



REPORT

Australian Airports: A Performance Benchmarking Study

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Executive Summary

The Productivity Commission's 2011 report on Australian airports benchmarked the performance of the major airports. It found whilst some Australian airports earned higher profits, their charges and efficiency were within the range of their peers, suggesting that higher profits were a function of greater efficiency. These findings supported the Commission's recommendation to the Australian Government that the light handed regulatory regime should continue.

This study reviews the literature on benchmarking since 2011 which includes studies involving some Australian airports. The approaches taken are highly variable and not all constitute valid comparisons, but in general Australian airports compare favourably with their peers. These studies tend to look at different measures and in some cases are methodologically flawed. Given the Commission's inquiry is strongly directed at identifying abuse of market power in aeronautical services, these studies are likely to be of little policy value as they rarely address the costs and profitability of aeronautical services, rather focussing on whole of airport outcomes.

The benchmarks chosen for this analysis look at four key aspects of the airports: charges, operations, profitability and investment performance. These benchmarks were also used in the 2011 Productivity Commission Inquiry. Data permitting, the top 10 Australian airports were compared to a total of 29 peer airports from a variety of countries, ownership models, and regulatory environments.

This study reaches a conclusion similar to those reached by the Productivity Commission in its 2011 benchmarking review of the five largest airports in Australia. Specifically, compared to their peers around the world, Australian airports' charges remain within the range of their overseas peers. While in 2011, Australian airports' profitability was among the highest in the world, the recent data suggests that is no longer the case. Australian airports are profitable, but now comparable to many of their peers. Australian airport costs are generally also within the range of their peers. The exception is with respect to financing charges, which are high, particularly compared to their non-privatized peers, some of whom received access to land at no cost, receive capital subsidies, and/or tax free access to financing (e.g., U.S. airports). Investment per passenger by Australian airports, averaged over a five year period, is similar or slightly higher than their peers.

Looking to the mid-sized airports in the sample, charges at Australian airports span the range of their peers. It should be noted, however, these comparisons are based on "rack rates" posted by Australian airports and their peers. Most Australian airports discount substantially from their posted rack rates, both for new and existing routes. We lack data on the degree of discounting at the peer airports, but believe that Australian airport discounting is higher and more prevalent than their peers, so the finding of somewhat higher rates at some mid-sized Australian airports may not represent market outcomes.

Following the logic of the Commission's 2011 findings in relation to market power, there is nothing in this study, regarding benchmarking, that should cause the Commission to recommend substantial change to the current regulatory framework.

As with all such studies, the results of this benchmarking exercise (and any benchmarking analysis) should be used with a degree of caution. There are limitations to the results, especially when comparing airports with different business environments and different data transparency. The exercise is still useful as it provides a broader overview of performance, and can help focus on areas where further analysis is needed.

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1 Introduction

The size and importance of Australia's aviation market.

Australia has the seventh largest domestic aviation market globally, measured by one-way seats.¹ However, the six nations with larger domestic markets have much larger populations.² If measured on a seats per capita basis, Australia ranks first in the world, ahead of the United States, Canada, and well ahead of Japan and the rest of the world.³ This highlights the high degree of reliance Australia has on air transportation for economic and social connectivity. This is due both to its geography (long distances between many population centres, and no land borders with other nations) 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.

The 2011 Productivity Commission benchmarking findings.

In 2011, the Productivity Commission released its inquiry report "Economic Regulation of Airport Services," which included a section on benchmarking.⁴ The findings indicated that the major airports in Australia are generally performing within an acceptable range of other airports.⁵ Some Australian airports included in the study earned higher profits, but were found to have fees and charges generally within the range of their peers. It therefore appears that the profits earned by Australia's airports arise from lower costs.

This report provides updated benchmarks for Australia's airports.

Since the 2011 Productivity Commission report, the Australian and global aviation industry has continued to evolve. Australia's airports have experienced significant traffic growth but have also faced large investment needs and new costs associated with security, safety regulations and general inflation. There is therefore merit in reviewing how Australia's airports are performing now, compared to the 2011 review.

This study provides current benchmarks for Australia's major airports in terms of their fees and charges, operating performance, profitability, and investment.

We note that benchmarking of airports is always problematic as there are so many differences between airports. Airports grow at different rates and reach their capacity limits (hence requirement for major investments) at different times. Investment typically cannot be smoothed over the years, and is typically 'lumpy'. Airports operate in different labour and property markets, making cost and productivity comparisons difficult. Airports differ in terms of their traffic mix, which can have profound implications in terms of operating and capital costs. They also face different regulatory regimes – e.g., Australian airports must build facilities that keep arriving and departing international passengers sterile from one another, whereas some peer airports in the Asia Pacific region (such as Singapore) do not have such requirements and thus can build less complicated terminals and enjoy lower capital and operating costs. Some airports must provide air traffic control, policing and/or rescue services themselves, whereas others do not. Some (most) airports operators were gifted the land on which they operate whereas other airport operators (specifically Australia) had to acquire or lease their land and also pay for previous government investment in basic infrastructure. There are a number of airport benchmarking studies, and we report on these, but most of these suffer deficiencies in not being able to control for the key differences between airports. One example is that U.S. airports,

¹ Article appearing in *anna.aero*, 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

² These are the US, China, Japan, India, Indonesia and Brazil.

³ *Ibid.*

⁴ Productivity Commission (2011), "Economic Regulation of Airport Services," Inquiry Report no. 57, Canberra.

⁵ The airports included were Sydney, Melbourne, Brisbane, Perth, and Adelaide.

which are subsidized, received their land at no cost, pay no taxes (indeed some have the power to raise funds by levying property taxes) and have access to tax free bond financing, often are found to perform well on a number of dimensions. But such comparisons generally do not control for the major differences between the conditions and regulations in which individual airports operate. Nevertheless, benchmarking of airport performance can be informative, although findings need to be carefully interpreted.

The primary focus of this report is comparison of airport fees and charges. The report includes a comparative analysis of the *level of charges* at Australia's airports, and how they compare to other airports around the world.⁶ However the fee comparisons do not provide a complete story. A finding that fees at a particular airport are high relative to peers may be due to factors such as major investments made at the airport in a period when peer airports did not face such needs. The benchmark analysis requires a careful review of the environments in which the Australian and their peer airports operate. Thus this report looks at operating performance including costs, profitability and investment.

Outline of this Report.

The remainder of this report is divided into five sections:

- Section 2 provides an overview of the literature on benchmarking;
- Section 3 outlines the benchmarking methodology to be used and the metrics analysed;
- Section 4 is a summary of the peer airports used in the analysis;
- Section 5 is a summary of the benchmark results by airport;
- Finally, Section 6 is a discussion of the benchmarking results and historical analysis.

Appendices are provided regarding the peer airports chosen for this review and some technical details on the computations and comparisons made.

⁶ A companion report, *The Impact of Airport Charges on Airfares*, provides greater detail on fees and charges at Australian airports, and covers the impacts of changes in airport charges.

2 Airport Performance Benchmarking in the Literature

Summary:

While there are a number of benchmarking studies undertaken globally, care must be taken when interpreting the results; benchmarking is not a simple exercise. Common issues include data availability, consistency, and difficulties with determining a perfect set of comparable airports (there will always be inherent differences between airports). In addition, the differences in structure, operation, regulation, etc. should be taken into account when interpreting the overall results.

This section provides a brief review of the literature on airport benchmarking work since the 2011 Productivity Commission (Commission) report. Our review includes studies that benchmark Australian and other airport performance, as well as recent work addressing theoretical or practical issues related to airport benchmarking in general.

2.1 Airport Benchmarking Studies

There are a number of studies which benchmark different aspects of airport performance.

- Airports Council International, for example, has an annual benchmark programme ranking airports based on service quality (ACI Airport Service Quality (ASQ)). The airports included in the benchmark are voluntary and ranked based on the results of passenger surveys.⁷
- LeighFisher produces two annual benchmark studies; one study focuses on airport charges (Review of Airport Charges) and the other benchmarks airports based on different financial and operational metrics (Airport Performance Indicators).⁸ These studies provide benchmarking on specific aspects of airports, looking at partial indicators for comparison rather than a holistic view of the airports. Sydney was the only Australian airport included in the most recent charges benchmarking report, and was ranked 14th out of the 50 airports included.^{9,10}
- There is a global benchmark of airport productivity and efficiency put forward by members of the Air Transport Research Society (ATRS). This annual study compares over 200 airports worldwide and measures performance in terms of partial productivity, cost competitiveness, and financial performance while also developing a total productivity index to make overall comparisons (Merkert et al., 2012). However, it is our view that the methodology is fundamentally flawed and has no basis in economic theory (Kincaid and Tretheway, 2009). One of the most egregious methodological errors is that the study seeks to estimate a variable cost function; however, such a function can only be estimated if there is a measure of the airport's capital stock – but ATRS has no measure of capital. Controlling for the level of capital is a critical aspect of estimating a variable cost relationship. Failing to do this can (will) result in a finding of inefficiency for an airport which in fact is variable cost efficient but which has a non-optimal level of capital for its current traffic level. Our view is that any findings

⁷ Additional information on the benchmarking programme is available at <http://www.aci.aero/Customer-Experience-ASQ/Homepage>

⁸ LeighFisher (2017), <http://www.leighfisher.com/discover-whats-new/reports-purchase>

⁹ LeighFisher (2016a), p. 4.

