demand Elasticities."

Australian domestic market given the market dominance of Qantas and the level of market concentration, especially once allowance is made for the fact that Qantas and Virgin, the largest two carriers, control between them the third and fourth largest carriers (in terms of passenger numbers).

Table 7-2
Summary of Elasticity Estimates
2007

	Route/Market Level		National Level		Supra-national Level	
Overall Elasticity Estimate	-1.4		-0.8		-0.6	
	Short-haul	Long-haul	Short-haul	Long-haul	Short-haul	Long-haul
Intra North America	-1.54	-1.40	-0.88	-0.80	-0.66	-0.60
Intra Europe	-1.96	-1.96	-1.23	-1.12	-0.92	-0.84
Intra-Asia	-1.46	-1.33	-0.84	-0.76	-0.63	-0.57
Intra Sub-Sahara Africa	-0.92	-0.84	-0.53	-0.48	-0.40	-0.36
Intra South America	-1.93	-1.75	-1.10	-1.00	-0.83	-0.75
Trans-Atlantic	-	-1.68	-	-0.96	-	-0.72
Trans-Pacific	-	-0.84	-	-0.48	-	-0.36
Europe-Asia	-1.39	-1.26	-0.79	-0.72	-0.59	-0.54

Source: Adapted from InterVISTAS Consulting Inc. (2007).

7.2.2 BITRE Elasticity Estimates

The Bureau of Infrastructure, Transport, and Regional Economics (BITRE) provides a number of documents containing elasticity estimates for air travel.[50] While not to discredit the work that has been completed in the past, the estimates presented by BITRE are from the early 1980's and 1990's. The air transport industry has undergone significant change since then. The tables provided by BITRE are summaries of past literature, and not in any specific format for ready comparison to the IATA estimates. More recently, BITRE also published other elasticities measured for the domestic Australian market (which is not available from the IATA report on elasticities). For a set of domestic routes, the elasticities were found to be in the range of -0.09 to -1.65 (from the year 1986).[51] Interestingly, the IATA estimates for the Intra-Asia route/market segment fall within this range, which is a positive sign for the validity of the IATA estimates, although the Australian estimates were generally found to be more inelastic than the IATA estimate. BITRE also reported another set of

[50] Bureau of Infrastructure, Transport & Regional Economics (2017), "Elasticities Database Online," https://bitre.gov.au/tedb/search.aspx

[51] Infrastructure, Transport & Regional Economics (2017), Table 4D04, "Estimates of Elasticities for Domestic Trunk Air Routes," https://bitre.gov.au/tedb/pdf/table4D04.pdf

elasticities at the market level for domestic travel in the range of -0.55 to -0.82.[52] These estimates were also from 1986, and the market in Australia has undergone major changes since then, which would likely lead to a more elastic response for passengers (e.g., the introduction of low cost carriers). It is for this reason that the elasticity analysis done here will use the IATA estimates rather than the estimates available through BITRE.

7.3 Review of the Literature on Airfare Elasticities

A review of the literature and more recent research into airfare demand elasticities was undertaken to provide a greater understanding of airfare elasticities and any new results that may confirm or update previous work done. Inter*VISTAS* has an extensive database summarising the literature up to 2014. This review will focus on work completed since then. Additionally, there will be a focus on research on the impacts of ancillary revenues and related elasticity estimates.

7.3.1 Elasticity Estimates from Recent Literature

Studies that had been published between 2007 and 2014 showed somewhat lower elasticity estimates overall, though none note significant changes from past research. Many of the articles asked different questions than the past literature. Since 2014, there have been some additions to the elasticity literature, though the focus has been on studying emerging markets or analysis based on past elasticity estimates rather than conducting new empirical research. For example, Wang, Zhang and Zhang (2017) analysed the airline performance in China and India in terms of efficiency and pricing behaviour. The authors used data envelopment analysis (a "DEA model") to measure the efficiency of the airlines and two-stage least squares analysis to measure the associated price elasticities. They used monthly data for the top 20 city-pair routes in China and India from 2012 to 2015 (monthly data). They found that, in general, the Indian airlines were more efficient than the Chinese carriers, and that low-cost carriers were more efficient than traditional full service carriers. The price elasticity estimate for India was -2.6 and -1.3 for China. They noted that India is more price elastic than China, and this could be explained by the differing income levels in the two nations.

7.3.2 The Impact of Unbundling and Other Related Literature

Since the introduction of LCCs into the market, there has been a shift in the way in which travellers observe and actually pay for air travel. The increase in airlines' focus on ancillary revenues amongst strong competition over the 'sticker price' of an airline ticket may have further distorted the consumer's ability to anticipate the full cost of air travel when making their purchasing decision. However, the rise of online ticketing has given consumers a greater ability to not only comparison shop between carriers on a desired market, but also to purchase only the services they desire instead of bundled packages where exact airfare prices are less transparent.[53] These last two factors tend to pull elasticities in opposite directions, with empirical evidence focusing on one effect or another.

More recent research done on the unbundling of airfares has focused on the introduction of checked baggage fees by the airlines.

- Scotti and Dresner (2015) examined the demand response of passengers following the introduction of baggage fees by carriers in the United States. Their study compared airlines which instituted checked baggage charges versus Southwest Airlines, which does not charge for the first few bags. Using domestic U.S. data from 2007 to 2010 (covering the period when airlines began introducing checked baggage fees), they estimated the impact of baggage fees on demand and fares. For passenger demand, baggage fees had a demand elasticity of -0.01

[52] Infrastructure, Transport & Regional Economics (2017), Table 1A02, "Elasticities of Demand for Domestic Air Trunk Routes by Sub-Market," https://bitre.gov.au/tedb/pdf/table1A02.pdf

[53] See Franados, Kauffman, Lai, and Lin, "A La Carte Pricing and Price Elasticity of Demand in Air Travel", *Decision Support Systems* 53 (2012), and Granados, Gupta, and Kauffman, "Online and Offline Demand and Price Elasticities: Evidence from the Air Travel Industry", *Information Systems Research* 23 (2012).

(i.e., passengers are inelastic to baggage fee increases). Passengers are less responsive to baggage fee changes than they are to fare changes, which had a calculated elasticity of -3.1.

- Brueckner et al. (2015) studied the impact of airline baggage fees on ticket prices. Their analysis of the U.S. market from 2008-2009 found that fares, on average, fell when bag fees were introduced (approximately 2.7%), but the full cost to the traveller checking a bag increased. Airlines using baggage fees were able to extract more revenue from the traveller checking bags, but those travellers that did not check bags would face lower average fares from the policy.

7.4 Observations

While the literature produces different values for airline fare elasticities, a careful reading reveals a fairly consistent set of findings, once differences between the studies in the markets analysed are recognized. We make the following observations:

- The market level analysed is critically important to the measurement of elasticities.
    - Studies which are at the route level show price elastic outcomes, but those at the flight level show highly elastic results.
    - Studies at the national level (i.e., when prices change in all markets at the same time) show inelastic responses.
- Some studies suggest that there may have been changes in fare elasticities in some years. However, elasticity findings seem to be in the same ranges for studies widely separated in years.
- Some of the newer studies, making use of carrier-specific data and distribution channel specific-ticket sales, indicate different elasticities for different consumer groups.
- Some of the studies focused on particular geographical regions with resulting elasticities specific to the area. When discussing these findings, it is important to look at the maturity of the air transport market in question. More mature markets may have higher levels of competition (i.e., passengers have options for substitution) or have a passenger base with higher levels of disposable income.
- Studies looking at the changes in the way airfares are structured (i.e., unbundling of many charges) show passengers are somewhat inelastic to the “added” fees, such as baggage charges, and are less elastic to changes in these fees than they are to an increase in airfare.

These findings reinforce our view that the appropriate price elasticity to be used depends on the question being asked and the scope of the price or policy change. Questions at the route competition level should use an elastic value, while policy questions on user charges that affect all or nearly all routes should use an inelastic value.

8 Elasticity of Airline Demand with respect to Airport Charges

Based on IATA's price elasticity of demand at the route/market level for domestic, trans-Tasman and international travel, the consumer response to changes in airport charges is small, very much smaller than the airline price elasticity. The elasticity with respect to airport charges is estimated to be -0.11 for domestic service, -0.13 for trans-Tasman service and -0.14 for international service. This is based on round trip tickets which include airport charges at non-Australian airports. When applied to the current traffic in Australia, if airport charges were to increase by 1%, the impact of traffic would be a loss of roughly 0.1% of passengers. A 10% increase in airport charges would reduce passenger volumes by about 1.2%. However, these elasticities, computed using neoclassical economic theory, very likely overstate that true impact of higher airport charges. Because airlines engage in a high level of airfare price discrimination, the pass through of any increase in airport charges will be greatly reduced, and possibly minimal. As well, incentives offered by airports to airlines for building higher traffic levels implies that any posted increase in airport charges may result in practice with airlines paying the airport only a fraction of the increase in posted charges.

8.1 Deriving Airport Charges Elasticities from Airfare Elasticities

It is important to distinguish between the elasticities applicable to different prices/costs. The academic literature (and past work completed by Inter*VISTAS*) focused on the price elasticity of demand with respect to airfares. There is little, if any, empirical evidence on the elasticity of demand with respect to airport charges.

The need to analyse the price elasticity of demand with respect to airport charges is separate and distinct from airfare elasticities. A 1% increase in airfares will have a much larger impact on passenger demand for travel than a 1% increase in airport charges since airport charges represent a small fraction of the total airfare the passenger sees and pays. Furthermore, the response to changes in airport fees and charges will depend on the price elasticity of air carriers operating at the airport and on the amount of the increase in charges an airline can and does pass through to the passenger. For example, where there is a concentrated market in which an airline can exercise market power, any decreases in airport charges provided to a carrier might not be passed through to the consumer while any increases in airport charges might be passed through to the consumer. In highly competitive markets, reductions in airport charges are more likely to be passed through to consumers, and increases in airport charges absorbed in whole or in part by the carriers.

Since adjustments to airport charges in Australia in the early years of the century, charges have increased in real terms, in some case substantially, largely in order to undertake major refurbishment or expansion of old terminals, the construction of new terminal and airfield assets to provide additional capacity and to meet higher security and passenger amenity requirements. As discussed in section 3, domestic airfares have generally fallen over this period and the Board of Airline Representative has indicated that international airfares have fallen by 40% in real terms since 2006.[54]

We do not have estimates for the relevant supply elasticities showing the extent to which airlines pass on increased (or decreased) airport costs to passengers, but we can use neoclassical economic theory to estimate the impact when an airline is able to pass through 100% of the increase in charge,

[54] BARA (2018) *Airline Views,* http://bara.org.au/wp-content/uploads/2018/01/Airline-Views-January-2018.pdf.

and chooses to do so.[55] Thus, the price elasticity related to airport fees and changes will be estimated by the share of these fees/charges in the total airfare paid:

$$Price\ Elasticity\ for\ Airport\ Fees\ and\ Charges = \%\ Share\ of\ Airport\ Fees\ and\ Charges\ in\ Total\ Airfare \times Passenger\ Airfare\ Elasticity$$

For example, if airport fees and charges represent 10% of ticket prices, then a 10% increase in airport fees and charges would represent a 1% increase in the overall ticket price (assuming the entire increase is passed through to the passenger). If the passenger fare elasticity is -1, then traffic would be expected to decline by 1%. Therefore, the elasticity with respect to airport fees and charges is $-1\% \div 10\%$ = -0.1.

An additional complication arises when deriving the elasticity estimate for airport charges, namely ticket classes. When analysing an airport charge that is levied directly on the passenger, the computation should be fairly straightforward. Passenger reactions to changes in such fees can be observed directly since the passenger pays those fees directly. Similarly, airport fees that are charged on a per passenger basis can be allocated to each passenger, and the response observed (again assuming the airlines passes these charges through to the passengers). However, with a fixed fee charge or weight-based landing fee, how the change in the common cost should be allocated among individual passengers arises. There is no unique and "correct" way of assigning these costs through to passengers: common costs are incurred at the same level regardless of number of passengers on the flight.

In transport economics, Ramsey Pricing is commonly regarded as the most economically efficient way of allocating such costs. It is a long recognized pricing methodology in economics generally and for regulatory economics in particular.[56] Many regulators are guided by its principles, even if not by actual computations of Ramsey prices. Ramsey Pricing is the means of allocating common costs to different passengers in a way which maximises total economic efficiency while ensuring that an airline with economies of scale or common costs achieves revenue adequacy (including a reasonable rate of return but no more). In the case of airlines, this means that all passengers must cover their marginal or incremental costs (for which LRVC is used as a proxy) and make some contribution to fixed costs. Ramsey pricing works by setting prices to cover marginal costs, and then allocating the remaining common costs based on the elasticity of demand of the customers using the good/service.[57] The potential issue for applying this to airfares is the case in which the mark-up on the ticket price to cover the common charge could be less than proportional to the actual airfare.[58] As Ramsey Pricing is difficult in practice, for this exercise, we will assume the charges are uniformly applied to tickets on average.

Additional discussion on the how to derive the elasticities for airport fees and charges can be found in **Appendix B and Appendix C**.

---

[55] There is also the scenario in which the airline could pass through the entire increase in the charge plus additional increases (hence, increasing their revenue), but given the competitive landscape within aviation, this is not a likely outcome. In general, the amount of an increase that an airline would pass through to consumers depends on factors such as the degree of competition as well as the airlines' strategic objectives. This would likely vary across airports.

[56] "Ramsey pricing" is an economic tenet sometimes referred to as specific form of differential pricing which allows firms to set prices above marginal cost in order to cover their common and fixed costs by pricing their products higher when there is less elasticity of demand. The price is based on the inverse of the price elasticity of demand.

[57] This inherently means that different customers will pay different prices for the same service, based on their willingness to pay.

[58] For example, if the discounted ticket price were $50 AUD but the common costs were $75 AUD, it would mean that the common costs are 150% of the ticket price.

8.2 Airfare Elasticity Estimates

This analysis uses the air travel demand elasticities estimated by Inter*VISTAS* in 2007, as there have not been any known large scale updates to the demand elasticities (other than those applicable to North America). The air travel demand elasticities are then converted to elasticities with respect to airport charges.[59] The elasticity estimates are based on the intra-Asia and Europe-Asia markets. These were chosen as Australia was included in their underlying calculations, and we are not aware of any updated estimates.

Table 8-1
Relevant Airfare Demand Elasticity Estimates for Australia

	Route/Market Level		National Level		Supra-national Level	
	Short-Haul	Long-Haul	Short-Haul	Long-Haul	Short-Haul	Long-Haul
Intra-Asia	**-1.46**	**-1.33**	-0.84	-0.76	-0.63	-0.57
Europe-Asia	-1.39	**-1.26**	-0.79	-0.72	-0.59	-0.54

Source: Adapted from Inter*VISTAS* Consulting Inc. (2007).

8.3 Elasticity of Air Travel with Respect to Airport Charges

Table 8-2A shows the share of airport costs based on the "all-in" ticket price, and Table 8-2B shows the elasticity estimates for airport charges, for short-haul, medium-haul, and long-haul services, based on a round-trip ticket. In other words, airport costs at both ends are included in the calculation. The short-haul intra-Asia elasticity was used to proxy the domestic elasticity, long-haul intra-Asia for Trans-Tasman and long-haul Europe-Asia for International. Based on the previously calculated share of airport charges in the "all-in" fare, we calculated the airport charges elasticity. As expected, the resulting elasticity estimates for airport charges are more inelastic than the case for airfares; this means increasing airport charges by any given percentage will lead to less traffic loss than the same percentage increase in airfares.

Table 8-2A
Share of Airport Costs in "All-in" Ticket Price
All Airport Charges

Sector	% Share of Airport Charges
Domestic	7.7%
Trans-Tasman	10%
International	11%

Source: Inter*VISTAS* computations using SABRE airfare data and airport charges data.

[59] We have adopted a methodology that has been used by academics, and has been through the peer review process.