¹⁰ We note that LeighFisher has prepared bespoke reports for Australian airports in the past that have been provided to and cited by the Productivity Commission as authoritative (and as such we have used them here), see Productivity Commission (2011, p.55).

based on the ATRS study or its data (several studies in the literature make use of this flawed data) should be given no weight. Nevertheless, the results of the most recent study identify Sydney as the most efficient airport in Oceania for the seventh year in a row (Roddey, 2017; Sydney Airport, n.d.).

There are also benchmark studies done at the country level, either in aggregate for the country or for individual airports within a country.

- An example of the latter (and specific to Australia) is the Australian Competition and Consumer Commission's (ACCC's) Airport Monitoring report. This is an annually updated review of the larger Australian airports. The ACCC's most recent price and quality-of-service assessment of Australia's four largest airports was released in April 2018.¹¹ The ACCC's analysis only compares performance among the largest four airports, based on Key Performance Indicators (KPIs). Brisbane and Perth received a 'good' rating for quality of service (consistent with their rating from the previous year); Melbourne and Sydney received 'satisfactory' ratings (consistent with their revised rating from the previous year, both close to a 'good' rating). Perth received the highest quality of service rating, which the ACCC noted has been increasing over the past three years, tied to investments at the airport (ACCC, 2018). The highest aeronautical profit margin was at Brisbane airport, overtaking Sydney (ACCC, 2018). Perth was the only airport with a decrease in passenger numbers (ACCC, 2018).
- The World Economic Forum provides a periodical ranking of the competitiveness of countries around the world for travel and tourism.¹² They rank countries based on a series of metrics with various weightings to create their ranking. Although airport charges are included in their analysis, it is mixed with other charges and taxes, making any conclusion on the competitiveness of a country based on airport charges difficult. For example, for some countries, charges for air navigation services and rescue/fire services are included, but not for others. Countries differ dramatically in terms of their taxes on air transport, with U.K. taxes being a particularly notorious example. As well, the Forum's index is based only on international charges, and does not take into account how charges are levied domestically.¹³ While it is a useful report to look at the general ranking of a country for travel and tourism, there are difficulties in interpreting the results for airport charges specifically. Australia ranked 7th overall for travel&tourism, but for ticket charges and taxes, it ranked much lower (94th out of 136 countries).¹⁴ As noted though, this ranking does not allow for an accurate comment on airport charges, as it is not clear from the index how much of this is weighted on airport charges versus other government taxes.

2.2 Benchmarking – Theoretical Issues

The Productivity Commission (2011) has well-acknowledged the difficulties in benchmarking airport performance, centred on comparability difficulties across airports, data limitations, and differing methodologies. These issues have been identified by the ACCC as well. We note that the ACCC's commentary, included in the appendices of its 2015-2016 Monitoring Report, appears to be unchanged from their reporting guidelines written in 2009 (no additional updated guidelines appear to be published).¹⁵

Bezerra and Gomes' (2016) literature review on airport performance measurement (PM) echoes the Commission's call for more comprehensive approaches. As previously noted, airport performance

¹¹ Australian Competition & Consumer Commission (2018), <https://www.accc.gov.au/publications/airport-monitoring-reports/airport-monitoring-report-2016-17>

¹² World Economic Forum (2017), <https://www.weforum.org/reports/the-travel-tourism-competitiveness-report-2017>

¹³ World Economic Forum (2017), p. 357.

¹⁴ World Economic Forum (2017), pp. 86-87.

¹⁵ ACCC (2009), "Airport prices monitoring & financial reporting guideline," <https://www.accc.gov.au/publications/airport-prices-monitoring-financial-reporting-guideline>

analysis over the past decade has focused on benchmarking measures of efficiency (e.g., the ATRS and LeighFisher reports). However, airport PM encompasses a broader array of indicators which are often interrelated. By limiting their scope to one or two PMs and, more importantly, by limiting a given PM to one or two rigidly-defined factors, most studies have avoided the inherent complexity involved in any airport business, regardless of how the airport is regulated or owned. Further, the lack of any standardized or systematically defined method to analysing a PM makes it difficult to compare findings across studies. Liebert and Niemeier (2013) agree on this last point, finding it difficult to compare different studies as the “application of different methods and data are likely to affect the results...” (p. 175).

The key issues surrounding benchmarking studies can generally be categorized as follows:

- Airport selection criteria;
- The feasibility of comparability adjustments among the selected set of airports;
- Selection of performance parameters; and
- How to interpret the results.

Airport selection criteria

Any comparison study must appreciate that, by nature, there is a reasonable level of heterogeneity among airports. In regards to selecting peer airports for a benchmarking assessment, recent prescriptions by analysts include:

- Adler et al. (2013) and Assaf and Gillen (2012) – Competitive environment, ownership structure, and economic regulation (and potential combinations thereof) should be considered when devising the list of comparable airports.
- Adler et al. (2013) – Capacity should be considered in conjunction with utilization. This study found that operating costs at highly congested airports are much larger mainly due to employee costs; hence airports with similar capacities but lower utilization should not be placed in the same group.
- Liebert and Neimeier (2013) – Aside from the basic operating characteristics, the authors suggest other aspects such as slot coordination practices and strategic management choices as important when comparing airports.
- Yang et al. (2014) – The selection process may need to consider whether the potential comparable airport engages in vertical arrangements with airlines (as more revenues will be shared).
- Vogel and Graham (2013) – The use of cluster analysis of key performance indicators (KPIs) could be used to help select airport groups for comparative financial and economic performance analysis. Selection of KPIs would require careful consideration, and ideally each KPI should be statistically significantly different in the cluster in order to ensure that the selected airports have distinct performance profiles.

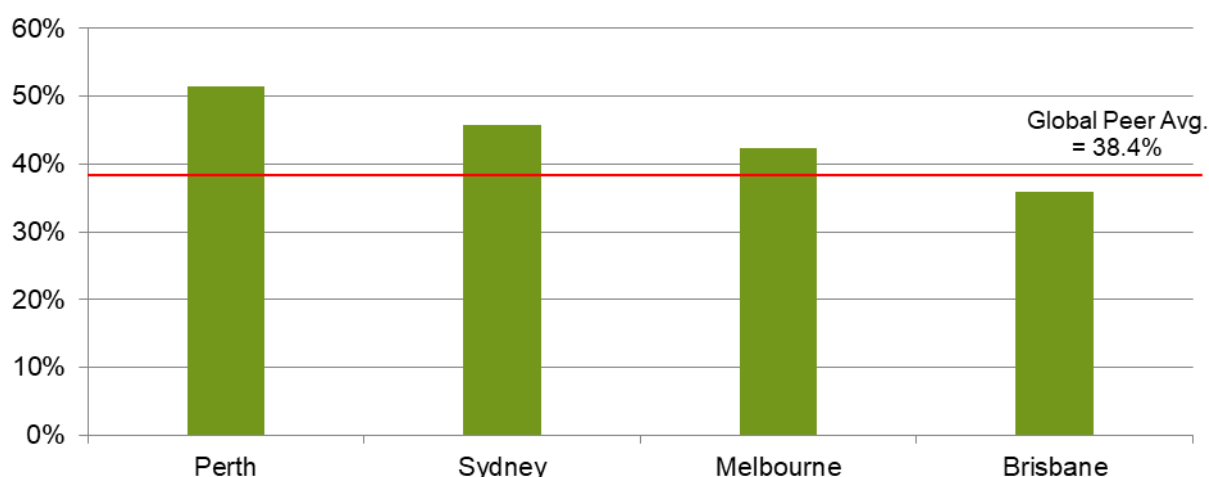
Factoring all of these criteria would likely mean very few airports would be deemed comparable especially between countries. Some degree of discretion would be needed when choosing the criteria based on the availability of comparable airports, though noting this in the interpretation of results then becomes important.

Comparability Adjustments

Even among sufficiently comparable airports, there will be differences in the way each airport is managed and operated. When making international comparisons in particular, a benchmarking analysis can be hindered by substantial variations in the types and levels of services, which services are outsourced, and other characteristics that influence measures of cost efficiency, productivity, or pricing. As an example, airports may have different levels of commercialization. Figure 2-1 shows the

percent of commercial revenue in total revenue for a selection of Australian airports versus the average of 50 airports globally.¹⁶ The Australian airports included tend to have higher levels of commercialization compared to their peers, on average.

Figure 2-1
Commercial Revenue as a percent of Total Revenue
FY 2015



Source: Adapted from LeighFisher (2016b), p. 110.

One solution for comparability defects among the selected pool of airports is to standardize the data in a manner that controls for major discrepancies. For instance, comparability adjustments can be universally applied so that each airport is assumed to undertake a uniform set of activities while outsourcing others (Merkert et al., 2012). The extent to which this is possible depends largely on the quality of data available. Even then, some critics argue that such comparability adjustments will hinder the value of any results since the analysis is no longer based on reality. From this perspective, it would be more effective to benchmark airports as they are and include consideration for comparability defects when interpreting the end results (Merkert et al., 2012).

Methodology and Interpreting Results

The limitations of partial parameters, such as those used in the ATRS report, have been widely documented (for example, see Serebrisky [2012], Merket et al. [2012]). To overcome these limitations, econometric methods and estimation techniques have increasingly been used in scholarly research. Econometric analysis includes stochastic and non-stochastic methods, as well as parametric and nonparametric ones (Serebrisky, 2012). For instance, Data Envelopment Analysis (DEA) is a popular non-stochastic, nonparametric technique to estimate productive efficiency, while Stochastic Frontier Analysis (SFA) is a stochastic, parametric alternative. But like the traditional regression and partial parameter analysis, these more sophisticated methods have their own shortcomings. DEA and SFA, for example, will almost always find the largest airport to be among the most efficient. This is because it seeks to envelop that data points and that means the extreme points become part of the frontier.

The design and selection of performance indicators will dictate the type of conclusions that can be made from the analysis. However, they are often determined based on data limitations. Availability of data remains a crucial issue in airport benchmarking and may lead to biased results in cases where data limitations are not properly controlled for (Liebert and Niemeier [2013], Adler et al. [2013]).

¹⁶ LeighFisher (2016b), "2016 Airport Performance Indicators," p. 110.

2.3 The Impacts of Regulation and Governance

A growing and dynamic field of research exists on the factors that shape airport performance in general. Of particular interest for our analysis is work that considers the role of regulation and ownership. While there are a number of papers which look into the conceptual aspects of regulation and ownership, the focus here will be on the empirical evidence from the research. In general, attempts to empirically measure the impacts of regulation and ownership on airport performance have yielded mixed results. Below we include an analysis of findings related to various indicators of airport performance, with a focus on airport efficiency/productivity and pricing.

Efficiency/Productivity

Productive or cost efficiency is the most common performance metric or output used when measuring the factors that impact airport performance (Bezerra and Gomes, 2016).

Some studies show that certain forms of regulation are more productively efficient than others. Adler et al. (2015) determined that airports under various forms of incentive regulation¹⁷ showed continuously higher levels of short-term productive efficiency when compared to airports under a cost plus regulatory system. Based on a data envelopment analysis (DEA) that estimates production frontiers across 58 airports worldwide, light handed regulation (LHR) corresponded with a 9% increase in productive efficiency relative to cost plus regulation. The LHR data points in this study were predominantly comprised of the major Australian airports.

These results are reinforced from a qualitative perspective in Lohmann and Trischler's (2017) study, which involved interviewing key stakeholders throughout the Australia airports system. The majority opinion among supply-side stakeholders¹⁸ (i.e., executives from airports and major airlines, as well as regulatory officials) was that "LHR is more effective than the previous airport-specific price cap regulation," with most interviewees opposing a return to stronger regulation (Lohmann & Trischler, 2017, p. 35). Further, interviewees from both airports and major airlines expressed that they have good relationships with each other, "considering each other as partners that are dependent upon each other" (p. 35).

Adler and Liebert (2014) empirically analysed the joint impact of competition, ownership and regulation on airport performance. The authors used DEA analysis on a set of airports in Europe and Australia over a period of 10 years. They found that airports under dual till regulation were, in general, more productively efficient than those under single till. But, their analysis also shows that, holding all else equal, unregulated airports were more efficient than their regulated counterparts. This finding was statistically significant for all cases with the exception of a dual-till price cap, where the finding of improved efficiency under this form of regulation was not statistically significant. They noted that when competitive forces (even imperfect ones) already exist in the market, regulation is unnecessary.

However, the literature often instead points to other factors that exhibit stronger or more impactful relationships with productive efficiency than either regulation or ownership. Liebert and Niemeier's (2013) survey of roughly 60 airport benchmarking studies found that, regardless of methodology or scope, these studies consistently reported that efficiency improvements correlated with increases in commercialisation, restructuring, and technological progress, while ownership effects were inconclusive. Serebrisky (2012), using DEA analysis with a focus on Latin American airports, found that private airports were more efficient than public ones; this was only statistically significant under

¹⁷ Incentive regulation includes pure price caps, hybrid price caps, revenue caps, and light handed regulation (LHR). Pure price caps are set independently from the costs of the regulated airport, while hybrid price caps are determined with some consideration toward the airport's asset base. Under light handed regulation (LHR), the regulated airport retains some ability to increase prices, subject to the approval of the regulator. In Australia, the airports and airlines commercially agree upon the level of airport charges. The LHR results from the Adler et al. (2015) study include Adelaide, Brisbane, Melbourne, Perth, and Sydney.

¹⁸ Subject matter academics and a respondent working in aviation consulting were also interviewed.

the assumption of variable returns to scale for the efficiency measure. There were also other factors that impacted efficiency, such as airport characteristics, and these were also statistically significant.

Adler and Liebert's (2014) comparison of 51 European and Australian airports, as well as Assaf and Gillen's (2012) study of the UK airports, found that competition from nearby airports was typically more impactful on efficiency than regulation. Assaf and Gillen (2012) used DEA analysis to look at the impact on efficiency of changes to both ownership and regulation type; based on their analysis, removing regulation provides greater efficiency impacts than privatization. Adler and Liebert (2014) found that under competitive conditions, fully public and fully private airports were almost equally efficient and this was statistically significant under the assumption of no regulation. When regulation was present with potential competition, the impacts on efficiency are either smaller or not statistically significant. This leads to the authors' conclusion that regardless of ownership form, competitive conditions will have an impact on moving airports toward cost efficiency.

Pricing

In their case study of Sydney Airport, O'Donnell et al. (2011) found that gains in efficiency after privatisation came with higher charges. Adler and Liebert (2014) found that of the airports sampled, those which had a 50% share of non-aeronautical revenues or higher also had 15% lower fees (prices) and this finding was statistically significant.¹⁹ Of the types of regulation covered, price cap regulation generally led to higher fees/prices (with the exception of the dual-till in an uncongested airport) and this was statistically significant; the results for other forms of regulation were not statistically significant (Adler and Liebert, 2014).

Nonetheless, these results are far from unanimous. For example, Bilotkach et al. (2012) tested the impact of different regulatory policies and privatization on airport charges using a panel dataset covering 61 European airports over an 18 year period. This panel data econometric analysis differs from cross-sectional analyses performed in many other studies, as the results are determined based on *within*-airport variation, rather than differences across airports.²⁰ In contrast to others' results, Bilotkach et al. (2012) found that:

- Aeronautical charges generally become lower at airports that move toward higher levels of private ownership, and this finding was statistically significant;
- Airports that switch from cost-based to price-cap regulation did not appear to generate lower aeronautical charges; and,
- Single-till regulation appears to lead to lower aeronautical charges, relative to dual-till charges, and while the results are statistically significant, they are not robust among the different model specifications.

The counter-intuitive nature of some of the findings here suggest that when looking at the impact of regulation, there are multiple factors which need to be considered (not just the type of regulation implemented), as well as the methodology and data used.

There is also research suggesting that the issue should not necessarily be the level of prices, but the pricing structure used (Adler et al., 2015). Rather than focusing on whether an airport has higher charges, analysis should also look at how they are charging (i.e., flat landing fee, terminal charges, etc.). Biggar (2012) argues that regulation should focus on structure and not levels; in addition, he suggests a possible reason for the varying results from research into pricing levels is due to the current regulatory practices not achieving the goal of social welfare maximisation.²¹

¹⁹ p.101

²⁰ This is true when the regression contains airport specific indicators (dummy variables).

²¹ The Productivity Commission (2011, pp. 86-88) largely dismissed this as a significant issue.

Other factors of airport performance

Airport performance can also include indicators related to service quality, safety, security, and profitability, among others (Bezerra and Gomes, 2016). These performance indicators are studied far less frequently in the literature than airport efficiency/productivity and pricing. We note below some preliminary findings and difficulties with measuring investment, which was included in the literature:

- Adler et al. (2015) note historical issues of over-capitalization under Rate of Return regulation models (such as in the US). Conversely, the long-term effects of incentive regulation are still unclear.
- Several authors note the inadequacy with which most studies incorporate airport capital, pointing to a lack of clear, consistent, and sufficient data (Liebert and Niemeier [2013], Vogel and Graham [2013], Adler et al. [2013]).

2.4 General Observations

The literature makes clear that benchmarking is not a simple exercise. There are common issues with data availability and consistency. As well, determining a perfect set of comparable airports is a challenging task as there will always be inherent differences between airports. This, however, does not mean that there is no merit in benchmarking exercises; it means that the comparable airports chosen should be reasonably similar, but the differences between them and the implications of these differences should be noted. In addition, the differences in structure, operation, regulation, subsidy, etc. should be taken into account when interpreting the overall results.

The use of benchmarking to evaluate or compare different regulatory types is a difficult exercise. The choice of metric and model can, and has led to different outcomes in the research; this underscores the importance of using suitable models and correctly interpreting results. In its 2011 Inquiry Report, the Productivity Commission noted the case of Ireland, where an attempt was made to use benchmarking for the regulation of the airports under the Dublin Airport Authority; ultimately this attempt was not successful due to criticism of the method when applied to airports (Productivity Commission, 2011). While in theory benchmarking could help the regulatory process, in practice, this has not been the case.

3 The Benchmarking Methodology in This Study

Summary:

The benchmarks chosen for this analysis look at four key aspects of the airports: Charges (prices), operations, profitability and capital performance.

- Charges are benchmarked using rack rates, though there is discounting on rates at the airports. For major airports, international charges are on average discounted by 9.8% and domestic charges are discounted on average by 24%. Outside of Australia, the average discounting present at airports is not known, and thus caution is needed when interpreting results.
- Operations are benchmarked by comparing the cost per passenger of the airports.
- Profitability is benchmarked based on different measures of earnings, and for different areas of the airport business.
- Capital performance was measured on capital spending.

There are a number of limitations to benchmarking, including data quality and availability, regulatory practices, and ownership, among others. As well, when comparing different countries, there will be an impact from the currency conversion used. As such, benchmark results should be interpreted with these factors taken into account, or at the very least, noted.