Table 8-2B
Estimates of Elasticity with Respect to Airport Charges for Australia
All Airport Charges

Sector	Passenger Airfare Elasticity	% Share of Airport Charges	Airport Charges Elasticity
Domestic	-1.46	7.7%	-0.11
Trans-Tasman	-1.33	10%	-0.13
International	-1.26	11%	-0.14

Source: Inter*VISTAS* computations using Inter*VISTAS* (2007) elasticity estimates, SABRE airfare data and airport charges data

The elasticity estimates here are based on the route/market level. It should be noted, however, that the concentration of passengers at the Australia airports subject to prices monitoring (Sydney, Melbourne, Brisbane, and Perth) may indicate that the elasticity estimates are likely an upper boundary for these airports. A change in pricing at one of these airports is likely to impact most passengers, rather than a smaller route or market subset. While this would not be the same impact as a national level change in charges (or taxes), the change in airport charges at these airports could be more inelastic than the estimates provided here.

8.4 The Expected Demand Impact from Changes in Airport Charges

Based on the airfare elasticities from Section 8.3, we can comment on the theoretical impact of reducing charges at Australia's airports. As noted, there is not a one-to-one relationship between changes in airport charges and traffic. Table 8-3 shows the expected traffic increase due to a variety of charge reductions.[60] Based on the analysis in Table 8-3, if charges were to decrease by 10%, it would be expected that roughly 1.2% of the passenger traffic in Australia would be gained. For a 5% reduction in airport charges, the additional traffic would account for less than 1% of all of Australia's traffic. The theoretically estimated impact from decreased charges is a small amount of traffic overall. It is important to note that this is a theoretical outcome from decreasing charges and it is assumed that all of the reduction in charges is passed through by the airline to the consumer. Further, no account is taken of the impact that such a charges reduction might have on the ability of airports to invest in infrastructure and operational improvements. Given this, the estimates here likely overstate the theoretical impact of decreasing charges.

The following analysis is based on the total origin/destination (O/D) passenger traffic in Australia rather than embarkation/disembarkation (E/D) due to the level of detail available in the O/D data. The E/D data does not include a split between international and Trans-Tasman. While the magnitude of the traffic level would be larger based on E/D data, the overall percent of total traffic lost would likely be similar to the results based on O/D data.

[60] This analysis has been done based on the total passenger traffic in Australia. The following analysis is done as a way of estimating what would happen if the government were to impose stronger price regulation again. It should be noted that there is no guarantee with regulation that prices would decrease. An example of this is in the price control period prior to 2002, when the ACCC approved some sizeable price increases at airports, most notably at Sydney and Adelaide, to fund new capacity necessary for the expected demand growth.

Table 8-3
Estimated Traffic Gains from Decreased Airport Charges

	Decrease in Charges				
Increased Passenger Traffic (Thousands)	**1%**	**2%**	**5%**	**10%**	**100%**
Domestic	61	120	305	610	6,100
Trans-Tasman	7.5	15	40	75	750
International	40	80	200	400	4,010
Total Traffic Gained	110	220	545	1,100	10,900
Total Traffic in Australia (2016)	89,000	89,000	89,000	89,000	89,000
Increased Traffic as % of Total	0.1%	0.2%	0.6%	1.2%	12%

Note: Figures may not add due to rounding
Source: InterVISTAS analysis based on elasticity estimates and SABRE O/D Data

8.5 Why the previous neo-classical elasticity analysis (likely greatly) overstates the traffic reduction from a hypothetical increase in airport charges

The previous subsection used neoclassic economic analysis to derive the impact on airline passenger traffic of a hypothetical increase in airport charges. E.g., a hypothetical 10% increase in Australian airport charges would decrease traffic by 1.2%. However, this estimate may overstate, perhaps greatly overstate, the actual impact of an increase in airport charges for several reasons.

First, *airlines* are price discriminators. This means that different passengers pay different fares, based on

- *The level and package of services they want.*
  Higher fare classes offer greater services such as a superior cabin quality, larger baggage allowance, advanced seat selection, priority boarding, food choices.

- *How early the passenger books tickets.*
  In general the early booking passenger can benefit from access to a greater number of lower fare seats, while in some cases a booking closer to the flight date may find that the least expensive seats are sold out. Those that purchase these tickets are less price elastic.

The consequence of price discrimination is that the airlines have been able to sort airline passengers into groups for whom price is only a secondary factor in the travel decision, versus those for whom price is of primary importance in the travel decision. Because of their use of price discrimination, when faced with a cost increase, an airline will be able to raise the fare more on the least price elastic customers and thus lose little of the traffic of these customers. This mitigates price increases on the more fare elastic customers. The resulting reduced or minimal pass through of higher airport charges does not entail an efficiency loss. There is no issue of technical or dynamic efficiency, and the

allocative efficiency issue is reduced or eliminated by price discrimination. These are well known consequences of Ramsay pricing discussed in section 8.1. Thus, the effect of an increase in airport charges on passenger traffic may be much less than the neoclassical elasticity analysis above would suggest.[61,]

A second reason that, *in Australia,* an increase in posted airport charges may produce little in the way of traffic loss, due to the widespread use of incentive airport charges. Because many of the airlines serving Australian airports have unique contracts with airport operators regarding fees and charges, there is a decoupling of posted airport charges from actual payments by airlines to airports. A landing fee increase posted by an Australian airport may affect only a small portion of flights, as a number of airlines will have locked in charges from past contract negotiations. For these airlines there may be no increase in airport charges and no need to increase their fares.

Another aspect of the unique nature of some airport charges *in Australia* is that airport charges can tend to have the characteristics of a fixed cost to the airlines. We are advised that a number of contracts between airlines and airports have significant volume discounts in order to encourage carriers to grow traffic.[62] Posted landing and/or passenger fees may seem to be incremental to each new flight or passenger, but the incentive contract may result in a much reduced incremental charge per passenger paid by the airline to the airport beyond a traffic threshold. The result is that an increase in posted airport charges may in practice result in only a fraction of the decline in passenger traffic computed by neoclassical elasticity analysis.[63]

A third reason is common airline pricing across major routes.[64] Broadly, airline fares can have similarities across routes (or more importantly, across origins and destinations) and this constrains the willingness of airlines to raise fees on one route relative to another. Certainly there are distance based differences between routes and origin-destination itineraries.[65] But we tend to observe similar fares after adjusting for distance. This is especially noticeable when comparing origin-destination fares that

---

[61] Even where the airport charge is a fixed amount per passenger, airlines are able to price discriminate the pass-through to passengers, merely by slightly reducing the base fare on price insensitive passengers and disproportionately increasing the base charge on price sensitive passengers. A change in airport charges does not create either a requirement or an incentive for airlines to lock in their base fares between classes of customers.

[62] We interpret these contracts as a means to reflect the relatively fixed cost structure of airports in their charges to airlines. Ideally, airports would like to be guaranteed of sufficient revenues to cover their relatively fixed airport costs (the marginal cost to the airport operator of an additional flight added to the schedule may be minimal). Beyond coverage of these fixed costs, the airport is not incented to charge more, both because of the threat of regulation if aeronautical charges exceed aeronautical costs, and because airport operators are incented to achieve high traffic levels in order to earn unregulated revenues from non-aeronautical services such as food/beverage/retail services in passenger terminals. Hence contracts with airlines that incent them to increase flights or the number of passengers on board flights reflect the underlying economics of the airport industry.

[63] Another reason that airlines in some markets are unlikely to pass on increases in airport charges to passengers in full (or possible at all) is that when charges are based on the weight of the aircraft or the number of seats on the aircraft (differentiated from the number of passengers actually on board) then the airport charge has the characteristics of a fixed cost to the airline. An increase in fixed cost does not change marginal cost and thus might not change the traffic level. However, since most airports in Australia now based their fees largely on the number of passengers, this economic phenomenon is not applicable in Australia.

[64] This observation does not necessary apply to regional routes, especially where travellers may have limited choices. The issue here is exercise of potential airline market power. Even in the case of a pure monopolist, cost increases are not passed through 100% due to the demand elasticity.

[65] Even modest differences in distances may have little or no impact on fares. As an example, the lowest fare available for SYD, BNE and MEL to AKL can be identical for all three nonstop routes, despite differences in distances and airport charges.

use different connecting points.[66] This commonality in airline pricing across routes comes as a surprise to some observers as things such as airport costs and fuel usage differ between specific origin-destination pairs. This occurs for at least two reasons. First, from the supply side, where a given aircraft can be deployed to any route and carriers will tend to revise capacity allocations to routes until aircraft on the margin produce similar revenues per day. Second, from the demand side, related to brand reputation, as carriers want potential passengers to associate a brand with a price and quality of service point. Having a consistently higher price on A to M versus A to S, on roughly similar distances, can undermine the carrier's brand reputation.

In sum, for a number of reasons, the neoclassical elasticity analysis of the previous sections is highly likely to overstate the actual impact of an increase in airport charges on passenger traffic. Of primary importance is that a consequence of airline extensive price discrimination of their own services is a much dampened transmission of increased airport charges to price sensitive passengers.

[66] Different connecting itineraries on a given day for an origin-destination itinerary may result in differ fares, reflecting seat availability on the connecting flight segments, but often the lowest fare available is the same regardless of connecting points.

9 Charges & Airfares in Practice

Summary: There is little, if any, empirical evidence on the elasticity of air travel demand with respect to airport charges. Based on a series of case studies, there are a variety of outcomes to increased airport charges. In some cases, increases had a limited negative impact, in others, the impact was more significant. As well, the nature of the charges and scale of increase will have an impact on the ultimate outcome for the airport. The case studies also show that even when airlines react to increases in airport charges in the short-run by reducing the number of services offered traffic levels tend to recover, although it may take several years. Moreover, in many cases, increases in airport charges were related to capacity expansions. Thus while airport charges might go up, the airlines costs due to congestion may decline. Capacity expansions are necessary to accommodate growth, and to facilitate competition between airlines. Even in the early 2000s following privatization and deregulation of airport pricing, the increased airport charges did not materially impact passenger levels at the Australian airports.

9.1 Introduction

As there is very little empirical research on the linkage between airport charges and airline response, this section will describe a selection of global case studies as well as review the changes in passenger growth in Australia as a case study. For the Australian case, we will compare the actual change in passenger growth versus what would theoretically be expected based on the elasticity analysis.

9.2 Australian Case Studies

9.2.1 Phase 1 Airports

Melbourne Airport (MEL) was privatized in 1997. From the time of privatisation until 1 July 2002, MEL's aeronautical charges were subject to CPI-4% price cap, although it was allowed a pass through of necessary new investment which did not maintain its prices in nominal terms.[67] When price controls were removed, MEL increased its prices by around 40% on average.[68] Since then, airport charges at MEL have increased on average by 4%.[69]

Like all Australian airports, MEL also experienced a drop in passenger traffic in 2002. This was largely due to the liquidation of Ansett Australia[70], and the resulting decrease in seat capacity in the market. However, MEL rebounded strongly in the following years with steadily increasing passenger numbers. In total, traffic growth at MEL increased by over 159% between 1996 and 2016, for a compound annual growth rate of 4.9%, despite the growth in prices over the period.

9.2.2 Sydney Kingsford Smith Airport

In 2000 Sydney Airport Corporation submitted a proposal to increase the charges at the airport. Sydney airport had applied to increase prices on average 130%, to cover the increased investment costs.[71] While the ACCC did not approve the full 130% price increase, it did approve an increase of

[67] Productivity Commission (2002)

[68] ACCC (2004)

[69] Inter*VISTAS* analysis of airport charges data.

[70] Coleman (2001)

[71] ACCC (2001), p. 7.

97%.[72] In its decision, the ACCC noted that the increased prices were approved to provide both a reasonable return for the airport company (then owned by the Australian Government) and to allow the airport to be compensated "…**for major new investments** undertaken in the lead up to the Olympics."[73] Subsequent to this increase, the airport was privatised, and in the following years, price increases were much lower (13% between 2002 and 2005, roughly 4% per annum, when excluding higher security related charges as a consequence of post 9/11 increased security requirements).[74] In addition, between 2005 and 2017, the increase in charges, on average, was approximately 2% per annum.[75]

In 2002, the year of privatization, the airport's total passenger traffic dropped by over 6%, attributable in large part to the effects of cessation of operations by Ansett, SARS and the 9/11 terrorist attacks.[76,77] However, in the years following, SYD experienced consistently rising passenger traffic figures, a trend which continues to the present day, that was enabled, in part, by the major investment program approved by the ACCC. Overall, SYD's passenger traffic has grown by over 80% from 2002 to 2016, for a compound annual growth rate of +4.3%.

9.2.3 Traffic Growth in Australia

All else being equal, the elasticity of airline demand with respect to airport charges indicates that passenger traffic should have a negative yet small correlation to airport charges. Based on our analysis in Section 8, if airport charges were to increase by 1%, the impact on traffic would be a loss of roughly 0.1% of passengers. Following the privatization of the airports in the early 2000s, airport charges increased significantly (ranging from 25% to 162%).[78] Theoretically, there should have been a loss of traffic at the airports from this, but that was not the case for the Australian Airports. Figure 9-1 and Figure 9-2 show the evolution of total passenger traffic at the 10 largest Australian airports from 1998-2016. Although there was significant growth in charges, traffic was still above pre-privatization levels, and although growth was smaller, this rebounded in 2003 and subsequent years. It is important to note that the removal of Ansett from the market also had an impact on traffic levels in the early 2000s. This implies that impact of airport charges is likely too small to materially affect traffic, relative to other factors.

[72] *Ibid.*

[73] *Ibid.,* emphasis added.

[74] ACCC (2007), p.114.

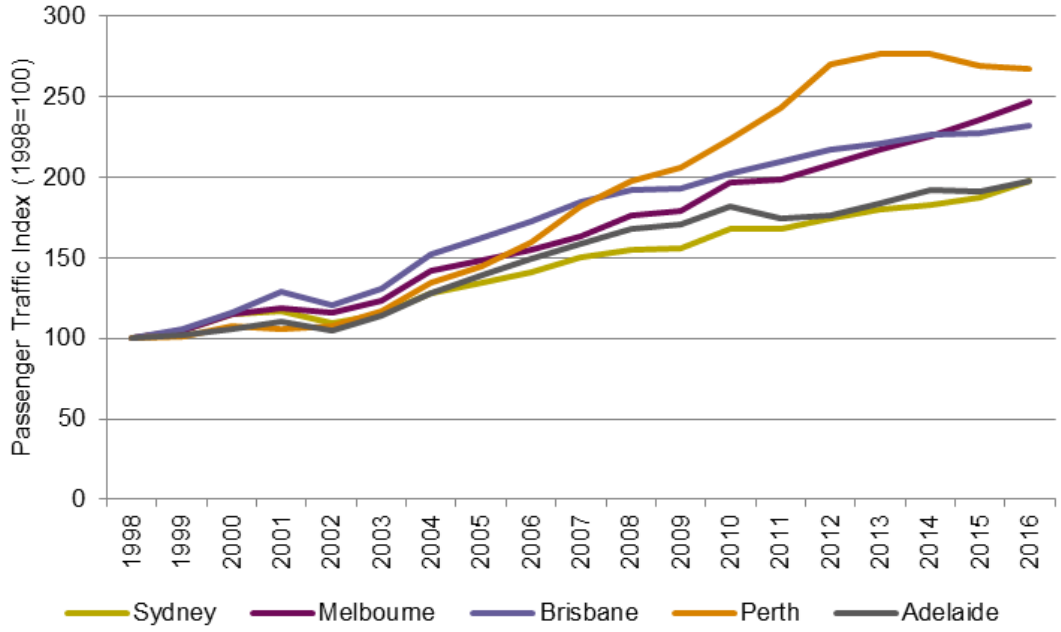
[75] InterVISTAS calculations based on ACCC Monitoring Report data.

[76] InterVISTAS calculations based on BITRE Airport traffic data.

[77] ACCC (2007), p.111.