This benchmarking exercise compares the ten largest airports in Australia to peer airports globally. The following section outlines the performance metrics used, the peer airports chosen and includes commentary on some of the limitations of benchmarking.

3.1 Key Benchmark Metrics

The benchmark metrics chosen for this analysis are based on those used in the 2011 Productivity Commission Inquiry Report. Some metrics have been adapted to better suit the current operations at the airports, while others are updates to the metrics used in the 2011 inquiry, based on more recent data. Whilst it might be desirable to link these into a single overall measure of airport effectiveness, there is no natural or theoretically robust means of doing this. This applies equally to cost, charges, and capital performance indicators. Any indexing would necessarily be arbitrary in terms of the weights to be put on each individual component. Accordingly, we report the individual benchmark results but do not combine into an overall index.

3.1.1 Airport Charges

Globally airports typically charge a complex set of fees, including:

- A weight based landing fee, with the fee per 1000 kg varying for a number of weight blocks. Thus, inferring rack rate revenues would require knowing landed weight on the runways in each of the weight blocks. We know of no airport or government/industry source that reports such rates.
- A terminal fee that may depend on either the number of total enplaned passengers, enplaned originating passengers (excluding enplaned connecting passengers) or total departing seats. The latter can be preferred as it is easier to monitor and audit. Or, some airports charge a fixed fee per gate use, or a fixed daily fee per gate regardless of the number of daily turns.

- Aircraft parking and other fees whose computations require complex information such as number of hours an aircraft is parked above the base allowed hours incorporated into a terminal fee.
- Environmentally based charges based on the noise and/or emissions of aircraft are becoming a common way for charging for runway and airfield usage.

Major Australian airports largely abandoned weight based landing fees for RPT services when price controls were removed in 2002, generally at the request of the airlines, although remain in place for other aircraft operators. The airports moved to a charging structure based mainly on a per passenger charge, that generates the revenue that would otherwise be raised from landing fees and terminal fees. Further, many of the passenger based charges will vary between domestic and international use. We understand that weight based charges are still common practice at smaller, often council owned, airports, but these are not part of our study.

While there are other benchmark reports, such as the annual LeighFisher report on airport charges, there is limited use for this analysis; the LeighFisher analysis only includes one Australian airport (Sydney), and it also includes terminal air navigation charges and airport rescue and firefighting services, but these are not controlled by the airports in Australia. That said, the LeighFisher reports are useful as a comparison for some general results on operations and financial measures.

The airport charges at the Australian airports will be compared to their peers based on a sample of different aircraft providing both domestic and international services.

The aircraft included in the analysis are:

- Airbus A380 (International)
- Boeing 777-300ER (International)
- Airbus A330 (Domestic and International)
- Boeing 737-800 (Domestic and International)
- Bombardier Dash 8-Q400 (Domestic)
- Embraer 190 (Domestic)

This choice of aircraft is somewhat different than that in the 2011 Productivity Commission report to better reflect the key aircraft now used in services to/from/within Australia. In each category of size (seat capacity) and range, one exemplar aircraft type was chosen. Thus the 737-800 is used as an exemplar for other models of the 737 and the A320 family of aircraft.

In addition, the analysis also includes a broad measure of airport charges: aeronautical revenue per passenger. This measure will be computed using both 5 year average exchange rates to adjust revenues in different currencies, and purchasing power parities (PPP), an alternative method for adjusting currencies to make comparisons.²²

There are subtleties though to this metric (aeronautical revenue per passenger). It is important to understand what is included in the charges when comparing across airports. The use of aeronautical revenue per passenger does not easily allow for this; while one airport may have larger aeronautical revenue per passenger than another airport, this does not necessarily mean it is charging high fees that are too high. It may be that the airport with the lower figure is because airlines self-provide some services (such as baggage handling), or the airport with the larger fees may include more services

²² Adjusting for purchasing power parity (PPP) allows for a better comparison across countries as it adjusts to the differences in currencies across countries.

(such as air navigation or security) that in some jurisdictions may be provided by governments or other agencies/companies. The issues with comparison can be mitigated by looking at the charges for a specific aircraft on a specific route, where the differences in charging practices can be more easily compared.

A limitation to the comparison of airport charges for specific aircraft on specific routes is that the comparisons will be based on the airport's published rates. But these may not be indicative of how much airlines are actually paying at each airport. Airports provide discounts on their published 'rack rate' fees & charges:

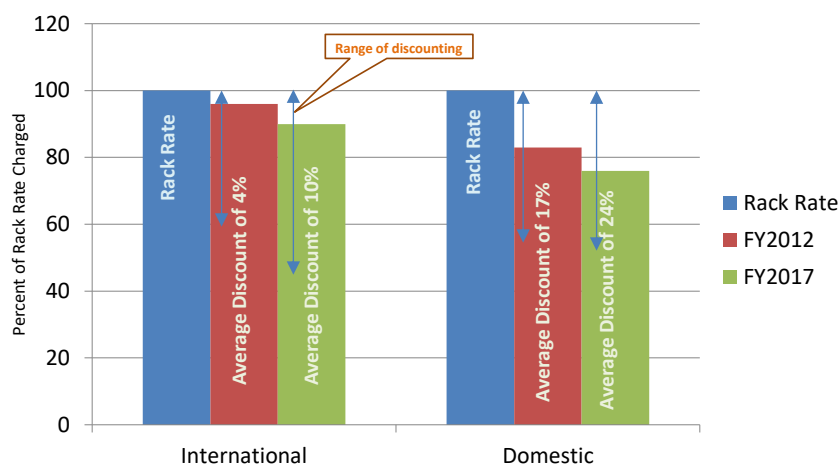
- Temporary discounts to support the establishment of new routes or the expansion (either by increased frequency or larger aircraft) of existing routes – these are more common on international than domestic routes;
- Discounts for total passenger volume delivered by an individual airline or all airlines to the airport – these typically operate on a sliding scale and are more common in the domestic markets; and
- Discounts in the form of penalties for poor service quality or late delivery of infrastructure.

The discounts are generally not transparent and differ by sector (domestic and international).

While we do not have data on individual Australian airports discounting of aeronautical revenues relative to rack rates, the Australian Airports Association has surveyed its members and has advised us that for major airports, international charges are on average discounted by 9.8% (the range being 1.0% to 55%) and domestic charges are discounted on average by 24% (the range being 1.6% to 48%).²³ This can be seen in Figure 3-1.

Figure 3-1
Airport Evolution in Discounting from "Rack Rates"
FY2012-FY2017

Significant and Increasing Discounting



Source: Australian Airports Association

²³ The discounting exercise is based on the practices of the ten largest Australian airports, excluding Canberra. Hobart is excluded from the international average as they do not have any international service in the given year of the analysis.

None of the peer airports provide the detailed set of information that would enable us, or any other benchmarker, to compute the rack rate aeronautical revenue and compare to the actual aeronautical revenue.²⁴ Thus, we cannot enrich our airport fee benchmarks with adjustments for discounting. This in turn implies that caution must be applied when interpreting airport fee benchmarks. We provide the following observations regarding fee benchmarking:

- Based on our experience and a number of interviews with airports, we believe that the degree of discounting is higher for Australian airports than others, but it is present to some degree at an increasing percent of airports globally.
- Most airports today, large and small, offer incentives for new services.
- Some offer incentives for existing services based on quantity discount concepts. The economics here is that a high proportion of airport costs are fixed and thus once an airport's major carriers provide a base of annual revenue, additional traffic does not drive proportional incremental cost and thus a lower fee per unit beyond a base level of traffic can be rationalised. This also means that airport fee schedules do not need to be adjusted annually, as these types of quantity discounts will constrain airport revenue growth.
- We are aware of discounting at some North American airports beyond incentives, although some city government operated airports in the U.S. may be constrained from discounting beyond incentives for new services.
- In Europe, we are advised that fee discrimination is prohibited by the European Commission regulations. However, many airports do offer incentives for new services and some airports do seem to have broader discount policies. These might not be transparent but are equitably available to carriers and non-discriminatory in that sense.

To address this intractable issue, first, we provide airport fee benchmarks for selected aircraft types on specific routes based solely on rack rates. Second, we note that these comparisons will likely overstate Australian airport charges relative to their peers. Third, we caution that any econometric benchmark based findings that purport to measure market power of airports in Australia likely produce overstated measures of market power, as they are not based on actual fees paid by carriers, but rather on the rack rates.

3.1.2 Operating Performance

There are different ways to measure operating performance. For this exercise, the key metrics are:

- Total costs per passenger
- Operating costs per passenger
- Staff costs per passenger

One issue with these metrics is they include both aeronautical and non-aeronautical costs. This does not allow for a comparison to peer airports on the potential market power in aeronautical services. While data is available to compare the larger Australian airports amongst themselves in terms of aeronautical revenues and costs, the same is not true for comparison to other airports. While data is generally available on aeronautical revenues, cost data is generally not available on a disaggregated level as is available in Australia. While the ideal comparison would be aeronautical costs, this level of data is not available.

²⁴ This would require data on individual flights, in terms of the landed weight of the aircraft, the number of passengers on board, etc.

Total Costs

This metric is meant to provide an overview of the total cost the airport faces for each passenger. The total cost will include operations, labour, and financing. There are limitations to the usefulness of this metric though; namely, costs may vary between airports due to forces outside of management control. Financing costs, for example, will likely be lower for government owned airports, or those which receive government infrastructure grants and/or tax free financing. Any such lower costs are not a reflection of the cost efficiency of the airport, but simply the business environment in which they operate. As well, total costs per passenger, while useful to compare general levels of costs, does not indicate which operation the costs are attributed to. Comparing two airports with different levels of non-aeronautical activity would be problematic, as the costs could be higher due to the additional activity, whilst the aeronautical costs may be the same. This metric has been included in the analysis as it was used in the 2011 Commission Inquiry, though it should be interpreted with a degree of caution.

Operating Costs

The operating costs used in this analysis are total costs less financing costs. Unlike total cost per passenger, operating costs per passenger give a better indication of the level of costs associated with the actual operations of the airport.

Staff/Labour Costs

This metric is meant to assess the overall cost of labour per passenger at the airport. Care must be taken when using this metric though; labour costs can differ by airport depending on the amount of outsourcing undertaken. As well, the general wage levels in the country will have a direct impact on the result. While this metric is useful it is limited by only providing partial information.

3.1.3 Profitability

The metric to measure profitability will be operating profit per passenger. To account for different tax and amortization practices across countries, this will be based on the earnings before interest, tax, depreciation and amortisation figure (EBITDA). If a measure of profitability beyond EBITDA is used (for example, net profit) it would be a move from the underlying economic interpretation to the accounting interpretation. At this point, economic and accounting interpretations deviate in an important way. Taking net profit as an example, this would include accounting adjustments for interest and depreciation (capital costs). From an economic perspective, depreciation measures the reduction of the productive capacity of the asset, but from the accounting viewpoint, it would be a measure of cost of the asset that is attributable to the current use. As well, while it is common practice in accounting to calculate depreciation in a linear fashion ("straight-line"), the fall in the value of an asset from an economic viewpoint is more likely geometric.²⁵ As the focus of this analysis is economic and not accounting, EBITDA is the chosen metric. For comparative purposes, we have also included EBIT per passenger as a measure of profitability.

An additional metric, the return on capital employed, is also included, though only for the four largest Australian airports. The analysis is from LeighFisher (2016b), but summarized to focus on the Australian airports. Return on capital employed provides a comparison of profitability based on the capital base (including debt) of the airports. This is interesting to compare across private versus public airports. There are subtleties to this metric though, as factors such as capital structure can influence the overall comparative results.

3.1.4 Investment

The investments (capital performance) of an airport need special attention when comparing to other airports. The capital cycle of an airport needs to be taken into account, as many capital projects for an

²⁵ This would mean that rather than depreciating an asset by the same amount each year, it would be more tied to the usefulness of the asset itself. There are different methods of calculating depreciation such as double declining balance or declining balance.

airport have a long life cycle (20 years or more for some major investments). To measure the capital performance of the airports, the metric chosen is capital expenditure (CAPEX) per passenger. Given the previously stated issue around the capital cycle, this metric will be based on the current year and an average of multiple years where the data is available.

3.2 Limitations

Benchmarking can be a powerful evaluative tool but it has some limitations that need to be recognised.

- In Malaysia, airport charges currently are set exclusively by a benchmark of airport fees at peer airports (largely neighbours in Southeast Asia, but also selected airports in Australia and elsewhere). The result is a set of “competitive” charges that fail to cover costs, and which also provide some undesirable incentives to carriers on efficient resource use.
- In Ireland, the Irish Aviation Regulator attempted to set benchmarks for each component of airport costs and to link allowed revenues to these, but ultimately the policy was abandoned for a number of reasons, in part due to unique differences between airports.
- A number of airport benchmarks are publicly or privately available, but many of these suffer from a number of flaws.
 - The predecessor of the airport service quality index of customer service was administered by airlines, not airports, and included results on airports where no surveys were conducted. A second version of the ASQ, administered by a private company on behalf of Airports Council International (ACI), did not conduct random sampling. Some airports planned activities on the day (such as having live music in the terminal, scheduling high frequency cleaning of washrooms, adding extra customer service staff, etc.) and the airports would self-survey and report results to ACI. The ASQ today is much better constructed and administered, although it continues to be voluntary.
 - A number of benchmarks of airport charges fail to recognize that in some countries airports are subsidized, with a combination of operational subsidies, capital subsidies and/or free access to land.

Other issues arise with benchmarks, such as comparing airport operational costs of nations with extremely low wage rates, low construction standards and limited environmental regulation, to airports in high wage countries, such as Australia.

While care was taken when choosing the peer airports for each of the 10 Australian airports, there are still some differences that should be noted. One is the inclusion of the U.S. airports in the peer group; the U.S. airports, while similar in size, operate in a very different business environment than the Australian airports. They are publicly owned, have access to substantial public infrastructure funding,²⁶ and have access to tax free debt financing. This means that while there is merit in including airports from the U.S., caution must be taken when directly comparing the benchmark results as funding is different for the airports. U.S. airports did not purchase their lands and do not pay either rent (lease payments) or property taxes. In general, we expect U.S. airports to have lower costs and thus fees due to the government benefits available to them.

As well, one of the key issues with benchmarking is the availability and quality of data. As the peer airports are from a global set, there will be different levels of data available publicly. Ownership of an airport will have an impact on the availability of financial data, and different accounting practices means that direct comparison of financial figures could be difficult. For airport charges, there are

²⁶ The U.S. has an Airport Improvement Program, financed by the Aviation and Airways Trust Fund. The fund is partially financed by a tax assessed on airline tickets and partially by a contributions from the U.S. General Fund.

some limitations to comparing the listed charges for airports. As the set of airports have differing business environments, climates, service offerings, mix of traffic, and capacity issues (among others), additional consideration is needed when interpreting the results.

Another issue when making international comparisons is the use of exchange rates. As shown in Table 3-1, the choice of exchange rate can have an impact on the outcome of the results in some cases. The benchmarking reports noted in the literature review use a variety of exchange rates. The ATRS report uses Purchasing Power Parity (PPP) rates, Leigh Fisher reports their findings using a Special Drawing Rights (SDR) conversion, and others use currency exchange rates. The analysis done in this report uses the five-year average exchange rate from the Reserve Bank of Australia,²⁷ but we also provide a comparison based PPP to show whether the key findings are sensitive to the exchange rate.

Table 3-1
Exchange Rate Comparison

Type	2012	2016	Ratio
Annual Exchange Rate (AUD/USD)	0.97	1.35	1.39
PPP Exchange Rate	1.54	1.47	0.95
AUD/SDR Rate	1.48	1.87	1.26

Source: InterVISTAS Analysis using Pacific Exchange Rate Service, IMF, and OECD Statistics

These various limitations do not negate the usefulness of the benchmarking exercise for the Australian airports, but simply cautions the reader from relying solely on the measures. It is important to understand the business environments that the airports operate in, which can impact the ultimate performance of the airport. For example, when comparing charges at two different airports, having a higher level of landing fees at one airport does not necessarily mean it is more expensive to land at that airport, as the comparator airport may have much larger terminal fees. The benchmarking exercise provides a broader overview of performance, and can help focus on areas where further analysis is needed.

²⁷ See Section 5 for additional analysis on the impact of exchange rates.

4 Peer Airports

The peer airports have been selected on the basis of their traffic profile in comparison with the 10 Australian airports, including passenger mix, freight, and aircraft movements. As well, the peer airports cover a number of countries, ownership and regulatory categories. The airport ownership types include: private, public, not-for-profit, and a variety of mixed public/private models; the regulatory models range from stronger forms of regulation (such as price and revenue caps), to lighter forms of regulation (including monitoring and benchmarking), to no set regulations.

While care has been taken to match the airports as closely as possible, there are characteristics of some airports that are difficult to replicate exactly. Table 4-1 provides the list of peer airports, as well as select characteristics of the airports. While initially there were more comparator airports considered for this analysis, due to data limitations they have not been included. One such limitation is the problem of consolidated airport accounts; this happens when airports are owned and/or operated by a common group. If unconsolidated financial data is not available those airports are excluded from financial comparisons. In addition, some airports may not report financials to enough detail for certain metrics to be calculated, and such cases those airports are not included when specific metrics cannot be calculated.

Table 4-1
List of Peer Airports

Airport	Country	E/D Passengers (Millions)	International (Millions)	Domestic (Millions)	Regulation Type	Ownership Type
Sydney	Australia	39.7	13.7	25.9	Prices monitoring	Private
Toronto Pearson	Canada	41.0	25.2	15.9	None	Not-for-Profit
Kuala Lumpur	Malaysia	48.6	34.4	14.2	Benchmark	Public
London Heathrow	United Kingdom	75.0	69.8	5.1	Price Cap	Private
Singapore	Singapore	54.8	54.8	0.0	Revenue Yield Cap	Public
Miami	United States	44.4	21.2	23.1	Government Ownership	Public
Melbourne	Australia	33.0	8.77	24.2	Prices Monitoring	Private
Boston Logan	United States	33.4	5.53	27.9	Government Ownership	Public
Bangkok Don Mueang	Thailand	30.2	9.08	21.1	None	Public
Zurich	Switzerland	26.2	25.6	0.59	Light Handed	Mixed/Public
Brisbane	Australia	22.1	5.16	17.0	Prices Monitoring	Private
Manchester	United Kingdom	23.1	20.7	2.39	None	Mixed/Public
Vancouver BC	Canada	20.3	10.0	10.3	None	Not-for-Profit
Dublin	Ireland	24.9	24.9	0.1	Price Cap	Public
Osaka Kansai	Japan	23.2	16.3	6.96	None	Concession
Perth	Australia	13.8	4.18	9.63	Prices Monitoring	Private
Luton	United Kingdom	12.3	11.3	0.95	None	Public
Chennai	India	14.7	4.74	9.97	Price Cap	Public
Hamburg	Germany	15.6	10.27	5.32	Price Cap	Mixed/Public
Auckland	New Zealand	15.8	8.41	7.42	Prices Monitoring	Mixed
Adelaide	Australia	7.81	0.87	6.94	None	Private
Toulouse	France	7.63	3.18	4.45	Price Cap	Mixed/Public
Cleveland	United States	8.12	0.18	7.93	Government Ownership	Public
Christchurch	New Zealand	6.09	1.48	4.61	Prices Monitoring	Public