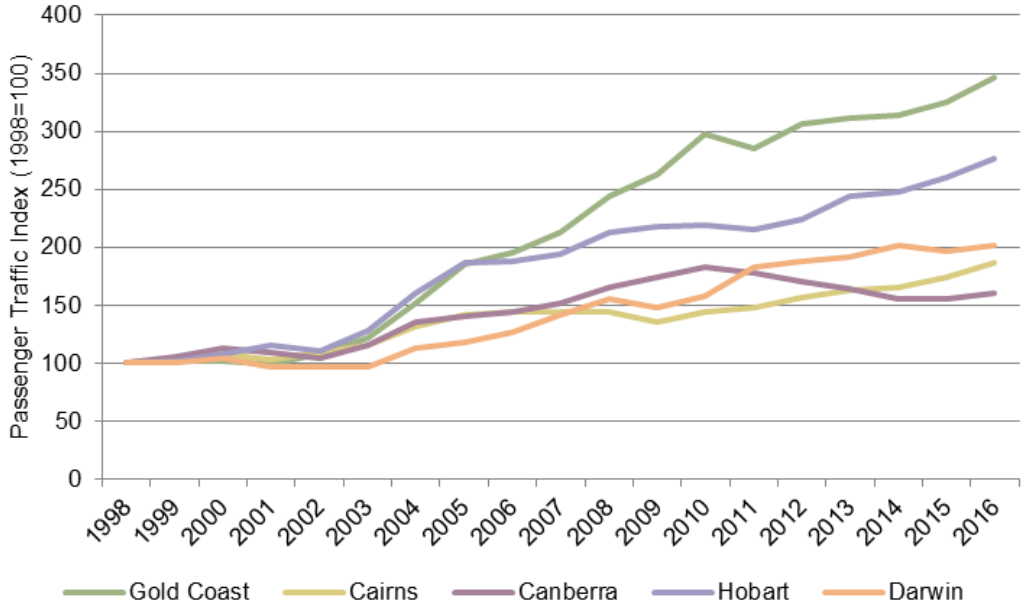
[78] Forsyth (2008), p. 86.

Figure 9-1
Annual Passenger Traffic (Index)
Australian Airports
1998-2016



Source: BITRE, Airport Traffic Data

Figure 9-2
Annual Passenger Traffic (Index)
Australian Airports
1998-2016



Source: BITRE, Airport Traffic Data

9.3 Selected Global Case Studies of Impact of Higher Airport Charges

The following case studies are related to increases in airport charges and the subsequent demand response.

9.3.1 U.S. Evidence on Limited Pass-through of Airport Charges Savings to Passengers

While not specific to airport charges, there is evidence from the United States that airlines do not necessarily pass on savings to consumers (i.e., decreasing charges would not necessarily equate to lower airfares). The U.S. GAO (2004) noted this in their review of the impacts of taxes and charges on airfares. In 1996 there was a period where the government did not collect ticket taxes from the airlines.[79] The GAO noted that airlines, on average, raised their base airfares, leaving the price paid by the customer at the same level it would have been with the tax (or in some cases higher total airfares). Rather than pass on the tax savings to the consumers, airlines essentially kept the amount that ordinarily would have been paid to the government as additional revenue.

9.3.2 Hong Kong International Airport

In January 1998, the Hong Kong Special Administrative Region Government approved an airport charges scheme at the new Hong Kong International Airport (HKG) that included landing charges, parking charges and terminal building charges. The charges scheme, which included fees that were approximately 20% higher than the fees at the existing Hong Kong international airport (Kai Tak Airport) would help finance the new airport.[80]

Shortly after the implementation of the charges scheme at the new airport, a few passenger and cargo carriers decided to either reduce services or cancel services entirely at HKG, due partly to the high fees at the airport, although the new airport charges were imposed while East Asia was suffering from a major financial crisis (referred to by many as the Asian Flu) that began in July 1997 and continued into 1999. In 1998, the Hong Kong Monetary Authority raised the interest rate dramatically, first from 8% to 23%, then temporarily increasing another tenfold. Hong Kong's flag carrier, Cathay Pacific Airways, indicated that the increase in airport charges contributed to the carrier's first financial loss in 35 years, although the air travel effects of the financial crisis undoubtedly was a major contributor, if not the main cause.[81] International carriers were also impacted by the new charges scheme, although again the timing with the financial crisis suggests that the latter may have been the primary reason for changes in airline capacity. In September 1998, Northwest Airlines decreased services at the airport,[82] while Scandinavian Airlines (SAS) withdrew services from HKG in March 1999. After experiencing a decrease in passenger traffic to Hong Kong, the carrier claimed that high airport charges and dominance of Cathay Pacific made it difficult for SAS to maintain services at HKG compared to other Asian airports.[83] Cargo carrier DHL Worldwide Express advised in April 1999 that it would not add any new services until the airport fees decreased.[84]

In response to complaints from carriers, HKG announced a reduction in aircraft landing fees and parking charges by 15% to maintain the airport's status as an aviation hub in the region effective

---

[79] This happened in the United States in 1996 when there was a lapse in the legal authority of the government to collect airline ticket taxes. The government's authority to collect the ticket tax lapsed on December 31, 1995. The Congress re-instated the ticket tax in August 1996.

[80] Airport Authority Hong Kong (1998)

[81] Bangsberg (1999).

[82] Ibid.

[83] Flight Global (1999)

[84] See footnote 43.

January 2000.[85] In 2000, Cathay recorded record profits. The airport, which opened in July 1998, amid the financial crisis and the handover of Hong Kong from the British Government to the Chinese government in Beijing has continued to grow strongly and is currently contemplating adding a third independent runway to handle even further increases in traffic. If there was an effect of higher airport charges on air travel, it was temporary and scrambled with a major financial crisis.

9.3.3 Osaka Kansai International Airport

Opened in September 1994, Osaka Kansai International Airport (KIX) was built on a man-made island off the coast of Osaka Bay to relieve congestion at Osaka Itami International Airport. Prior to the opening of KIX, the reclaimed land on which the new airport was being developed started to sink, causing a delay in the opening of the airport and an increase in costs by 50% (equivalent to $15 billion). To cover the additional costs for preventing the terminal building from sinking and prevent further debt, the airport imposed high landing fees and other airport charges (such as check-in counter rent, passenger boarding bridge service) much higher than other airports and reputed to be the highest in the world at the time.[86]

In response to the expensive charges, airlines, already faced with falling ticket prices and increased competition at the time, opted to provide services to other destinations or decrease the initially planned frequency of services. For example, United Airlines offered 21 weekly flights instead of the 50 weekly flights it had intended. Prior to opening, the airport estimated it would have less than half of its target of 630 weekly international flights.[87] Two years later, foreign carriers had already decreased operations at the airport, with some carriers cancelling services entirely by 2000. For example, three different carriers offered three daily non-stop services to London in the mid-1990s. However, by 2003, only one carrier provided daily non-stop service to London.[88]

Despite having higher charges than some of its peer airports,[89] traffic has grown at the airport. Based on the airports passenger statistics, the airport has seen large growth in passenger traffic, nearly doubling in passengers between 2003 and 2016.[90]

9.3.4 Toronto Pearson International Airport

Toronto Pearson International Airport (YYZ) announced that effective January 1, 2006, landing fees and terminal charges at the airport would increase by 6.9% and 8.9%, respectively. The airport authority indicated that the rise in fees was due to the hike in rent payments to the federal government in 2006 compared to the previous year. However, the reality was that the airport had just opened a desperately needed new terminal (at a cost of c$4.4 billion), and had opened two new runways in 1997 and 1992. After the announcement was made, Air Canada advised that it would introduce new services at other airports to avoid the high costs at YYZ. The country's flag carrier also mentioned that if the fees were lowered, they would increase the frequency of Air Canada's services at YYZ.[91]

Since the fee increase, traffic at YYZ has grown, for both the domestic and international sectors and for Air Canada as well as other carriers. When Air Canada surrendered slots at YYZ, domestic low cost carrier WestJet took up many of the slots and commenced service at YYZ, whereas before it only served a secondary airport in the region (Hamilton). YYZ traffic grew over 30% between 2006 and

---

[85] Lim (1999)

[86] Brull (1994)

[87] Same as above.

[88] Al-Badri (2003)

[89] CAPA (2016)

[90] Kansai Airports (2017)

[91] CBC News. (2005)

2015, averaging 3.2% compound annual growth; this is in comparison to a growth rate of 15% between 1997 and 2006 (CAGR of 1.5%).[92]

While airlines complained about higher charges and some adjusted their capacity downward, others expanded or entered the market with the result that airport traffic continued to grow.

9.3.5 San Antonio International Airport

The San Antonio City Council approved a new Air Service Incentive Program at San Antonio International Airport in November 2015.[93] The three-year program included waived landing charges and terminal rental fees for unserved targeted routes and new entrant carriers for one year. The program authorized marketing support of up to $200,000.[94]

The incentive program aimed to improve the airport's air connectivity, after reports that approximately 300,000 passengers were lost to nearby Austin-Bergstrom International Airport.[95] However, it is important to note that even without the new air service incentive program passenger traffic at the airport had been increasing in the past couple of years. In 2014 passenger traffic grew by 1.4% compared to 2013, while in 2015 passenger traffic rose by 1.6% year-over-year, reaching a record high of 8.5 million passengers.[96]

9.3.6 Denver International Airport

In February 1995, the new Denver International Airport (DEN) opened to replace Denver's former airport, Stapleton International Airport. However, as airline user fees at the new airport were three times more expensive than before.[97] Continental Airlines, which had previously used Stapleton as a secondary hub, announced that it would cancel services in Denver soon after the new airport had opened.[98] However, prior to the transition from Stapleton to the new airport, Continental Airlines had already closed its pilot and flight-attendant bases in the city (affecting approximately 1,500 jobs), and reduced flights by over 50% in 1994.[99] The carrier had gone through two bankruptcies and was being displaced by United Airlines at DEN. Continental refocused its operations at underutilized Newark Airport in the New York region and built it into a major hub. Some years later, United and Continental merged.

Effective January 1, 2014, landing charges for schedules air carriers increased at DEN, equivalent to over 30% over the past three years.[100] According to an announcement by Frontier Airlines in November 2014, the increase in fees was a contributing factor in the carrier's decision to reduce services and cut jobs at the airport.[101] Frontier cancelled services on approximately 20 routes in DEN in late 2014 to early 2015, decreasing the carrier's share of seats at the airport by 12%.[102] At the

---

[92] Inter*VISTAS* analysis using traffic data from the Greater Toronto Airports Authority.

[93] Brezosky (2015)

[94] San Antonio International Airport (2015)

[95] Kofler (2015)

[96] San Antonio International Airport Passenger Traffic Statistics 2014 & 2015

[97] U.S. Department of Transportation Research and Innovative Technology Administration (1994)

[98] Bearup (2015)

[99] Yates (1994)

[100] Denver International Airport. January 2014 Fees and Charges.

[101] Keeney (2014)

[102] CAPA (2014)

same time, it is important to note that at this time Frontier was transitioning to become an ultra-low cost carrier, and needed to cut costs to fit its new business model.[103]

Based on data available from the DEN, traffic growth fell in 2015, though was still positive (1% growth in 2015 versus 2% in 2014). Growth rebounded though in for 2016, where traffic grew approximately 8% over the previous year.[104]

9.3.7 Sacramento International Airport

Sacramento International Airport opened a new airport terminal in October 2011. The new terminal replaced the older building and increased capacity at the airport to 16 million passengers per annum. The airport intends to recover the construction cost of the new terminal, equivalent to $1 billion, through increased fees and charges paid by passengers and airlines.[105] Since the new terminal building was opened in 2011, the airport experienced a decrease in passenger traffic, reduced air services and, correspondingly, in revenues.[106]

Based on BTS data, domestic traffic is beginning to rebound at the airport, with 2015 growing to higher than 2010 levels, though still below historical traffic volumes.[107]

9.3.8 Washington Dulles International Airport

According to the 2013 budget of the Metropolitan Washington Airports Authority, $240.9 million in debt service was apportioned to Washington Dulles International Airport (IAD), approximately 75% of the authority's airport-related debt service.[108] As airlines pay for the high debt service at IAD through increased leases and landing fees, United Airlines has indicated difficulty in expanding operations at the airport.[109]

It should be noted that much of IAD's costs are from the new rapid transit line which the airport authority is responsible for building, even though the bulk of use of the transit line will be by commuters into the city. IAD has had to spread its costs over fewer carriers/operations, as United decreased domestic service there after the merger with Continental gave it a stronger transatlantic gateway at New York Newark Liberty Airport

Based on BTS traffic data, passenger volumes at IAD have continued to decrease since 2013, and had been falling since 2007.[110] (Independence Air had been a short lived domestic operator from 2004-2006 when it lost its capacity purchase contract with United, and its short lived traffic boost inflated earlier traffic numbers.) It should be noted that IAD faces competition in the Washington DC market, as travellers can use Ronald Reagan Washington National Airport or Thurgood Marshall Baltimore Washington International Airport. However, IAD international traffic is up 15% since 2010.

9.4 Summary of Key Findings

There are a variety of outcomes following increases in airport charges. In some cases, increases had a limited negative impact (Toronto), in others, the impact was more significant (e.g., Osaka). The results will also vary by other conditions, such as economic downturns, supply side disruptions, and

---

[103] Keeney (2014)

[104] Denver International Airport (2017)

[105] Thompson (2011)

[106] Bizjak (2015)

[107] Bureau of Transportation Statistics T-100 Market data.

[108] Metropolitan Washington Airports Authority. 2013 Budget.

[109] Russel (2013)

[110] Bureau of Transportation Statistics T-100 Market data.

competition. As well, the nature of the charges and scale of increase will have an impact on the ultimate outcome for the airport.

The case studies also show that even when airlines react to increases in airport charges in the short-run by reducing the number of services offered, traffic levels tend to recover, although it may take several years for this to occur. Airlines and passengers adjust to the new prices, but the fundamentals that drove growth in the past tend to reassert themselves.

In the case of Australia, increases in airport charges seem not have a significant impact on demand. Other than the adjustments to prices around 2002 (and for Sydney 2001) to put them on an efficient footing, increases have tended to be related to capacity and other enhancements (such as replacing aged assets), so there may be corresponding airline and passenger benefits offsetting the higher airport costs In particular, capacity expansions are necessary to accommodate growth, and to facilitate competition between airlines.

Thus, based on the case studies considered here, whilst there are examples of the theoretical results in practice (largely in the short run), there are also results that suggest that airport charges are largely irrelevant in the determination of airfares, and more importantly, levels of demand.

Bibliography

Al-Badri, D. (2003). “Kansai Airport: A beautiful loser.” *Japan Inc Communications, Inc.* http://www.japaninc.com/article.php?articleID=1181

Anna.Aero. (2017). “The US and China have largest domestic networks in 2017, but Australia offers more seats per capita an Middle East markets are growing fast.” Accessed from http://www.anna.aero/2017/11/22/the-us-and-china-have-by-far-the-largest-domestic-networks-in-2017-but-australia-offers-more-seats-per-capita-and-middle-east-markets-are-growing-fast/?utm_source=anna.aero+newsletter&utm_campaign=0b210cee12-anna_nl_221117&utm_medium=email&utm_term=0_ecdbf41674-0b210cee12-86957185

Airport Authority Hong Kong. (1998). “Hong Kong SAR Government approves new airport charges.” https://www.hongkongairport.com/eng/media/press-releases/ex_104.html

Aulich, C. (2014). “Airport Privatisation in Australia: A Tale of Three Cities.” https://www.researchgate.net/publication/273299772_Airport_Privatisation_in_Australia_A_Tale_of_Three_Cities

Australian Airports Association. (2017). “AAA Submission: Inquiry into Regional Airfares in Western Australia.” http://www.parliament.wa.gov.au/Parliament/commit.nsf/(Evidence+Lookup+by+Com+ID)/CA2CCA9D89D798DC4825817D002D22A7/$file/20170728+-+REGAIR+-+Sub+70+-+Australian+Airports+Assocaiton.pdf

Australian Competition & Consumer Commission. (2017). “Airport Monitoring Report 2015-2016.” https://www.accc.gov.au/publications/airport-monitoring-reports/airport-monitoring-report-2015-16

Australian Competition & Consumer Commission. (2012). “Air Asia Berhad to pay $200,000 penalty for breaching Australian Consumer Law.” https://www.accc.gov.au/media-release/air-asia-berhad-to-pay-200000-penalty-for-breaching-the-australian-consumer-law

Australian Competition & Consumer Commission. (2007). “Airport Monitoring Report 2005-2006.” https://www.accc.gov.au/publications/airport-monitoring-reports/airport-monitoring-report-2005-06-price-and-financial

Australian Competition & Consumer Commission. (2001). “Sydney Airports Corporation Ltd.: Aeronautical Pricing Proposal.” *Decision*. http://registers.accc.gov.au/content/item.phtml?itemId=978120&nodeId=47121da3c023548ab0d05d3f8830b925&fn=ACCC%27s%20Decision.pdf

ACCC v AirAsia Berhad Company [2012] FCA 1413. http://www.judgments.fedcourt.gov.au/judgments/Judgments/fca/single/2012/2012fca1413

Bangsberg, P.T. (1999). “High airport fees at Hong Kong seen deterring business.” *The Journal of Commerce*. http://www.joc.com/high-airport-fees-hong-kong-seen-deterring-business_19990413.html

Bearup, B. (2015). “Denver International Airport: A 20-year history.” *Airways News.* http://airwaysnews.com/blog/2015/03/02/denver-international-airport-a-20-year-history/

Bizjak, T. (2015). “Sacramento airport smooths over turbulence with Southwest.” *The Sacramento Bee*. http://www.sacbee.com/news/local/transportation/article43052889.html

Brezosky, L. (2015). “Airport hoping fee waivers will lure new nonstop flights.” *San Antonio Express News*. http://www.expressnews.com/business/local/article/Airport-hoping-fee-waivers-will-woo-new-routes-6611691.php

Brueckner, J. K., Lee, D. N., Picard, P. M. and Singer, E. (2015). “Product Unbundling in the Travel Industry: The Economics of Airline Bag Fees.” *Journal of Economics & Management Strategy*, 24: 457–484. doi:10.1111/jems.12106

Brull, S. (1994). “Will fees sink new Osaka Airport?” *The New York Times*. http://www.nytimes.com/1994/08/05/business/worldbusiness/05iht-airport.html

Bureau of Infrastructure, Transport & Regional Economics. (2017). “Elasticities Database Online,” https://bitre.gov.au/tedb/search.aspx

CAPA. (2016). “Osaka Kansai International Airport: A Powerful Regional Airport but Still an Investment Experiment.” https://centreforaviation.com/insights/analysis/osaka-kansai-international-airport-a-powerful-regional-airport-but-still-an-investment-experiment-260398

CAPA. (2014). “Frontier Airlines opts to resize Denver Airport operations, citing higher operating costs” http://centreforaviation.com/analysis/frontier-airlines-opts-to-resize-denver-airport-operations-citing-higher-operating-costs-199046

CBC News. (2005). “Landing fee hike makes Toronto's Pearson airport the world's costliest.” *CBC News.* http://www.cbc.ca/news/business/landing-fee-hike-makes-toronto-s-pearson-airport-the-world-s-costliest-1.562679

Coleman, Z. (2001). “Ansett Australia Strives To Hold Creditors At Bay.” *Wall Street Journal.* https://www.wsj.com/articles/SB1000286772593888831

Denver International Airport. (2017). “Passenger Traffic Reports.” https://www.flydenver.com/about/financials/passenger_traffic?date_filter%5Bvalue%5D%5Byear%5D=2013

Flight Global. (1999). “SAS withdraws from Hong Kong.” https://www.flightglobal.com/news/articles/sas-withdraws-from-hong-kong-47259/

Forsyth, P. (2008). Airport Policy in Australia and New Zealand. In Aviation Infrastructure Performance: A Study in Comparative Political Economy. Eds. Winston, C. and de Rus, G. Brookings Institution Press: Washington, D.C.

ICAO. (2013). “Financial Situation of Airports and Air Navigation Service Providers.” Worldwide Air Transport Conference, Sixth Meeting (ATConf/6-IP/2). https://www.icao.int/Meetings/atconf6/Documents/WorkingPapers/ATConf6-ip002_en.pdf

IdeasWorks Company. (2017). “Airline ancillary revenue projected to be $82.2 billion worldwide in 2017.” Press Release. http://www.ideaworkscompany.com/november-28-2017-press-release

. (2016). “CarTrawler Worldwide Estimate of Ancillary Revenue.” Press Release. http://www.ideaworkscompany.com/wp-content/uploads/2016/11/Press-Release-115-Global-Estimate.pdf

Inter*VISTAS* Consulting Inc. (2007). “Estimating Air Travel Demand Elasticities.”

Kansai Airports. (2017). “Kansai International Airport Statistics.” http://www.kansai-airports.co.jp/en/company-profile/about-airports/kix.html

Keeney, L. (2014). “Frontier blames rising taxes, landing fees for Denver job, flight cuts.” *The Denver Post*. http://www.denverpost.com/business/ci_26955916/frontier-blames-rising-taxes-landing-fees-denver-job

Keeney, L. (2014). “Denver fires back at Frontier's plans to cut jobs, flights at DIA.” *The Denver Post.* http://www.denverpost.com/business/ci_26985966/denver-fires-back-at-frontiers-plans-cut-jobs

Kofler, S.D. (2015). “Growing pains: Comparing San Antonio air ticket prices with other key cities.” *Texas Public Radio*. http://tpr.org/post/growing-pains-comparing-san-antonio-air-ticket-prices-other-key-cities#stream/0

Lim, P. (1999). “Hong Kong airport authority bows to pressure, lowers charges.” *Agence France Presse.* http://archives.californiaaviation.org/airport/msg02199.html

Metropolitan Washington Airports Authority. (2012). “2013 Budget.” http://www.mwaa.com/sites/default/files/budget_manual_-_2013_.pdf

Productivity Commission. (2011). “Economic Regulation of Airport Services.” Inquiry Report no. 57, Canberra. https://www.pc.gov.au/inquiries/completed/airport-regulation

Productivity Commission. (2002). “Price Regulation of Airport Services.” Report no. 19, AusInfo, Canberra. https://www.pc.gov.au/inquiries/completed/airports-2002/report

Qantas. (2017). “Positioning for Sustainability and Growth: Qantas Data Book 2017.” http://investor.qantas.com/investors/?page=data-book

Regional Express. (2017). “Clears Skies Ahead: Annual Report 2016/17.” http://www.rex.com.au/AboutRex/InvestorRelations/annual_report.aspx

Russel, E. (2013). “Airport debt hinders United expansion at Washington Dulles: Smisek.” *Flightglobal.* https://www.flightglobal.com/news/articles/airport-debt-hinders-united-expansion-at-washington-393395/

San Antonio International Airport. (2015). “San Antonio International Airport Air Service Incentive Program 2015-2018.” https://www.sanantonio.gov/Portals/0/Files/Aviation/BusinessOpportunities/IncentiveProgram-SAT.pdf

Scotti, D., & Dresner, M. (2015). “The Impact of Baggage Fees on Passenger Demand on US Air Routes.” *Transport Policy, 43,* pp.4-10. https://doi.org/10.1016/j.tranpol.2015.05.017

Thompson, D. (2011). “Sacramento Airport opens $1 billion, art-filled terminal.” *The Huffington Post.* http://www.huffingtonpost.com/2011/10/07/sacramento-airport-new-terminal_n_1000774.html

U.S. Department of Transportation Research and Innovative Technology Administration. (1994). “New Denver airport: Impact of the delayed baggage system.” http://ntl.bts.gov/DOCS/rc9535br.html

U.S. Government Accountability Office. (2004). “Summary Analysis of Federal Commercial Aviation Taxes and Fees.” https://www.gao.gov/products/A09510

Virgin Australia Group. (2017). “Annual Financial Report 2017.” https://www.virginaustralia.com/us/en/about-us/company-overview/investor-information/annual-reports/

Wang, K., Zhang, A., and Zhang, Y. (2017). “Airline Performance in China and India: What Drive Airline Efficiency and Pricing.” http://dx.doi.org/10.2139/ssrn.2927344

Yates, R.E. (1994). “Continental to shutter pilot, attendant bases in Denver.” *Chicago Tribune*. http://articles.chicagotribune.com/1994-07-08/business/9407080131_1_flight-attendants-mile-high-city-denver-hub

Zakrzewski, D., and Juchau, R. (2006). “Privatization impact & social disclosure: the case of Sydney Airport.” https://www.unisa.edu.au/Global/business/centres/cags/docs/apcea/APCEA_2006_12(4)_Zakrzewski_Juchau.pdf

Appendix A –
Summary of Past Elasticity Papers Reviewed

The following table briefly summarises the papers reviewed. Details include the elasticity estimates, variables used, and an overview of the findings.

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
Taplin - A Coherence Approach to Estimates of Price Elasticities in the Vacation Travel Market (1980)	Price (leisure): -0.9 to -3.3 Income: 1.0 to 2.6	Results synthesized from other studies.	Results synthesized from other studies.	Cross-elasticities of various substitute and compliment goods were inferred based on the results observed in other studies. Accommodations, domestic travel, car costs, and prices of other consumer goods were analyzed as for effects on foreign air travel.
Abrahams - A Service Quality Model of Air Travel Demand: An Empirical Study (1983)	Price: -0.36 to -1.81 Income: 0.46 to 1.6	Expected schedule delay time. Price elasticity of demand is calculated indirectly.	Traffic. Lowest unrestricted fare. Product of city pair populations. % change in GNP. Perceived price of air transport relative to auto transport.	Found rapid growth of hotel and recreation facilities in Hawaii in response to the introduction of low cost jet service; expansion of business activity in Reno as a result, in part, of the sharply increased service quality in airline services. Long-haul routes appeared to be more elastic than short and vacation traffic to be more elastic than business traffic. A negative correlation was found between the reduction in 1980 fare levels from the official CAB fare and the estimated service quality elasticity.
Oum, Gillen, and Noble - Demands for Fareclasses and Pricing in Airline Markets (1986)	Price: -1.152 (all routes) Income: -1.445 (all routes)	Route aggregate demand.	Average fare. Per capita incomes between city pairs. Population between city pairs. Vacation route	Derived partial elasticities for three fare classes using a translog demand system in a first stage then the second stage involves estimating a log-linear demand function to measure total price elasticities. Ramsey-optimal fare class prices were also computed by minimizing estimated airfare index functions subject

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
			dummies.	to breakeven constraints. Intra-U.S. routes were used as data sources.
Oum - Alternative Demand Models and their Elasticity Estimates (1989)	No aviation elasticities estimated.	No aviation elasticities estimated.	N/A	Examined linear demand, Log-Lin demand, Box-Cox, logit, and translog demand models for effectiveness in demand analysis and forecasting. The translog model was shown to be the model that produces the most reasonable results – elasticities exhibit stability and predictability, smaller standard errors than from log-linear model.
Oum, Zhang, and Zhang - Inter-Firm Rivalry and Firm-Specific Price Elasticities in Deregulated Airline Markets (1993)	Price: -1.24 to -2.34 on domestic U.S. routes	Route aggregate demand by carrier.	Average fare. Total income. Seasonality dummies. Vacation route dummies. Cost per passenger mile.	Firm specific price elasticities were measured, and were found to increase with distance. Vacation routes were found to have higher elasticity values. In addition, the analysis found that firms were shown to behave uniquely in a duopoly environment.
Alperovich and Machnes - The Role of Wealth in the Demand for International Air Travel (1994)	Price: -0.27 (all routes) Income: 1.64 to 2.06	Travelers per capita.	Financial assets. Non-financial assets. Wages. Consumer price index.	Authors examine air travel out of Israel. Price was found to be inelastic while income was highly elastic. Used log-linear models. Inclusion of wealth variables is found to reduce serial correlation, correct bias, and improve estimate precision. Total assets (including financial and non-financial assets) were determined to be significant in demand.
Australian Bureau of Transport and Communications Economics - Demand Elasticities for Air Travel to and from Australia	Price: -0.14 to -1.19 (Aus. leisure) -0.5 to -1.86	Total O/D leisure passenger; Total O/D business passengers	Real household disposable income. Price index of domestic holiday travel and	Airfares, income and relative prices found to be important determinants of leisure travel to and from Australia. Income and relative prices were important for business travel. Real exchange rate elasticities

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
(1995)	(foreign leisure) -0.01 to -0.4 (Aus. Business) -0.16 to -0.62 (Foreign business) Income: 0.21 to 11.58 (Aus. leisure) 1.88 to 5.51 (foreign leisure)		accommodations. Annual average exchange rates. Relative prices of holiday travel and accommodations. Per capita figures are used to account for population effects.	are also examined. Airfare elasticities differed between passenger type and O/D market. Linear and Log-Log models were employed.
Cohas, Belobaba, and Simpson - Competitive Fare and Frequency Effects in Airport Market Share Modeling (1995)	Price: -0.37 to -0.83	Airline market share	Quarterly Origin/Destination traffic data from 1979/1 to 1992/2.	Paper looked at competitive effects in duopoly markets. The elasticity of market share with respect to frequency of service was positive; the direct elasticity of market share with respect to price was negative; the cross-elasticity of market share with respect to price was positive.
Jorge-Calderon - A Demand Model for Scheduled Airline Services on International European Routes (1997)	Price: -0.534 (all economy) Frequency: 0.79 to 1.26 Aircraft Size: 0.55 to 1.74	Total scheduled traffic between two cities. Taken from ICAO Traffic by Flight-Stage Survey.	Population of O/D cities. Incomes of O/D cities. Distance. Frequency. Average aircraft size. Unrestricted economy fares. Dummies: Travel over sea water; proximity of nearby hub airport; discounted restricted fares; holiday resort	International European routes were examined using a demand model that used several independent variables. Various stage lengths were examined separately. Overall, demand was shown to be price inelastic with a tendency for elasticities to increase with distance but fall in the long-haul sector. Highly discounted fares have a positive effect on traffic. Discounted fares were used more often in short-haul markets (presumably to compete with other modes); longer distance flights were more price sensitive due to the reduced use of discounted fares.

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
			destination.	
Taplin - A Generalized Decomposition of Travel-Related Demand Elasticities into Choice and Generation Components (1997)	Price: -1.7 to -2.1 (leisure) Income: 1.1 to 2.1	Estimates from Taplin (1980)	Estimates from Taplin (1980)	Firm specific price elasticities were measured, and were found to increase with distance. Vacation routes were found to have higher elasticity values. Cross elasticities between domestic and international vacation choices were examined. Expenditure choice and generation elasticities were derived separately.
Hamal - Australian Outbound Holiday Travel Demand Long-haul Versus Short-haul (1998)	Price: -0.35 to -2.23 Income: 0.63 to 0.84	Short-term resident departures for holiday purposes.	Real per capita household income. Price index of domestic holiday travel and accommodation over domestic CPI. Price index of foreign country holiday travel and accommodation over foreign CPI. Foreign/domestic exchange rate. Exchange rate weighted by prices of overseas and domestic travel and accommodations.	Paper makes use of four log-log models with different explanatory variable combinations to measure elasticities for travel demand to various markets outside of Australia. Income elasticities were shown to vary depending on the market. Cross price elasticity with domestic demand and accommodations were positive and above one for all markets.
Carlsson - Private vs. Business and Rail vs. Air Passengers: Willingness to pay for Transport Attributes (1999)	Price: -1.09 to -1.43 (total) -0.94 to -1.28 (business) -2.95 to -3.04 (personal).	Number of trips.	Elasticities were inferred indirectly through the use of a logit model that accounts for mode choice decision making.	A stated preference survey was used to generate data for passenger's willingness to pay for improvements to various transport modes through a conditional logit model. Routing were limited to travel between Stockholm and Gothenburg, Sweden. Air Arlanda and Air Bromma estimates were generated separately. Business travelers are found to value time more highly and were less price elastic than

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
				private passengers.
Abed, Ba-Fail, Jasimuddin - An Econometric Analysis of International Air Travel Demand in Saudi Arabia (2001)	No elasticity estimates.	Demand for international air travel.	Population size. Expenditures.	A proposed econometric model of demand was derived for Saudi Arabia international air travel. Population and expenditures were found to be the primary determinants of international air travel in Saudi Arabia.
Gillen, Morrison, Stewart - Air Travel Demand Elasticities: Concepts Issues and Measurement (2002)	Price: -0.27 (long-haul int. business) -1.04 (long-haul int. leisure) -1.15 (long-haul dom. business) -1.10 (long-haul dom. leisure) -0.7 (short-haul business) -1.52 (short-haul leisure) Income: 1.39 Median Values Reported	Survey of a large group of studies.	Survey of a large group of studies.	The report was based on an extensive survey of literature related to provide air travel elasticity estimates. Six distinct markets for air travel were identified: business and leisure travel; long-haul and short-haul travel; and international and North American long-haul travel. Estimates vary significantly, reflecting the range of studies that were examined.