Airport	Country	E/D Passengers (Millions)	International (Millions)	Domestic (Millions)	Regulation Type	Ownership Type
Gold Coast	Australia	6.02	0.94	5.08	None	Private
Wellington	New Zealand	5.80	0.90	4.90	Prices Monitoring	Mixed
Naples	Italy	6.14	3.72	2.42	Price Cap	Mixed/Private
Cincinnati OH	United States	6.32	0.25	6.06	Government Ownership	Public
Cairns	Australia	4.56	0.57	3.99	None	Private
Trondheim	Norway	4.30	0.96	3.35	None	Public
Palermo	Italy	4.89	1.00	3.89		Public
Ottawa ON	Canada	4.66	1.17	3.49	None	Not-for-Profit
Canberra	Australia	2.80	0.00	2.80	None	Private
Hobart	Australia	2.19	0.00	2.19	None	Private
Darwin	Australia	2.16	0.34	1.81	None	Private
Tulsa	United States	2.82	0.00	2.82	Government Ownership	Public
Belfast City	Northern Ireland	2.69	0.17	2.52	None	Private
Cork	Ireland	2.07	2.07	0.00	None	Public
Halifax	Canada	3.70	0.66	3.04	None	Not-for-Profit

Source: 2015 Data from WATR Report, ACI World
Note: E/D passengers does not include transit passengers.

5 Benchmark Results for Australia's Airports

Summary:

The main conclusion for the operating performance metrics for the four largest airports was that, on average, the comparisons for the Australian airports are within the range of their international counterparts. While in 2011, Australian airports' profitability was among the highest in the world, the recent data suggests that is no longer the case. Australian airports are profitable, but now comparable to many of their peers. Australian airport costs are generally also within the range of their peers. The exception is with respect to financing charges, which are high, particularly compared to their non-privatized peers, some of whom received access to land at no cost, receive capital subsidies, and/or tax free access to financing (e.g., U.S. airports). With regard to investment, on a five year basis the Australian airports invest at the average per passenger or somewhat above their peers.

Looking to the mid-sized airports compared to their peer airports, Australia's airports range all the way from the highest to the lowest charges relative to their peers. It should be noted, however, these comparisons are based on "rack rates" posted by Australian airports and their peers. Most Australian airports discount substantially from their posted rack rates, both for new and existing routes. We lack data on the degree of discounting at the peer airports, but believe that Australian airport discounting is higher and more prevalent than their peers, so the finding of somewhat higher rates at some mid-sized airports needs to be tempered.

Also of note is the global comparison of airport and airline returns. While historically airlines have failed to earn their cost of capital, in comparison to other members of the aviation value chain (including airports), this trend has changed in recent years. Airlines are now covering their cost of capital, and globally, airport returns are somewhat lower than airlines (on average).

This section provides an overview of the general results from the benchmarking exercise for Australia's airports versus the average of the peer airports included in the analysis. As noted in Section 3, there were certain data limitations for some peer airports for a selection of the metrics, and some metrics will have more comparator airports than others.

As this analysis is a partial update to the 2011 Productivity Commission inquiry report; for the airports included in both the 2011 inquiry and this analysis, it would be prudent to look at whether or not the results differ (either positive or negative changes). This comparison can be done for the five larger Australian airports included in the 2011 report.²⁸ The results of this benchmark exercise are similar to the results of the 2011 Commission Inquiry report based on operating performance.

As the choice of aircraft is different for this analysis and the analysis done for the 2011 report, comparison of that metric would be difficult to interpret, though the overall results are still similar.²⁹ Australia's airports do not have the highest charges in comparison to their peers, but they also do not have the lowest charges of their peers; the Australian airports are overall within range of their peers.

It was noted in the 2011 review that "Australian airports' aeronautical charges, revenues, costs, profits and investment look reasonable compared with (the mostly non-commercial) overseas airports."³⁰ This report reaches the same general conclusion with respect to the Australian airports considered in the 2011 report, especially given some peer airports are subsidised, or may have a single till regulatory scheme.

²⁸ Those airports are Sydney, Melbourne, Brisbane, Perth, and Adelaide.

²⁹ The choice of aircraft differs from the 2011 report due to changes in fleet mix since 2011.

³⁰ Productivity Commission (2011), "Economic Regulation of Airport Services," Inquiry Report no. 57, Canberra, p. xx.

5.1 Airport Charges – Top 5 Airports

For this benchmark, charges from the Australian and peer airports were collected and assessed based on a selection of aircraft types and operating assumptions (see Section 3.1.1). All assumptions are itemised in Appendix B and airport codes are in Appendix D. It is important to note that the airport charge comparisons are based on the “rack rates” (i.e., the rates and charges published publicly on the airport’s website). While we have data available on the aggregate level of discounting at major Australian airports, we do not have the same information for individual Australian airports or the peer airports (or their jurisdictions).³¹ As such, we compare the published rates of the airports, but note that the inclusion of discounts could lead to different comparative ranking.³²

Based on industry discussions and industry knowledge, Inter VISTAS believes that the magnitude of rate discounting in Australia exceeds that of airports in Europe, North America and Asia. Thus ranking on the basis of rack rates will very likely place Australian airports in a less favourable light than would a ranking based on actual rates negotiated and paid by airlines. Also noted in Section 3, there can be an impact on the results based on the choice of exchange rate. Appendix E includes a summary of the charges for a B777 aircraft but using different exchange rates.

In addition to the assumptions listed in Appendix B, there are additional assumptions for specific airports:

- Melbourne does not have domestic terminal charges included in their rack rates (they are commercially agreed upon), so its charges would be understated for domestic comparisons. The 2015 domestic charge has been used, the last year it was published, and inflated by CPI.
- Osaka has a different passenger charge for adults and children. As there is no estimate for the number of children per movement, we have assumed all passengers are adults. The charges for Osaka would then be overstated, although compared with other benchmark reports Osaka is generally among the higher end of rankings.
- For Singapore, all flights are assumed to be international, as they do not have domestic services.

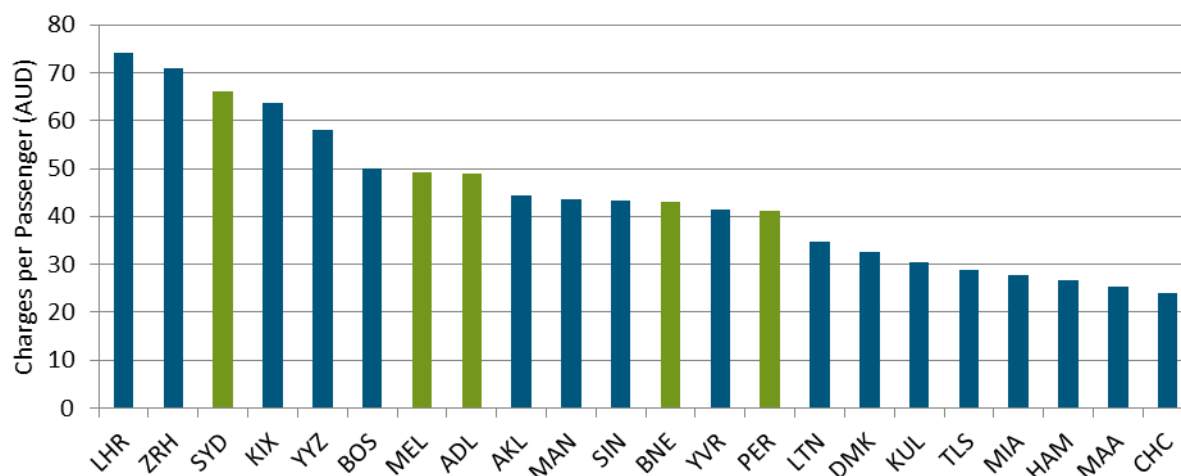
Charges for Specific Aircraft

Among the five largest Australian airports, Sydney has the highest airport charges for international services, while Perth is the most expensive for domestic services when compared to the other Australian airports. Taken together, all of the Australian airports appear to be within the range of their international peers, while never appearing as the highest charges among all airports. Figure 5-1 and Figure 5-2 are the per passenger charges for an A330 aircraft, for international and domestic services, respectively. The results for the other aircraft types are available in Appendix C.

³¹ The charges at other airports can be a complex mix of weight based landing charges as well as terminal charges, and we do not have access to the specific figures needed to estimate the level of discounting outside the Australian airports.

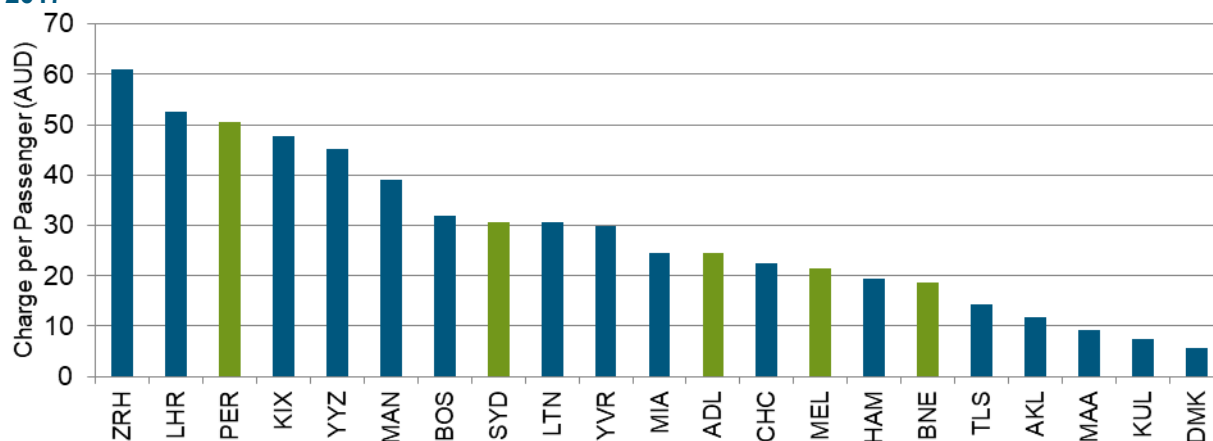
³² Note that for Sydney Airport, all rack rate charges are included (e.g., GPU charges), although they do not charge for all services. For example, the GPU charge is not used for domestic services.

Figure 5-1
Airport Charges for A330 Aircraft (International) – Large Airports
Per Passenger, Excludes Taxes (Turnaround basis)
2017



Source: InterVISTAS Computations based on Airport Charges Schedules
Currencies adjusted using 5-year average exchange rates
Security charges included in calculation

Figure 5-2
Airport Charges for A330 Aircraft (Domestic) – Large Airports
Per Passenger, Excludes Taxes (Turnaround basis)
2017



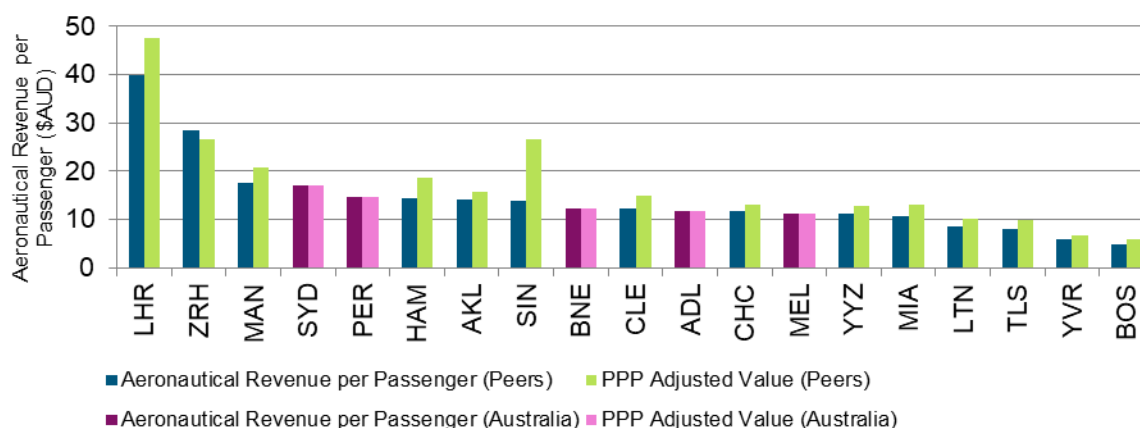
Source: InterVISTAS Computations based on Airport Charges Schedules
Currencies adjusted using 5-year average exchange rates
MEL is 2015 domestic terminal charge, inflated by CPI
Security charges included in calculation

Average Aeronautical Revenue per Passenger.

In the 2011 Productivity Commission report, the level of charges was also estimated on an aeronautical revenue per passenger basis. It should be noted that there are some issues with the use of this metric. In particular, Australian airports have been experiencing a shift in the mix of international and domestic passengers. As international passengers require more services and infrastructure (e.g. security, processing, lounges, etc.) than domestic passengers, they tend to be charged more to cover services. Thus the shift to a greater percentage of international passengers will

lead to an increase in aeronautical revenue per passenger even without a change in rates. Nevertheless, for comparative purposes, we have elected to include aeronautical revenue per passenger as a comparison and show this in Figure 5-3. The aeronautical revenue per passenger results for the Australian airports is within range of their peer airports. Also included is the comparison where currencies are adjusted using PPP rather than exchange rates. While the relative pattern varies somewhat (and LHR becomes an outlier), the key finding is unchanged.

Figure 5-3
Aeronautical Revenue per Passenger
Fiscal Year 2015-2016*



Source: InterVISTAS Analysis of Airport Financial and Operational Data, World Bank PPP Data

Note: Most recent year of data available for the Australian Airports, comparator airports may have different fiscal year ends
Currencies adjusted using 5-year average exchange rates and PPP rates
Security revenue included

The full set of comparisons by aircraft type are provided in Appendix C, but all of them show that same pattern of the large Australian airports having fees and charges that fall within the range of their peers.

5.2 Airport Charges – Mid-Sized Airports

We now turn to Australia's mid-sized airports³³ and their international peers. As airline services at these airports differ in some cases from those of the larger airports, the large long haul aircraft have been excluded from the analysis for the mid-sized airports.³⁴ Figure 5-4 and Figure 5-5 show the results for the 737 aircraft, for both international and domestic services. The results of the other aircraft types are available in Appendix C.

Overall, the mid-sized Australian airports appear to be within range of their peers for international services.³⁵ The Australian mid-size airports run the entire range from the highest to the lowest charges relative to their peers. Two airports (Darwin and Hobart) have the highest charges for

³³ Australia's mid-sized airports include Hobart, Cairns, Darwin, Gold Coast and Canberra.

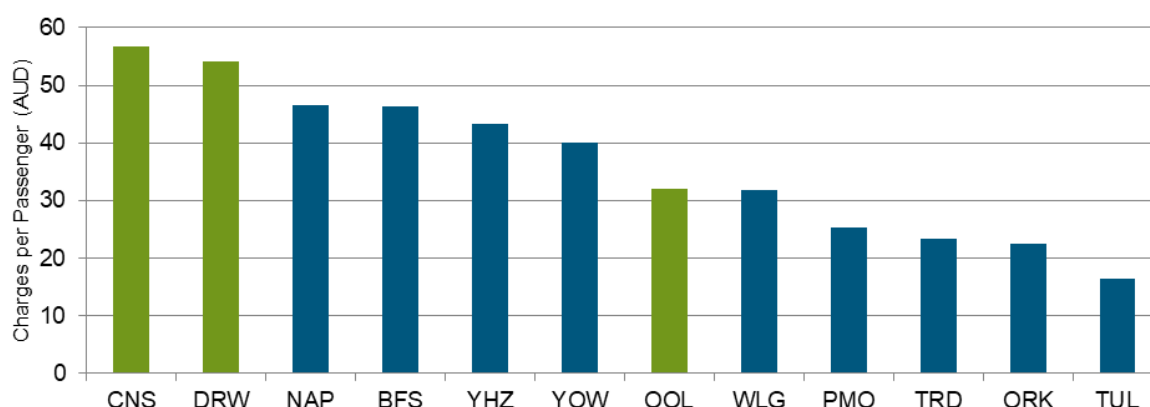
³⁴ The aircraft excluded are the A380 and B777-300ER.

³⁵ It should be noted that the rack rates for Canberra, as with the other airports, do not reflect the commercial practice the airport uses to determine their charges. As well specific to Canberra, the publicly published rack rates have not been updated in recent years. For consistency with the treatment of the other airports they have been included in the analysis, but any results here should be used with caution that they are not reflective of the true charges at the airport.

domestic services among their peers, but are within the range for international services.³⁶ The results in Appendix C have similar findings for other aircraft types commonly used at these airports, although the relative rankings and who is at the top and bottom ends change for different aircraft.

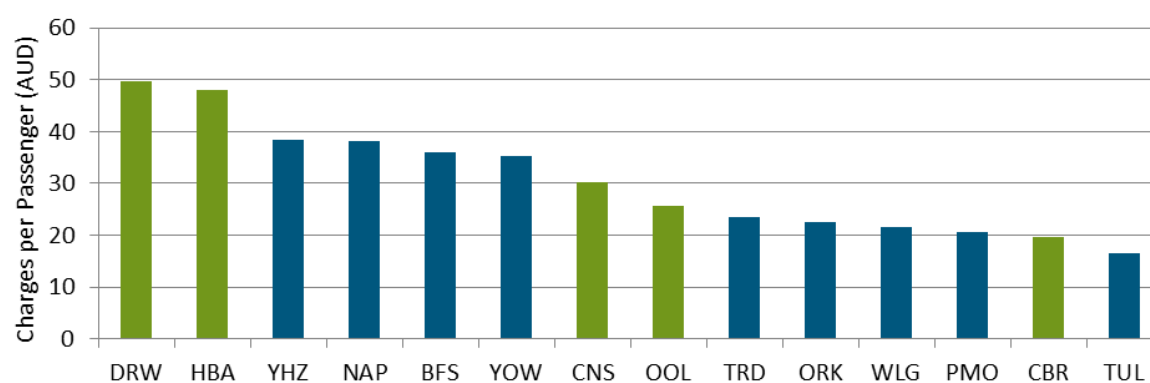
However, it is important to note yet again that these benchmark results are again on rack rates, and not the rates carriers actually pay. The relative position of the mid-size Australian airport is expected to somewhat lower than portrayed in the charts and impacted similarly by different approaches to currency conversion as illustrated above.