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
Brons, Pels, Nijkamp, Rietveld - Price Elasticities of Demand for Passenger Air Travel: A Meta-Analysis (2002)	No direct measures.	Price-elasticity.	Transfer distance. Fare Class. Geographic location. Research method (time, cross-section, or pooled). Time horizon. Period of data collection	This paper is a meta-analysis of the factors affecting price elasticities in the aviation sector. Long-run price elasticities were higher in absolute value; passengers became more price sensitive over time; Business passengers were less sensitive to price – the difference is about 0.6; European passengers were not more price sensitive than U.S. passengers and Australian passengers.
New Zealand Commerce Commission - Final Report Part IV Inquiry into Airfield Activities at Auckland, Wellington and Christchurch International Airports (2002)	Price: -1.3 (domestic) -1.8 (international)	Estimates obtained from other studies.	Estimates obtained from other studies.	Report cites that the price elasticity of the derived demand by airlines for airfield services can be inferred from the elasticity of the demand for airline travel – requires an assumption made about what portion of any change in landing charges is passed to passengers by airlines.
Castelli, Pesenti, Ukovich - An Airline-Based Multilevel Analysis of Airfare Elasticity for Passenger Demand (2003)	Price: -1.058 (all routes) Ranged from -0.75 to -1.62 on specific routes Frequency: 0.862	Number of passengers travelling on a route, in fare class, on a given day. No distinction is made between origin and destination.	Fare. Population of the total metropolitan are served by airports. GDP per capita in the two airport catchment areas. Distance between the two airports. A measure of the cost faced by travelers in other modes of transportation. Daily frequency of flights. Aircraft size. Hub (dummy).	Price elasticity of a specific airline (Air Dolimiti – the largest Italian regional carrier) was estimated. Nine routes were examined, price elasticity was found to vary significantly across the various routes – from -0.75 to -1.62.
PriceWaterhouseCoopers -	Price:	No information	No information	Impacts on competitiveness and economic

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
Aviation Emissions and Policy Instruments, Final Report (2005)	-0.73 (business) -1.52 (leisure) -1.23 (full service) -1.38 (low cost) -1.02 (cargo) Estimates derived from Gillen et al. (2001)	provided.	provided.	performance were estimated for the European Union based on the prospected introduction of certain environmental policy changes. The authors conducted their own estimates of elasticities but reject their estimates in favor of figures derived from Gillen et al. (2001).
Rubin and Joy - Where are the Airlines Headed? Implications of Airline Industry Structure and Change for Consumers (2005)	Price: -2.4 (leisure) Estimates from 1997 study – Mackinac Center for Public Policy, Price Elasticity of Demand	No information provided.	No information provided.	Authors postulate that demand for air travel has become more elastic with the advent of online purchasing making prices more transparent – heightened competition and increased awareness. Due to the high price elasticity for leisure travel, airlines pass these charges forward as surcharges to consumers.
Goolsbee and Syverson - How Do Incumbents Respond to the Threat of Entry? Evidence from the Major Airlines (2006)	Price: -0.64 to -1.12	Total passengers or mean fares. DB1A files from Q1 1993 to Q4 2004.	Time dummies: Southwest establishing presence at both endpoints of route w/o flying route; Southwest flying route.	The paper shows that the threat of Southwest entering a market was sufficient to encouraging incumbents to lower their prices – this was also said to cause an increase in demand prior to Southwest beginning service. The fare and quantity changes from this period implies a demand elasticity between -

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
			Various control variables are used in the different model specifications.	0.64 and -1.12.
Njegovan - Elasticities of Demand for Leisure Air Travel: A System Modelling Approach (2006)	Price: -0.7 (all routes) Income: 1.5 (all routes)	Share of household budget spent on leisure air travel.	Price of air travel. Price of tourism abroad. Price of domestic tourism. Total expenditures on leisure.	Analysis of leisure travel demand elasticities in the United Kingdom. Estimated that domestic leisure market has income elasticity of 0.6. Elasticity with respect to air fare changes is inelastic. The cross-price elasticities in the air travel equation were relatively large compared to the value of the own-price elasticity. The finding of a relatively low aggregated market own-price elasticity is not inconsistent with some relatively large own-price elasticities which are estimated from route-specific data where low cost airlines have been successful in attracting large volumes of traffic by offering low fares.
Wei and Hansen – An Aggregate Demand Model for Air Passenger Traffic in the Hub-and-spoke Network (2006)	Price: -0.899 Income: -0.361 Frequency: 1.187 (airline by route) 0.265 (airline average among routes)	Total connecting passengers in a hub and spoke network	Airline service frequency (by route), aircraft size, number of spokes, average airline frequency (average among all routes), average fare, average flight distance for all connecting passengers, total local passengers, total passengers starting at a specific spoke, total income, aircraft arrival capacity at the hub airport	Using data specific to domestic connecting passengers at major hub airports in the U.S., Wei and Hansen estimate an inelastic own-price elasticity for connecting air travelers. The authors' findings are specific to hub-and-spoke networks and provide guidance to airline route planners, particularly with respect to the elastic effect of increasing flight frequency over airport capacity.

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
Hofer, Windle, and Dresner – Price Premiums and Low Cost Carrier Competition (2007)	N/A	Airfare	Passengers (fitted), distance, tourist route, slot route, HHI, LCC competition, circuity, load factor, airline cost	Authors examine air travel price premiums (price markups due to firm domination and concentration at the airport and route level) and the effect of low cost carrier concentration on price premiums. Analysis was conducted on top 1000 U.S. domestic O/D pairs based on traffic, for all four quarters in 1992, 1997, and 2002. Results show that the largest component of price premiums are from airport market share and concentration, while route concentration and firm domination played a much smaller role. LCC concentration has a strong effect to reduce premiums on legacy or non-LCC carriers in the same airport/route market.
Bhadra and Kee – Structure and Dynamics of the Core US Air Travel Markets: A Basic Empirical Analysis of Domestic Passenger Demand (2008)	Price: -0.10 to -1.80 Income: 0.05 to 0.65	Daily passenger flow for OD markets	Nominal one-way fare, personal income, population and distance	Analyzed U.S. domestic air travel markets by density (number of passengers per day) segment to determine the effect of post-2001 airline restructuring on air travel demand elasticities. Findings show that elasticities are dependent on market segment passenger density, with markets with greater than 100 passengers/day being price fare elastic, while less-dense markets are fare inelastic. Bhadra and Kee use a gravity model framework to estimate the elasticity results by employing non-stop distance.
Gillen – International Air Passenger Transport in the Future (2009)	No price, income or frequency estimates	International traffic between eight regions	GDP, total trade, connectivity, fuel price, foreign direct investment, dummy for 9/11 and time dummies	Sets out to establish the determinants of air travel growth post-Great Recession, and to what impact these drivers will have on forecasted growth rates. Gillen's research identifies additional growth drivers (beyond traditional metrics such as GDP and population) in international trade, connectivity, and foreign direct investment which will have substantive effects on the future growth of air travel.

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
Richards – The Changing Price Elasticity of Demand for Domestic Airline Travel (2009)	Average Real price elasticity: -0.67 when GDP was used, -0.64 when Non-farm employment was used Average Nominal price elasticity: -0.75 when GDP was used, -0.58 when Non-farm employment was used (Average across the time period 1951-2007)	Revenue passenger-miles	Economic yield, GDP, disposable person income, non-farm employment, time variable and a 9/11 dummy	Attempts to show inelastic price elasticities for air travel since the 1970's, whether or not real or nominal data is used. Estimates are based on a log-log first differenced model. Results show a clear decline in own-price elasticity since 1951, with the estimates from the 1970's onward falling below the average over the whole period. Richards links these findings to product life-cycle theory, where strong initial growth of a product gradually tapers off to a reduced long-term growth rate, or in this case, elasticity of demand for air travel.
Chi, Koo, and Lim – Demand Analysis for Air Passenger Service in U.S. City-Pair Markets (2010)	Price: -1.22 to -3.30 Income: 0.79 to 1.43	Total O&D passengers for a given route	Average airfare per passenger-mile, average per-capita personal income, average population, tourism destination dummy, earnings of PST service sectors divided by total earnings in all industries(city pair), flight distance	Using an Instrumental Variables approach on U.S. O/D domestic city-pair air traffic data from 2000 and 2005, the researchers estimated a more than elastic own-price elasticity of air travel demand. Depending on the level of aggregation, estimates ranged from -1.22 to -3.30. Distance was found to be inelastic and have a negative effect – longer distances lead to less traffic. The authors use an innovative variable to identify different price elasticities of non-leisure travel by including the market share of Professional, Scientific, and Technical industries in a city-pair market.
Hofer, Dresner, and Windle – The Environmental Effects of Airline	Uses estimate from Gillen et al.	N/A	N/A	Examines the effect of an air traffic emissions tax on carbon emissions in the U.S. Specifically investigates

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
Carbon Emissions Taxation in the US (2010)	(2004) of -1.15 for price elasticity			an air-automobile substitution effect arising from an increase in air fares as consumers may substitute away from air travel to automobile travel. The authors do not estimate an own price elasticity of demand for air travel, but instead use an estimate from Gillen et al. (2004) of -1.15. Findings indicate that an environmental tax on air traffic emissions are likely to be muted by an increase in automobile traffic as consumers substitute away from air travel, particularly in short-haul markets.
Seetaram – Computing Airfare Elasticities or Opening Pandora's Box (2010)	No elasticity estimates	N/A	N/A	Seetram's paper focuses not on estimating demand elasticities, but provides common sources of error and potential solutions when researchers attempt to compute airfare elasticities. The author focuses on problems relating from not having accurate airfare data, and the difficulties in using other variables as proxies (oil/jet fuel price, for example) for airfare or airline cost data.
Wang and Song – Air Travel Demand Studies: A Review (2010)	Price: -0.30 to -2.00 Income: 0.40 to 2.00	Travel demand (e.g., total passengers)	Varies (economic activity, locational characteristics, quality of airline service, price factors)	Analysis of 115 previous studies on air travel demand published between 1950 and 2008. The authors review the spread of elasticity results from their literature review and discuss the various data sources and econometric methodologies used to derived elasticity estimates.
Bhadra – Disappearance of American Wealth and Its Impact on Air Travel: An Empirical Investigation (2012)	Price: -0.45 Wealth: 0.42	Total enplanements (domestic and international) at U.S. airports	Average fare, household wealth, household worthiness (wealth to income ratio), income, interest rate, and lagged passengers.	The authors attempt to confirm a relationship between household wealth and demand for air travel. Wealth was found to have an impact on demand, as well as average fare and past passenger demand. Results were highly robust and residuals were found to be normal. The Great Recession was estimated to have caused demand losses of 730,000 passengers

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
				(calculated from the $17 trillion in lost household wealth). Both wealth and fare are found to be inelastic.
Fouquet – Trends in Income and Price Elasticities of Transport Demand,1850-2010 (2012)	No direct air travel elasticities	Passenger Transport Demand	Average price of passenger transport, income per capita	Estimate the trends in income and price elasticities in the UK historically. Transport demand is aggregated to estimate elasticities (land and air). Income and price elasticities have declined since the mid-1800s. When air transport was introduced, the income elasticities for total transport demand took longer to decline than was seen in historical trends.
Granados, Kauffman, Lai, and Lin – A La Carte Pricing and Price Elasticity of Demand in Air Travel (2012)	Price: -0.25 to -0.71 (a la carte channel) -0.34 to -0.74 (traditional channel)	Tickets sold (specific airline)	Average airfare, dummy to indicate traditional or a la carte distribution channel, time of advanced purchase, dummy for leisure vs. business, OD city-pair dummies, dummies for ticket bundle types and time dummies	Examines the effects of the "à la carte" pricing mechanism employed by airlines. Specifically aims to answer whether or not there are differences in price elasticity of demand between the à la carte pricing mechanism and the more traditional channels (i.e., GDSs and OTAs). The authors estimate price elasticities based on data from a large international airline. Findings indicate that passengers purchasing through the à la carte channel are generally less price elastic than those that use the traditional channels (-0.64 versus -0.66). The authors did find that elasticities varied by market segment and ticket bundle type (i.e., discounted, premium, etc.).
Granados, Gupta, and Kauffman – Online and Offline Demand and Price Elasticities: Evidence from the Air Travel Industry (2012)	Price: -1.03 (overall) -1.33 (offline leisure) -1.56 (Transparent	The number of GDS bookings (U.S. flights)	Average price paid, dummy for type of booking (online, offline, transparent), booking time in weeks before flight, dummy for business vs. leisure, price of the other	Employs a data set containing airline ticket sales from both online and offline channels to estimate the own-price elasticity of demand across these channels. Results from two-stage least squares estimation suggest that, overall, air traffic is approximately unit elastic, with leisure travel being more elastic than business travel. Other results generally showed that purchases from online travel agents were more

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
	OTA leisure) -2.28 (Opaque OTA leisure) -0.34 (offline business) -0.89 (Transparent OTA business) -1.29 (Opaque OTA business)		channel (i.e., online for offline purchase), and dummy for the origin city.	elastic than offline, and that more transparent purchasing options had lower price elasticities due to greater product information available to consumers. 2SLS regression was over identified with stage length, degree of market concentration, and hub operation acting as instruments.
Hüschelrath and Müller – The Value of Bluer Skies: How Much do Consumers Gain from Entry by JetBlue Airways in Long-haul U.S. Airline Markets? (2012)	Price: -0.722 (long-haul) Income: 0.415 (long-haul)	Passengers	Average fare, income, population, unemployment rate, average airport HHI and time dummies	Using non-stop, U.S. O/D long-haul domestic flight data, the researchers estimate the effect of the introduction of JetBlue Airways, a LCC, into existing markets. Part of their analysis included estimating the own-price elasticity of demand for long-haul domestic flights, which they found to be inelastic. Their general findings indicated that the magnitude of the welfare gain due to a LCC entry into a market is dependent on the pre-existing market structure; effects in a monopolistic market were larger than those which were oligopolistic prior to the LCC entry.
Kopsch – A Demand Model for Domestic Air Travel in Sweden (2012)	Price: -0.6653 (Short run business) -0.8683 (Short run leisure) -0.8457 (Short run aggregate)	Departing passengers	Fare, lagged fare, variation in fare due to vacation, price of transportation substitutes, GDP per capita, population, Arlanda airlines share, 9/11 dummy and high speed rail introduction	Examines the short- and long-run price elasticity of demand for air travel in Sweden. Using time series data, the author estimates that the aggregate short-run elasticity is -0.84 and in the long-run -1.13. The author also estimates the cross-price elasticity between air and rail to be positive, the expected results for the two substitutes. Findings corroborate previous results that leisure travelers are more price elastic than business travelers and elasticities are

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
	-1.00 (Long run business) -1.20 (Long run leisure) -1.13 (Long run aggregate)		dummy	larger in the long run.
Clewlow, Sussman, and Balakrishnan – The Impact of High-Speed Rail and Low-Cost Carriers on European Air Passenger Traffic (2013)	Jet fuel price: -1.863 to -2.304 (city pair model) -2.287 to -3.412 (airport pairs) -0.172 to -0.201 (airport level)	Air Traffic (passengers carried)	Jet fuel price (proxy for airfares), GDP, population, density, rail travel times, low cost carrier presence dummy	Using European data, the authors examine the effect of rail travel as an alternative to air travel on the city-pair level. Using jet fuel price as a proxy for airfare, they find that own-price elasticities are more than elastic and consistent with previous estimates of intra-Europe short-haul air traffic. This finding also indicates that, in the absence of more accurate fare data, fuel price may be a reasonable proxy for airfare data in supply or demand modelling.
UK Department for Transport – UK Aviation Forecasts (2013)	Air Fares: -0.6 overall; sectors range from -0.7 to -0.2 Income: 1.3 overall; sectors range from 0.5 to 1.7	Terminal Passengers	Air fares, Income	Elasticities were estimated as part of the passenger, aircraft and emissions forecasts. The elasticities were estimated for the 19 different sectors used in the forecasts, based on destination and traveler type (foreign, domestic, business, leisure, etc.). Income elasticity is estimated to be strongly elastic, while fare elasticity is found to be inelastic. The results were consistent with other elasticity estimates for the UK.
Mumbower, Garrow and Higgins – Estimating flight-level price elasticities using online airline data: A first step toward integrating pricing, demand, and revenue optimization (2014)	Price: -1.32 (median price) -1.97 (mean price) -0.57 to -3.01	Total number of daily bookings for a flight (JetBlue, select markets and dates)	One-way price, dummy for date of seat sale on main competitor, dummy for flights during holiday, dummy for flight departure time,	Using an Instrumental Variables (2SLS) approach on online booking data for JetBlue, the authors estimate an elastic price elasticity of demand at the flight level. Depending on whether the mean or median price was used, the elasticity was estimated at either -1.97 or -1.32 (both elastic). The two instruments used were

Author/Paper	Elasticity Estimates	Dependent Variables	Explanatory Variables	Findings
	(range of estimates based on booking, flight and competitive characteristics)		dummy for advanced booking, dummy for departure day of week, dummy for market	JetBlue's mean price in other markets and the average number of their main competitor's nonstop flights in a market. Elasticities were also estimated based on booking and flight characteristics, as well as for seat sale dates of their competitor. With the exception of tickets purchased 1-2 days before the flight, all elasticity estimates were found to be elastic. The authors note the importance of correcting for endogeneity as not doing so gives biased estimates.

Appendix B – Demand Elasticities for Supply Inputs

The following discussion outlines the underlying theory behind derived demand, specifically how to calculate the elasticity of demand with regard to a supplier input.

The Simple Case:

When the final product is a passenger service (air service) the purchaser of the final product is the passenger and the producer of the product is the airline. There already exists research quantifying a range of elasticities for this final product. We will denote this elasticity of passenger demand with respect to price (air fare) asE_{pax}. The airline combines various inputs to produce the product for the passenger:

- Aircraft capital services;
- Airline labour;
- Fuel;
- Airport services;
- Air navigation services; and,
- Other inputs (e.g., insurance).

The elasticity we seek is the elasticity of demand for airport services with respect to the price of airport services (landing fees). We will denote this elasticity as E_{lf}. The Hicks-Marshall Laws of Derived Demand[111] leads to the simple case that:

$$E_{lf} = Share_{lf} * E_{pax}$$

where $Share_{lf}$ is the share of airport costs in the airline's total costs.[112]

Full case

The complete formula for the Law of Derived Demand is:

$$E_{lf} = Share_{lf} * E_{pax} - (1 - Share_{lf}) * \sigma$$

Where σ is the elasticity if substitution between landing fees and other airline inputs.[113]

---

[111] The Hicks-Marshall Laws are presented with labour as the input, we have adapted the formula for airport services. For additional information on the laws of derived demand see http://www2.econ.iastate.edu/classes/econ521/orazem/Hicks-Marshall_2010.pdf

[112] For $Share_{lf}$we will use the share of landing fees for a specific flight in the costs of that specific flight.

[113] Technically, the formula is more complex with terms for each input and cross elasticities between all the inputs.

In practice, airport economics researchers often assume that there is no substitution between airport services and other inputs, so the simple case is applicable.

It is worth discussing this point, however. Intuitively, if the original state is an airline operating 6 flights per day in a 50 seat aircraft and paying 6 landing fees, and the state were to change to introduce dramatically higher landing fees, then the airline may decide to economise in response to the landing fee increase; the airline may choose to operate 4 flights per day using 75 seat aircraft. In this case, σ is non-zero (in fact, it is negative). There is substitution of capital services (via more expensive aircraft) for airport services.

- In practice, it is not as simple as this.
    - The landing fee is likely to be higher for larger aircraft (weight based landing fees – i.e., there is price discrimination), so the Hicks equation does not apply.
        - It is not clear if anyone has worked out the equation for the case of price discrimination. It might be possible for this to be done if the landing fee price is a continuous function, with number of passengers (quantity) being a reasonable proxy for weight.
        - The effect of weight based landing fees (especially if the rate per 1000 pounds of aircraft weight also increases – as it does at most airports) is to discourage use of larger aircraft. So the effect of the increase in landing fees is attenuated. The airport loses 2/6 of the airlines demand, but perhaps loses only 1/6 of the revenue.
            - A simple way to state this is that the full formula for E_{lf} gets an attenuation factor on σ for this effect, although the pure math of this would be very complex.
    - Aircraft capital services are not continuous but rather lumpy. And capital may be fixed in the short to medium run.
        - So in practice, the airline may not be able to substitute 75 seaters for 50 seaters.
            - Which makes σ zero, or near zero
        - This effect is likely more important for long haul services where an airline with 767-200s in the fleet might not have an alternative widebody, or the next wide body is a huge increase in capacity (e.g., to a 747 or a 777-300) and the economics of such a discreet/lumpy jump is not favorable.

What to do?

Our basic analysis is for short to medium term effects where airlines have an ability to respond to landing fee increases by reducing their operations (the simple case of $Share_{lf} * E_{pax}$)
and a limited ability to respond to landing fee increases by changing their operations to deploy higher capacity aircraft at somewhat lower frequencies.

- As an example, if E_{pax} is -1.5, and $Share_{lf}$ is 10%
  then *doubling* landing fees can be expected to decrease landings by 15%.
  E.g., 6 flights per day being reduced to 5 or weekly service on long haul reduced to 6 per week.

    - This example is for a rather large landing fee increase.
    - For something a 10% increase in landing fees, we would then expect that of 10 airlines with 6 times daily service, one airline would cancel one flight.
  - Note that the demand elasticity in inelastic, but not zero. When the airport increases landing fees, there is a response by airlines, but the net effect is to increase airport revenues.
- In the longer term, the airline response to dramatically increasing landing fees would be more elastic.
  - Demand for airport services would still be inelastic and revenue increasing in response to landing fee increases, but perhaps two of ten airlines would reduce service by one flight per day to times daily.
  - Intuitively we some evidence for this. In the long term, congested airports (LHR) see increases in average aircraft size. This is not necessarily a direct landing fee increase, but congestion can be viewed as an indirect increase in the shadow price of airport services.

We also see landing fee reductions resulting in new services. Assuming airport economics are symmetrical this would reveal that landing fee increases will decrease demand.

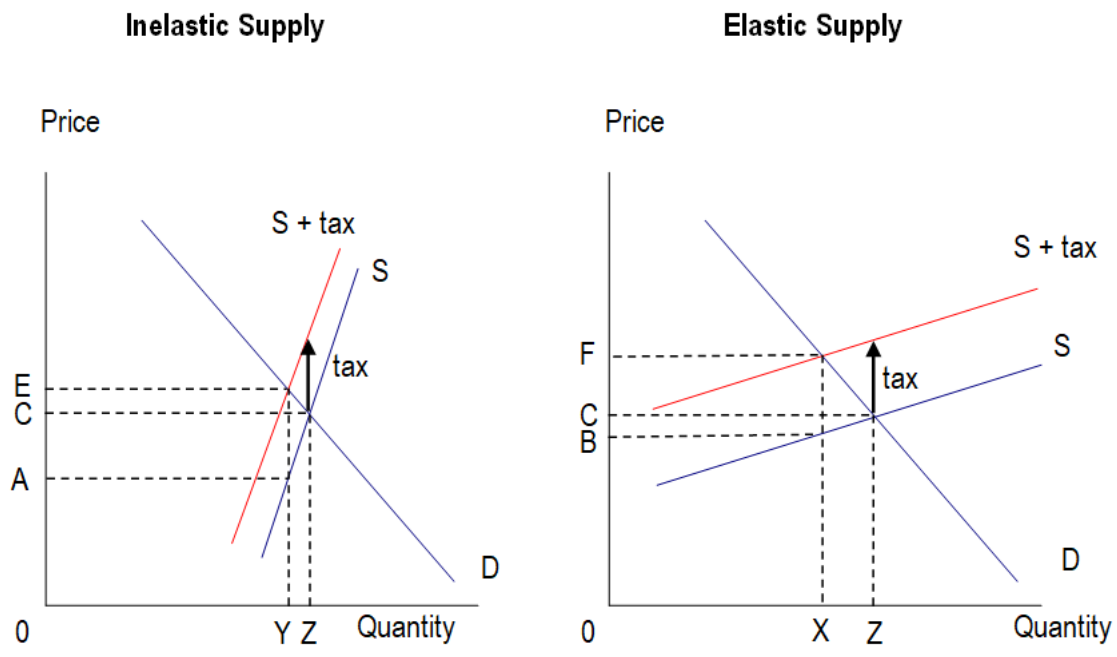
Appendix C – Economic Analysis of the Pass Through of a Charge

Short Term Pass Through of a Tax or Other Charge – Normal Supply

When a tax is imposed on a market, or if costs increases, it affects both the price that consumer pays and the price that supplier receives. If the tax is added by the supplier, as is the case with a surcharge, the portion of the tax borne by the consumer is referred to as the pass-through rate. The key determinants of the pass-through rate in a market are the price elasticity of demand and the price elasticity of supply. If we assume that the price elasticity of demand is exogenous (i.e., the supplier has no influence over the demand curve) then the only factor that influences the pass-through rate is the price elasticity of supply. Specifically, as the price elasticity of supply increases the pass-through rate increases.

To illustrate this concept we will use the following two examples: 1) a market with relatively inelastic supply, and 2) a market with relatively elastic supply. In both diagrams the slope of the demand curve is the same and the magnitude of the tax is the same.

Figure C-1
Diagrammatic Explanation of a Tax Pass-Through



In both the cases, when there is no tax present in the market the equilibrium quantity is 0Z and the equilibrium price is 0C for the consumer and 0C for the supplier. The introduction of a tax shifts the supply curve up exactly by the amount of the tax. In the case with inelastic supply, the tax results in a new equilibrium quantity, 0Y, and the equilibrium price is 0E for the consumer and 0A for the supplier. The amount of the tax is AE. The amount borne by the consumer is CE and the amount borne by the supplier is AC. Since AC is greater than CE, the supplier pays the majority of the tax in this case, and hence the pass-through rate is low. In the case with elastic supply, the tax results in the new

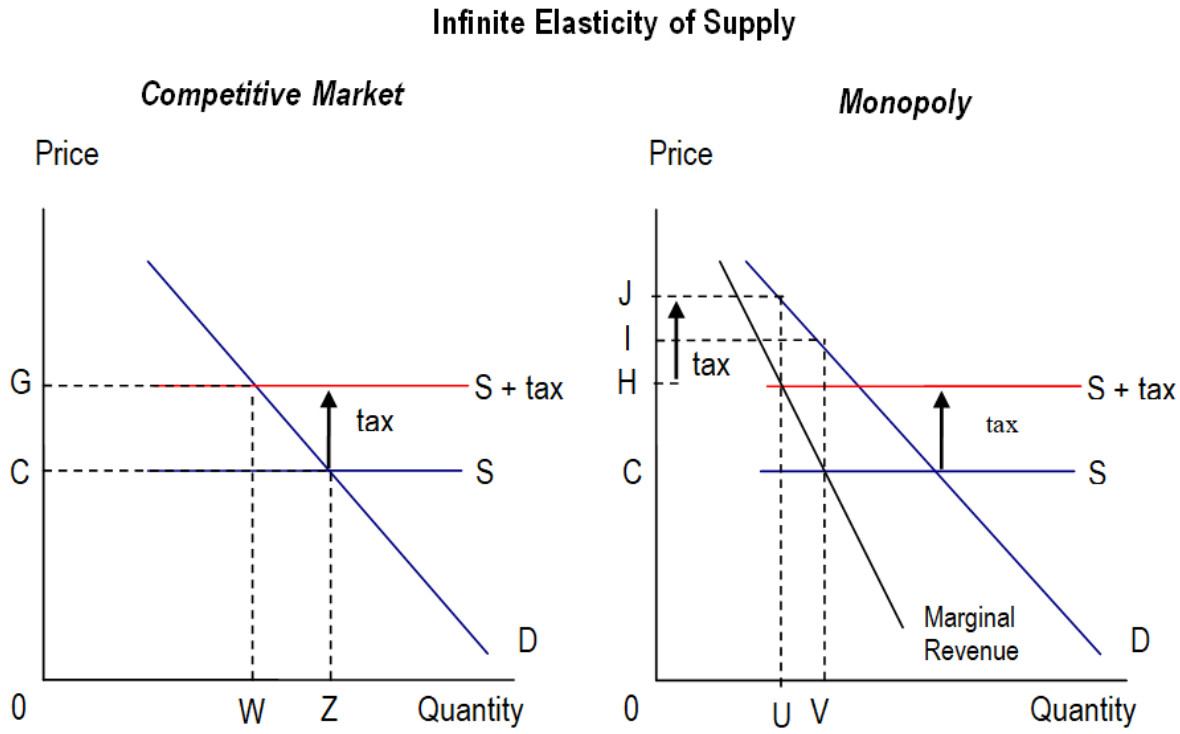
equilibrium quantity, 0X, and the equilibrium price is 0F for the consumer and 0B for the supplier. The amount of the tax is BF (which is the exact same as AE), the amount borne by the consumer is CF, and the amount borne by the supplier is BC. Since BC is smaller than CF, the consumer pays the majority of the tax and hence the pass-through rate is high.

In the short-run industry supply curves are relatively inelastic because firms are committed to certain costs and constrained by existing inputs (labour, capital and land). However, in the long-run all input factors are variable and the price elasticity of supply is typically more elastic. Therefore, when a tax is added by the supplier it is probable that pass-through rate observed in short-run will be less than the pass-through rate that will be present in the long-run. If long run industry cost is constant, then the long run industry supply curve is horizontal (infinite price elasticity of supply).

Short Term Pass-Through of a Tax or Other Charge – Infinite Supply (Constant Returns to Scale)

In the case of infinite price elasticity of supply (as shown in the diagram below), there are two cases that need to be considered; 1) a market with many competing suppliers (competitive market), and 2) a market with one supplier (monopoly).[114]

Figure C-2
Diagrammatic Explanation of a Tax Pass-Through - Infinite Supply



With infinite price elasticity of a supply and a competitive market the equilibrium quantity before the tax is 0Z and the equilibrium price is 0C for the consumer and 0C for the supplier. The tax results in

[114] Infinitely elastic supply can correspond to a case of constant returns to scale in a competitive market.

the new equilibrium quantity, 0W, and the equilibrium price is 0G for the consumer and 0C for the supplier. The amount of the tax is CG (which is the exact same as AE and BF) and the amount borne by the consumer is CG and the amount borne by the supplier is CC (which is zero). Therefore, with infinite price elasticity of supply and a competitive market the entire tax is passed through to the consumer (i.e. the pass-through rate is 100%).

With infinite price elasticity of a supply and a monopoly the equilibrium quantity before the tax is 0V and the equilibrium price is 0I for the consumer and 0I for the supplier. In this case, the equilibrium quantity without the tax is different than that in the other cases because a monopolist has influence over market price and as a result has a downward sloping marginal revenue curve that falls below the demand curve. The equilibrium quantity with a monopoly is less than the equilibrium quantity in a competitive market. In this case, the tax results in a new equilibrium quantity, 0U, and the equilibrium price is 0J for the consumer and 0H for the supplier. The amount of the tax is HJ (which is the exact same as AE, BF and CG) and the amount borne by the consumer is IJ and the amount borne by the supplier is HI. Therefore, even with infinitely elastic supply, we do not observe full pass-through of the tax when there is only one supplier in the market.

A horizontal supply curve is consistent with an industry with constant long-run marginal cost. In a competitive industry (i.e. many suppliers) it is possible for the suppliers to function in a manner similar to a monopolist, through collusion, and thus move away from an equilibrium point where there are zero economic profits to a profitable point. This new equilibrium point will collectively increase supplier profits and the price the consumer pays and result in full pass-through of the tax.

Mathematical Derivation of the Pass-Through Rate of Tax

This section derives the amount of pass-through as a function of demand and supply price elasticities. Supply price elasticities depend upon the nature of marginal cost.

When a market is in equilibrium we have the condition;

$$p_D = p_S \qquad (1)$$

If a tax is added the tax adds a wedge between the price the consumer pays (p_D) and the price the supplier pays (p_S) and we have the new equilibrium conditions;

$$p_D = p_S + t \qquad (2)$$

Equation (2) can be written as;

$$\Delta p_D = \Delta p_S + \Delta t \qquad (3)$$

In equilibrium, even in a market with a tax, the quantity demanded must equal the quantity supplied.

$$Q_D = Q_S \qquad (4)$$

Given equation (3) the following equation must also hold;

$$\frac{\Delta Q_D}{Q_D} = \frac{\Delta Q_S}{Q_S} \qquad (5)$$

The definition of price elasticity of demand is given by;

$$\eta_D = \frac{dQ_D}{dP_D} \times \frac{P_D}{Q_D} \quad (6)$$

Similarly, the definition of price elasticity of supply is given by;

$$\eta_S = \frac{dQ_S}{dP_S} \times \frac{P_S}{Q_S} \quad (7)$$

If we multiply the price elasticities given in (6) and (7) by the percentage change in price they will yield the percentage change in quantity. Based on this we can rewrite (5) as;

$$\eta_D \times \frac{\Delta P_D}{P_D} = \eta_S \times \frac{\Delta P_S}{P_S} \quad (8)$$

Substitute (3) into (8) to get;

$$\eta_D \times \frac{\Delta P_D}{P_D} = \eta_S \times \frac{\Delta P_D - t}{P_S} \quad (9)$$

Substitute (6) and (7) into (9);

$$\frac{dQ_D}{dP_D} \times \frac{P_D}{Q_D} \times \frac{\Delta P_D}{P_D} = \frac{dQ_S}{dP_S} \times \frac{P_S}{Q_S} \times \frac{\Delta P_D - t}{P_S} \quad (10)$$

Multiply both sides of (9) by Q_S (which equals Q_D) and simplify to get;

$$\frac{dQ_D}{dP_D} \times \Delta P_D = \frac{dQ_S}{dP_S} \times (\Delta P_S - \Delta t) \quad (11)$$

Solve for $\Delta P_D / \Delta t$ to get;

$$\frac{\Delta P_D}{\Delta t} = \frac{\frac{dQ_S}{dP_S}}{\frac{dQ_S}{dP_S} - \frac{dQ_D}{dP_D}} \quad (12)$$

Now multiply both the numerator and denominator in (12) by P_S / Q_S (or the equivalent $P_D - t / Q_D$) and simplify to get;

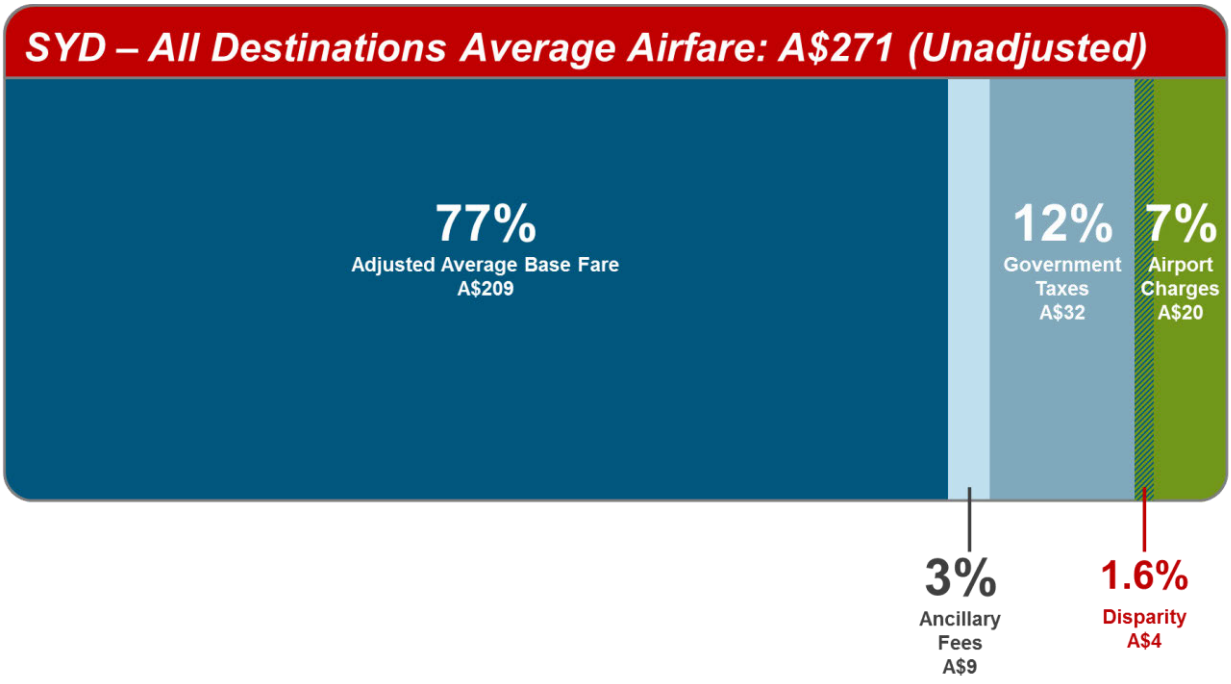
$$\frac{\Delta P_D}{\Delta t} = \frac{\eta_S}{\eta_S - \eta_D} \quad (13)$$

Appendix D – Disparity between Airport Rack Rates and the Fees Appearing on Airline Tickets

In discussions with airports, it is clear that there is a disparity between the charges paid by airlines to airports, and the airport charges shown to passengers on a ticket, presumably to hide the negotiated rate paid by the airline from competitors. An examination of the difference between estimated "rack rate" revenue (annual passengers * public per-passenger airport fees) versus actual aeronautical revenue collected from airlines (reported in the airport annual report) reveals that the disparity is approximately 24.2% for domestic routes and 9.8% for international routes of the Airport Charges category, illustrated in the ticket diagram below (Figure D- 1).

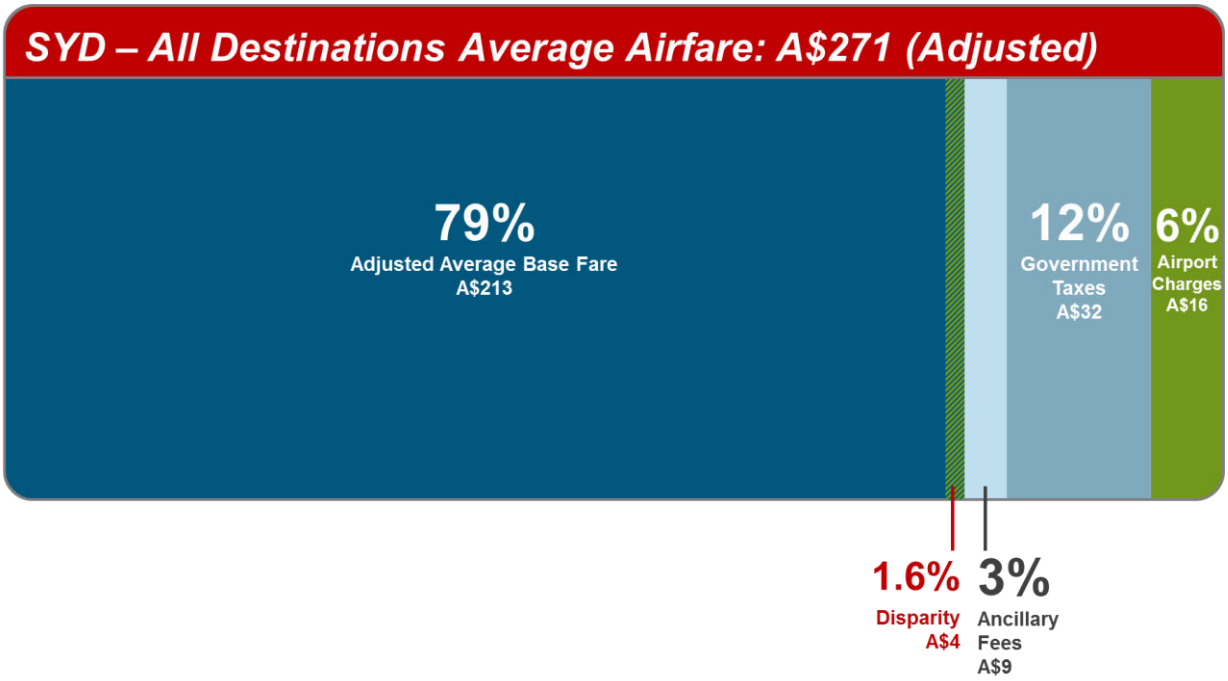
For purposes of this analysis, the disparity share of airport charges has been reallocated to the base fare, in order to accurately represent each category's share of the all-in airfare. Figure D- 2 illustrates this reallocation used in our average airfare analysis in Section 6.

Figure D- 1
SYD-All Destinations Average All-in Airfare
Airport Charges Disparity
2016 Fare data with 2017 Ancillary Fees



Sources: Average Airfare, Taxes & Airport Charges: Sabre 2016 origin-destination passenger & ticket revenue estimates, all destinations. Australian airline fares only, one way, AU-outbound; SYD aeronautical charges & financial data; ITA Software by Google accessed September 2017.
Ancillary Fees: Australian airline websites, Qantas, Virgin Australia, Jetstar, Tigerair Australia.
Airport charges: SYD airport charges and financial data. Government Taxes: 10% GST (domestic routes) residual Sabre Airfare data (international routes).

Figure D- 2
SYD-All Destinations Average All-in Airfare
Airport Charges Disparity Moved to Base Fare
2016 Fare data with 2017 Ancillary Fees



Sources: Average Airfare, Taxes & Airport Charges: Sabre 2016 origin-destination passenger & ticket revenue estimates, all destinations. Australian airline fares only, one way, AU-outbound; SYD aeronautical charges & financial data; ITA Software by Google accessed September 2017.
Ancillary Fees: Australian airline websites, Qantas, Virgin Australia, Jetstar, Tigerair Australia.
Airport charges: SYD airport charges and financial data. Government Taxes: 10% GST (domestic routes) residual Sabre Airfare data (international routes).

Appendix E – Additional Sample All-in Airfare Breakdowns

Domestic Australia – Regional Routes

Brisbane - Mackay

Average All-in Economy Airfare BNE-MKY			
Base Airfare (one way, average of all airlines)	A$	118	
Airline: Baggage Fee (1 checked bag as per JQ)	A$	24	
Airline: Seat Selection Fee	A$	7	
Airline: Meal Fee	A$	15	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
BNE: Domestic Terminal Charge (Departing)	A$	6	Airport Fees & Charges
BNE: Domestic Security Charge (Departing)	A$	2	
BNE: Domestic Passenger Charge (Departing)	A$	2	
MKY: Domestic Passenger Charge (Arriving)	A$	12	12.6%
MKY:Landing Charge (Arriving only)	A$	4	
AU: Federal Goods & Services Tax	A$	14	
Total Ticket Price	**A$**	**203**	

JQ ancillary fees used; represents carrier with most seats

Base airfare includes only QF, VA, JQ, TT fares

Mackay - Brisbane

Average All-in Economy Airfare MKY-BNE			
Base Airfare (one way, average of all airlines)	A$	119	
Airline: Baggage Fee (1 checked bag as per JQ)	A$	24	
Airline: Seat Selection Fee	A$	7	
Airline: Meal Fee	A$	15	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
BNE: Domestic Terminal Charge (Arriving)	A$	6	Airport Fees & Charges
BNE: Domestic Security Charge (Arriving)	A$	2	
BNE: Domestic Passenger Charge (Arriving)	A$	2	
MKY: Domestic Passenger Charge (Departing)	A$	8	11.4%
MKY: Bag Screening Charge (Departing only)	A$	2	
MKY: Security Charges (Departing only)	A$	3	
AU: Federal Goods & Services Tax	A$	14	
Total Ticket Price	**A$**	**203**	

JQ ancillary fees used; represents carrier with most seats

Base airfare includes only QF, VA, JQ, TT fares

Airport Charges as % of All-in Fare	
BNE-MKY	12.6%
MKY-BNE	11.4%
BNE-MKY-BNE	12.0%

Sydney - Wagga Wagga

Average All-in Economy Airfare SYD-WGA			
Base Airfare (one way, average of all airlines)	A$	159	
Airline: Baggage Fee (1 checked bag as per QF)	A$	0	
Airline: Seat Selection Fee	A$	0	
Airline: Meal Fee	A$	0	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
SYD: Domestic Terminal Charge (Departing)	A$	7	Airport Fees & Charges
SYD Domestic Security Charge (Departing)	A$	1	
SYD: Domestic Passenger Charge (Departing)	A$	3	9.0%
WGA Domestic Passenger Charge (Arriving)	A$	6	
AU: Federal Goods & Services Tax	A$	18	
Total Ticket Price	**A$**	**195**	

QF ancillary fees used; represents carrier with most seats

Base airfare includes only QF, VA, JQ, TT fares

Wagga Wagga - Sydney

Average All-in Economy Airfare WGA-SYD			
Base Airfare (one way, average of all airlines)	A$	170	
Airline: Baggage Fee (1 checked bag as per QF)	A$	0	
Airline: Seat Selection Fee	A$	0	
Airline: Meal Fee	A$	0	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
SYD: Domestic Terminal Charge (Arriving)	A$	7	Airport Fees & Charges
SYD: Domestic Security Charge (Arriving)	A$	1	
SYD: Domestic Passenger Charge (Arriving)	A$	3	9.8%
WGA: Domestic Passenger Charge (Departing)	A$	9	
AU: Federal Goods & Services Tax	A$	19	
Total Ticket Price	**A$**	**210**	

QF ancillary fees used; represents carrier with most seats

Base airfare includes only QF, VA, JQ, TT fares

Airport Charges as % of All-in Fare	
SYD-WGA	9.0%
WGA-SYD	9.8%
SYD-WGA-SYD	9.5%

Melbourne - Devonport

Average All-in Economy Airfare MEL-DPO			
Base Airfare (one way, average of all airlines)	A$	135	
Airline: Baggage Fee (1 checked bag as per QF)	A$	0	
Airline: Seat Selection Fee	A$	0	
Airline: Meal Fee	A$	0	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
MEL: Domestic Pax Charge (Departing)	A$	7	Airport Fees & Charges
MEL: Security Charge (Departing only)	A$	0.2	
DPO: Landing Fee (Arriving only)	A$	5	7.5%
AU: Federal Goods & Services Tax	A$	15	
Total Ticket Price	**A$**	**162**	

QF ancillary fees used; represents carrier with most seats

Base airfare includes only QF, VA, JQ, TT fares

Devonport - Melbourne

Average All-in Economy Airfare DPO-MEL			
Base Airfare (one way, average of all airlines)	A$	133	
Airline: Baggage Fee (1 checked bag as per QF)	A$	0	
Airline: Seat Selection Fee	A$	0	
Airline: Meal Fee	A$	0	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
MEL: Domestic Pax Charge (Arriving)	A$	7	Airport Fees & Charges
(DPO does not have departure fees)			4.6%
AU: Federal Goods & Services Tax	A$	14	
Total Ticket Price	**A$**	**154**	

QF ancillary fees used; represents carrier with most seats

Base airfare includes only QF, VA, JQ, TT fares

Airport Charges as % of All-in Fare	
MEL-DPO	7.5%
DPO-MEL	4.6%
MEL-DPO-MEL	6.1%

Sources:
Average Airfares: Sabre Origin-Destination Passenger Estimates, 2016. Qantas, Jetstar, Virgin Australia and Tigerair Australia only.
Airline Ancillary Fees: Airline websites, 2017
Airport Charges: Airport websites and AAA airport charges data file, 2017 (MKY is 2016)
GST: calculated as 10% of airfare and airport charges.

Domestic Australia – Other Domestic Routes

Hobart - Sydney

Average All-in Economy Airfare HBA-SYD			
Base Airfare (one way, average of all airlines)	A$	158	
Airline: Baggage Fee (1 checked bag as per JQ)	A$	24	
Airline: Seat Selection Fee	A$	7	
Airline: Meal Fee	A$	15	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
HBA: Passenger Services Charge (Departing)	A$	13	Airport Fees & Charges
HBA: Passenger Security Charge (Departing)	A$	3	
SYD: Domestic Terminal Charge (Arriving)	A$	7	11.1%
SYD: Domestic Security Charge (Arriving)	A$	1	
SYD: Domestic Runway Charge (Arriving)	A$	3	
AU: Federal Goods & Services Tax	A$	18	
Total Ticket Price	**A$**	**250**	

JQ ancillary fees used; represents AU carrier with most seats

Base airfare includes only QF, VA, JQ, TT fares

Sydney - Hobart

Average All-in Economy Airfare SYD-HBA			
Base Airfare (one way, average of all airlines)	A$	148	
Airline: Baggage Fee (1 checked bag as per JQ)	A$	24	
Airline: Seat Selection Fee	A$	7	
Airline: Meal Fee	A$	15	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
HBA: Passenger Services Charge (Arriving)	A$	13	Airport Fees & Charges
HBA: Landing Charge (Arriving)	A$	7	
SYD: Domestic Terminal Charge (Departing)	A$	7	13.0%
SYD Domestic Security Charge (Departing)	A$	1	
SYD: Domestic Passenger Charge (Departing)	A$	3	
AU: Federal Goods & Services Tax	A$	18	
Total Ticket Price	**A$**	**244**	

JQ ancillary fees used; represents AU carrier with most seats

Base airfare includes only QF, VA, JQ, TT fares

Airport Charges as % of All-in Fare	
HBA-SYD	11.1%
SYD-HBA	13.0%
HBA-SYD-HBA	12.1%

Melbourne - Sydney

Average All-in Economy Airfare MEL-SYD			
Base Airfare (one way, average of all airlines)	A$	168	
Airline: Baggage Fee (1 checked bag as per VA)	A$	0	
Airline: Seat Selection Fee	A$	0	
Airline: Meal Fee	A$	15	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
MEL: Domestic Pax Charge (Departing)	A$	7	Airport Fees & Charges
MEL: Security Charge (Departing only)	A$	0.2	& Charges
SYD: Domestic Terminal Charge (Arriving)	A$	7	
SYD: Domestic Security Charge (Arriving)	A$	1	8.5%
SYD: Domestic Runway Charge (Arriving)	A$	3	
AU: Federal Goods & Services Tax	A$	19	
Total Ticket Price	**A$**	**220**	

VA ancillary fees used; represents AU carrier with most seats
Base airfare includes only QF, VA, JQ, TT fares
MEL Airport charges are for 2015; 2016/2017 charges are not published

Sydney - Melbourne

Average All-in Economy Airfare SYD-MEL			
Base Airfare (one way, average of all airlines)	A$	171	
Airline: Baggage Fee (1 checked bag as per VA)	A$	0	
Airline: Seat Selection Fee	A$	0	
Airline: Meal Fee	A$	15	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
MEL: Domestic Pax Charge (Arriving)	A$	7	Airport Fees & Charges
SYD: Domestic Terminal Charge (Departing)	A$	7	
SYD Domestic Security Charge (Departing)	A$	1	8.3%
SYD: Domestic Passenger Charge (Departing)	A$	3	
AU: Federal Goods & Services Tax	A$	19	
Total Ticket Price	**A$**	**223**	

VA ancillary fees used; represents AU carrier with most seats
Base airfare includes only QF, VA, JQ, TT fares
MEL Airport charges are for 2015; 2016/2017 charges are not published

Airport Charges as % of All-in Fare	
MEL-SYD	8.5%
SYD-MEL	8.3%
MEL-SYD-MEL	8.4%

Melbourne-Perth

Average All-in Economy Airfare MEL-PER			
Base Airfare (one way, average of all airlines)	A$	251	
Airline: Baggage Fee (1 checked bag as per QF)	A$	24	
Airline: Seat Selection Fee	A$	7	
Airline: Meal Fee	A$	15	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
MEL: Domestic Pax Charge (Departing)	A$	7	Airport Fees & Charges
MEL: Security Charge (Departing only)	A$	0.2	
MEL: Domestic Airfield & Infrastructure Charge (Departing)	A$	4	
PER: Airfield Usage Arrival	A$	4	8.2%
PER: Terminal Usage Charge Arrival	A$	14	
AU: Federal Goods & Services Tax	A$	33	
Total Ticket Price	**A$**	**359**	

QF ancillary fees used; represents AU carrier with most seats
Base airfare includes only QF, VA, JQ, TT fares
MEL Airport charges are for 2015; 2016/2017 charges are not published

Perth-Melbourne

Average All-in Economy Airfare PER-MEL			
Base Airfare (one way, average of all airlines)	A$	251	
Airline: Baggage Fee (1 checked bag as per VA)	A$	24	
Airline: Seat Selection Fee	A$	7	
Airline: Meal Fee	A$	15	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
MEL: Domestic Pax Charge (Arriving)	A$	7	Airport Fees & Charges
MEL: Domestic Airfield & Infrastructure Charge (Arriving)	A$	4	
PER: Airfield Usage Departure	A$	4	
PER: Terminal Usage Charge Departure	A$	14	
PER: ACUS Charge Departure	A$	0.05	9.9%
PER: Security Recover Charge Departure	A$	1	
PER: Pax & Bag Screening Charge Departure	A$	6	
AU: Federal Goods & Services Tax	A$	33	
Total Ticket Price	**A$**	**367**	

QF ancillary fees used; represents AU carrier with most seats
Base airfare includes only QF, VA, JQ, TT fares
MEL Airport charges are for 2015; 2016/2017 charges are not published

Airport Charges as % of All-in Fare	
MEL-PER	8.2%
PER-MEL	9.9%
MEL-PER-MEL	9.0%

Sources:
Average Airfares: Sabre Origin-Destination Passenger Estimates, 2016. Qantas, Jetstar, Virgin Australia and Tigerair Australia only.
Airline Ancillary Fees: Airline websites, 2017
Airport Charges: Airport websites and AAA airport charges data file, 2017
GST: calculated as 10% of airfare and airport charges.

International Short/Medium-haul Routes

Gold Coast - Christchurch

Average All-in Economy Airfare OOL-CHC				
Base Airfare (one way, average of all AU airlines)	A$	331		
Airline: Baggage Fee (1 checked bag as per JQ)	A$	46		
Airline: Seat Selection Fee	A$	10		
Airline: Meal Fee	A$	15		
Airline: Other Ancillary Fees	A$	0		
Airline: Fuel Surcharge	A$	0		
OOL: International Terminal Usage charge (Departing)	A$	4	Airport Fees & Charges	
OOL: International Aeronautical Passenger charge (Departing)	A$	6		
OOL: International Security charges (Departing)	A$	2		
OOL: International Baggage Infrastructure charge (Departing)	A$	1		
OOL: International Liquid Aerosols and Gels charge (Departing)	A$	2		
OOL: International CUTE charge (Departing)	A$	0.4		5.8%
CHC: International Airfield Charge (Arriving)	A$	5		
CHC: International Terminal Charge (Arriving)	A$	8		
CHC: International Check-in Hall & Counter charge (Arriving)	A$	1		
AU: International Departure Tax	A$	60		
NZ: Border Clearance Levy	A$	17		
Total Ticket Price	**A$**	**508**		

JQ airline fees used; JQ carries the most OD pax of the AU airlines
Base airfare includes only QF, VA, JQ, TT fares

Christchurch - Gold Coast

Average All-in Economy Airfare CHC-OOL				
Base Airfare (one way, average of all AU airlines)	A$	361		
Airline: Baggage Fee (1 checked bag as per JQ)	A$	46		
Airline: Seat Selection Fee	A$	10		
Airline: Meal Fee	A$	15		
Airline: Other Ancillary Fees	A$	0		
Airline: Fuel Surcharge	A$	0		
CHC: International Airfield Charge (Departing)	A$	5	Airport Fees & Charges	
CHC: International Terminal Charge (Departing)	A$	8		
CHC: International Check-in Hall & Counter Charge (Departing)	A$	1		
OOL: International Terminal Usage charge (Arriving)	A$	4		
OOL: International Aeronautical Passenger charge (Arriving)	A$	6		6.0%
OOL: International Security charges (Arriving)	A$	2		
OOL: International Baggage Infrastructure charge (Arriving)	A$	1		
OOL: International Liquid Aerosols and Gels charge (Arriving)	A$	2		
NZ: Border Clearance Levy	A$	17		
Total Ticket Price	**A$**	**478**		

JQ airline fees used; JQ carries the most OD pax of the AU airlines
Base airfare includes only QF, VA, JQ, TT fares

Total Airport Charges as % of All-in Fare	
OOL-CHC	5.8%
CHC-OOL	6.0%
OOL-CHC-OOL	5.9%

Australian Airport Charges as % of All-in Fare	
OOL-CHC	3.0%
CHC-OOL	3.1%
OOL-CHC-OOL	3.1%

Darwin - Singapore

Average All-in Economy Airfare DRW-SIN				
Base Airfare (one way, average of all AU airlines)	A$	315		
Airline: Baggage Fee (1 checked bag as per QF)	A$	0		
Airline: Seat Selection Fee	A$	0		
Airline: Meal Fee	A$	0		
Airline: Other Ancillary Fees	A$	0		
Airline: Fuel Surcharge	A$	0		
DRW: International Passenger Facilities Charge (Departing)	A$	9	Airport Fees & Charges	
DRW: International Airport Services Charge (Departing)	A$	8		
DRW: Safety & Security Charge	A$	10		
DRW: Liquids, Aerosols & Gels Charge	A$	4		7.8%
DRW: CUTE Charge	A$	0.2		
(No Singapore arrival charges)	A$	0		
AU: International Departure Tax	A$	60		
Total Ticket Price	**A$**	**407**		

QF airline fees used; QF carries the most OD pax of the AU airlines
Base airfare includes only QF, VA, JQ, TT fares

Singapore - Darwin

Average All-in Economy Airfare SIN-DRW				
Base Airfare (one way, average of all AU airlines)	A$	439		
Airline: Baggage Fee (1 checked bag as per QF)	A$	0		
Airline: Seat Selection Fee	A$	0		
Airline: Meal Fee	A$	0		
Airline: Other Ancillary Fees	A$	0		
Airline: Fuel Surcharge	A$	0		
SIN: Passenger Service Charge (Departing)	A$	19	Airport Fees & Charges	
SIN: Passenger Security Service Charge (Departing)	A$	8		
DRW: Safety & Security Charge	A$	10		
DRW: Liquids, Aerosols & Gels Charge	A$	4		7.3%
DRW: CUTE Charge	A$	0.2		
DRW: International Passenger Facilities Charge (Arriving)	A$	9		
DRW: International Airport Services Charge (Arriving)	A$	8		
SN: Aviation Levy	A$	6		
Total Ticket Price	**A$**	**503**		

QF airline fees used; QF carries the most OD pax of the AU airlines
Base airfare includes only QF, VA, JQ, TT fares

Airport Charges as % of All-in Fare	
DRW-SIN	7.8%
SIN-DRW	7.3%
DRW-SIN-DRW	9.9%

Australian Airport Charges as % of All-in Fare	
DRW-SIN	7.8%
SIN-DRW	6.3%
DRW-SIN-DRW	14.0%

Perth - Denpasar

Average All-in Economy Airfare PER-DPS			
Base Airfare (one way, average of all AU airlines)	A$	183	
Airline: Baggage Fee (1 checked bag as per JQ)	A$	24	
Airline: Seat Selection Fee	A$	7	
Airline: Meal Fee	A$	15	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
PER: International Airfield Usage (Departing)	A$	4	Airport Fees & Charges
PER: International Terminal Charges (Departing)	A$	11.8	
PER: International Security & Screening (Departing)	A$	6	7.1%
(No arrival charges at DPS)	A$	0	
AU: International Departure Tax	A$	60	
Total Ticket Price	**A$**	**311**	

JQ airline fees used; JQ carries the most OD pax of the AU airlines
Base airfare includes only QF, VA, JQ, TT fares

Denpasar - Perth

Average All-in Economy Airfare DPS-PER			
Base Airfare (one way, average of all AU airlines)	A$	201	
Airline: Baggage Fee (1 checked bag as per JQ)	A$	24	
Airline: Seat Selection Fee	A$	7	
Airline: Meal Fee	A$	15	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
PER: International Terminal Charges (Arriving)	A$	11	Airport Fees & Charges
(No departure charges at DPS)	A$	0	
			4.1%
IN: International Departure Tax	A$	19	
Total Ticket Price	**A$**	**277**	

JQ airline fees used; JQ carries the most OD pax of the AU airlines
Base airfare includes only QF, VA, JQ, TT fares

Total Airport Charges as % of All-in Fare	
PER-DPS	7.1%
DPS-PER	4.1%
PER-DPS-PER	5.7%

Australian Airport Charges as % of All-in Fare	
PER-DPS	7.1%
DPS-PER	4.1%
PER-DPS-PER	5.7%

Sources:
Average Airfares: Sabre Origin-Destination Passenger Estimates, 2016. Qantas, Jetstar, Virgin Australia and Tigerair Australia only.
Airline Ancillary Fees: QF, JQ, VS, TT Airline websites, 2017
Airport Charges & Aviation Taxes: Airport/government websites and AAA airport charges data file, 2017

International Long-haul Routes

Brisbane - Beijing (via Sydney)

Average All-in Economy Airfare BNE-SYD-PEK			
Base Airfare (one way, average of all AU airlines)	A$	643	
Airline: Baggage Fee (1 checked bag as per VA)	A$	0	
Airline: Seat Selection Fee	A$	0	
Airline: Meal Fee	A$	0	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
BNE: Domestic Terminal Charge (Departing)	A$	7	Airport Fees & Charges
BNE: Domestic Security Charge (Departing)	A$	2	
BNE: Domestic Passenger Charge (Departing)	A$	3	
SYD: Domestic Terminal Charge (Arriving)	A$	8	
SYD: Domestic Security Charge (Arriving)	A$	1	7.2%
SYD: Domestic Runway Charge (Arriving)	A$	4	
SYD: Passenger Charge International Services (Departing)	A$	29	
(No PEK arrival fees)	A$	0	
AU: International Departure Tax	A$	60	
Total Ticket Price	**A$**	**757**	

QF airline fees used; they carry the most passengers of the AU airlines
Base airfare includes only QF, VA, JQ, TT fares

Beijing - Brisbane (via Sydney)

Average All-in Economy Airfare PEK-SYD-BNE			
Base Airfare (one way, average of all AU airlines)	A$	783	
Airline: Baggage Fee (1 checked bag as per VA)	A$	0	
Airline: Seat Selection Fee	A$	0	
Airline: Meal Fee	A$	0	
Airline: Other Ancillary Fees	A$	0	
Airline: Fuel Surcharge	A$	0	
SYD: Passenger Charge International Services (Arriving)	A$	29	Airport Fees & Charges
SYD: Domestic Terminal Charge (Departing)	A$	8	
SYD: Domestic Security Charge (Departing)	A$	1	
SYD: Domestic Runway Charge (Departing)	A$	4	
BNE: Domestic Terminal Charge (Arriving)	A$	7	6.4%
BNE: Domestic Security Charge (Arriving)	A$	2	
BNE: Domestic Passenger Charge (Arriving)	A$	3	
(No PEK departure fees)	A$	0	
CN: International Departure Tax	A$	18	
Total Ticket Price	**A$**	**855**	

QF airline fees used; they carry the most passengers of the AU airlines
Base airfare includes only QF, VA, JQ, TT fares

Total Airport Charges as % of All-in Fare	
BNE-SYD-PEK	7.2%
PEK-SYD-BNE	6.4%
BNE-SYD-PEK-SYD-BNE	6.8%

Australian Airport Charges as % of All-in Fare	
BNE-SYD-PEK	7.2%
PEK-SYD-BNE	6.4%
BNE-SYD-PEK-SYD-BNE	6.8%

Sources:
Average Airfares: Sabre Origin-Destination Passenger Estimates, 2016. Qantas, Jetstar, Virgin Australia and Tigerair Australia only.
Airline Ancillary Fees: QF, JQ, VS, TT Airline websites, 2017
Airport Charges & Aviation Taxes: Airport/government websites and AAA airport charges data file, 201

Prepared by

Inter*VISTAS* Consulting Inc.

Airport Square – Suite 550
1200 West 73rd Avenue
Vancouver, BC
Canada V6P 6G5

Telephone: +1-604-717-1800
Facsimile: +1-604-717-1818

www.intervistas.com