Figure 5-4
Airport Charges for B737-800 Aircraft (International) – Mid-Sized Airports
Per Passenger, Excludes Taxes
2017



Source: InterVISTAS Computations based on Airport Charges Schedules
Note: Hobart excluded as they do not have international service; Canberra excluded as they do not publish international charges
Currencies adjusted using 5-year average exchange rates
Security charges included in calculation

Figure 5-5
Airport Charges for B737-800 Aircraft (Domestic) – Mid-Sized Airports
Per Passenger, Excludes Taxes
2017



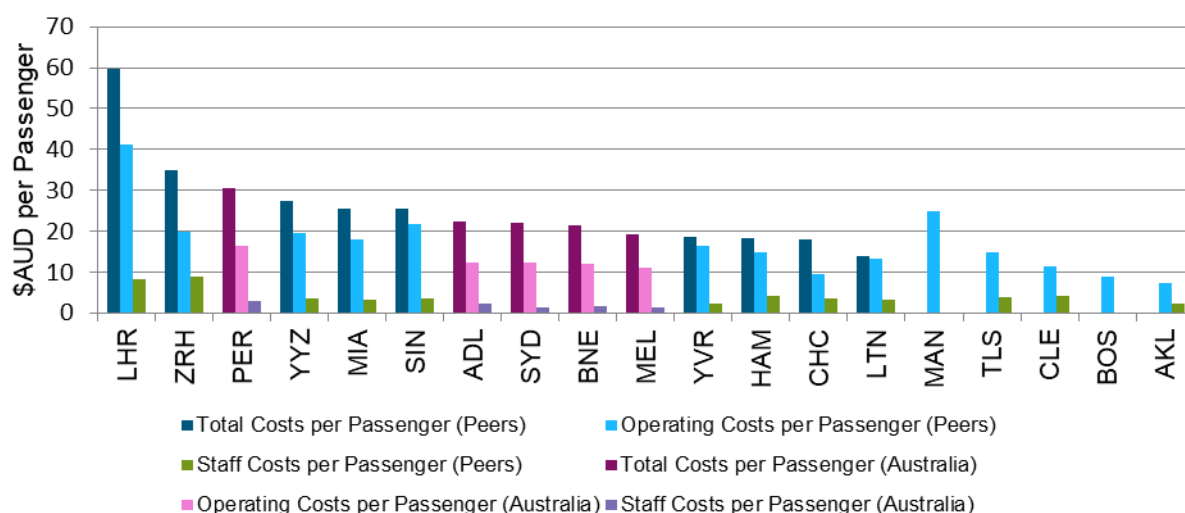
Source: InterVISTAS Computations based on Airport Charges Schedules
Currencies adjusted using 5-year average exchange rates
Security charges included in calculation

³⁶ Hobart does not have international services.

5.3 Operating Performance

We now turn to benchmarking results for the operating performance of the five largest Australian airports and their international peers. Financial data was not readily available for a comparison of the medium sized airports and their peers. The metrics used to evaluate the operating performance of the airports were related to airport costs per passenger (total costs, operating costs, and staff costs). Figure 5-6 and Figure 5-7 summarizes the results for the five largest Australian airports compared to their peers.³⁷ Figure 5-6 separately compares the individual cost elements, while Figure 5-7 does the comparison by stacking each cost element into a single column for total cost. Because of the different scales of the airports, the comparisons are on a cost per passenger basis.

Figure 5-4
Airport Costs per Passenger
Select Australian and Comparator Airports
Fiscal Year 2015-2016*



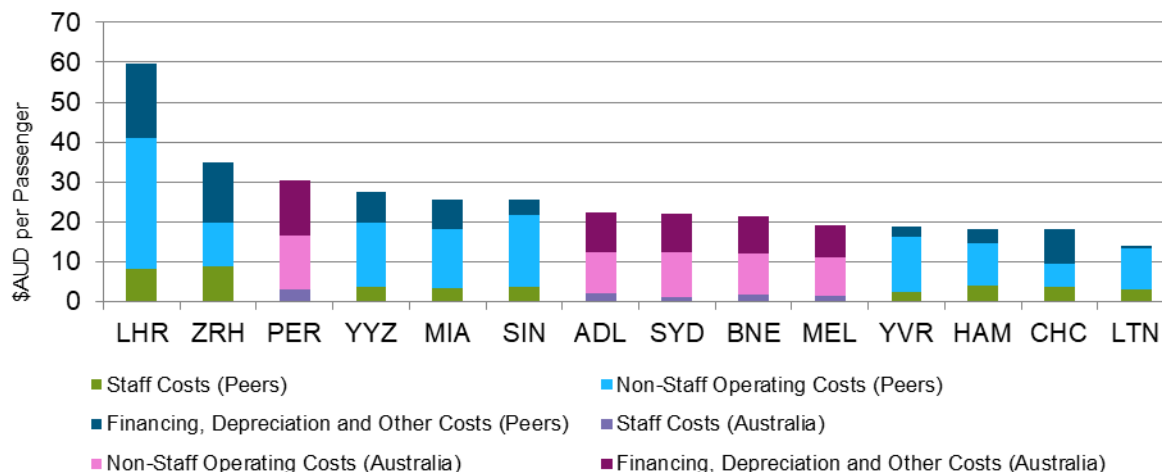
Source: InterVISTAS Analysis of Airport Financial and Operational Data

Note: Most recent year of data available for the Australian Airports, comparator airports may have different fiscal year ends
Currencies adjusted using 5-year average exchange rates

Data for Sydney Airport sourced from the airport, and excludes costs related to the West Sydney Airport project.

³⁷ Where data for the peer airports was available, some metrics include more peer airports than others.

Figure 5-5
Breakdown of Airport Costs per Passenger
Select Australian and Comparator Airports
Fiscal Year 2015-2016*



Source: InterVISTAS Analysis of Airport Financial and Operational Data

Note: Most recent year of data available for the Australian Airports, comparator airports may have different fiscal year ends
Currencies adjusted using 5-year average exchange rates

Data for Sydney Airport sourced from the airport, and excludes costs related to the West Sydney Airport project.

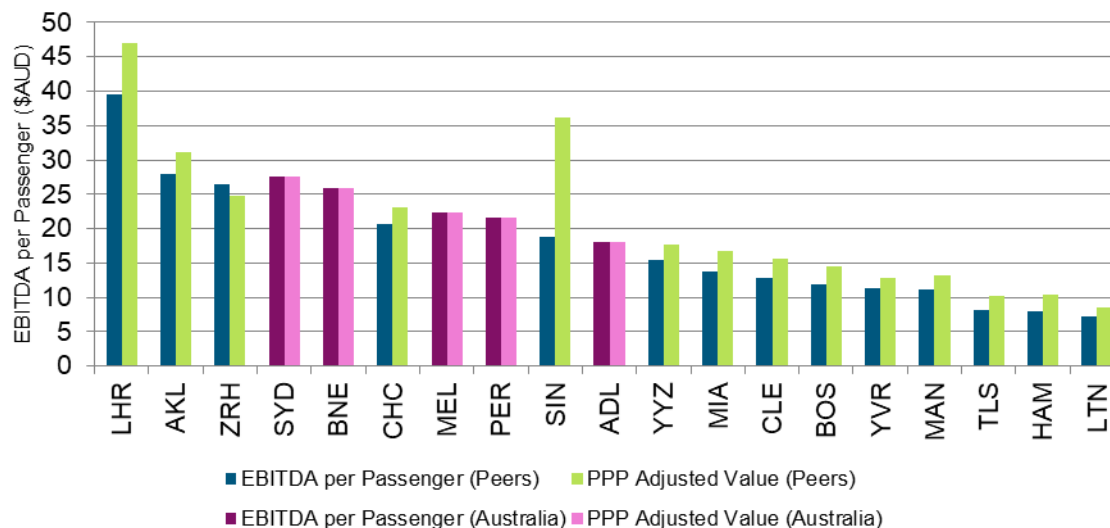
Perth had the highest total costs of the Australian airports, though not of all airports. Its staff and other operating costs, although, were lower than most other airports. Of the Australian airports, staff costs per passenger were largest at Perth airport and lowest at Sydney on a per passenger basis. All five of the large Australian airports have lower operating costs per passenger than the average of their international peers, including staff costs. Financing, depreciation and other costs appear to be higher at the Australian airports compared to their peers. Part of this can be explained by recent major capital expenditures; airports having undergone major expansions tend to have higher financing costs. Another factor to keep in mind is the governance model and degree of government financial support; in some jurisdictions airports are owned and supported directly or indirectly by governments, are subsidized and were provided land at no cost; In Australia and other jurisdictions which have fully privatized airports, the airports are responsible for all their costs and financing needs.

5.4 Profitability

EBITDA/EBIT. To assess the profitability of the airports, the metric of enterprise EBITDA per passenger was chosen.³⁸ Figure 5-8 shows the enterprise EBITDA per passenger for the five Australian airports versus the average for the group of peers. For comparative purposes, EBIT per passenger is shown in Figure 5-9. Although the ranking of the Australian airports changes, the overall results compared to their peers is still the same for EBITDA and EBIT. The Australian airports fall within the range of the peer airports, with the most profitable Australian airport, Sydney, being exceeded by Heathrow, Auckland and Zurich.

³⁸ This measure is enterprise EBITDA, as it includes the profit from non-aeronautical activities as well as the break-even or profit from aeronautical operations. Airports in general have higher EBITDA under dual-till regulation but not necessarily higher costs and airport charges.

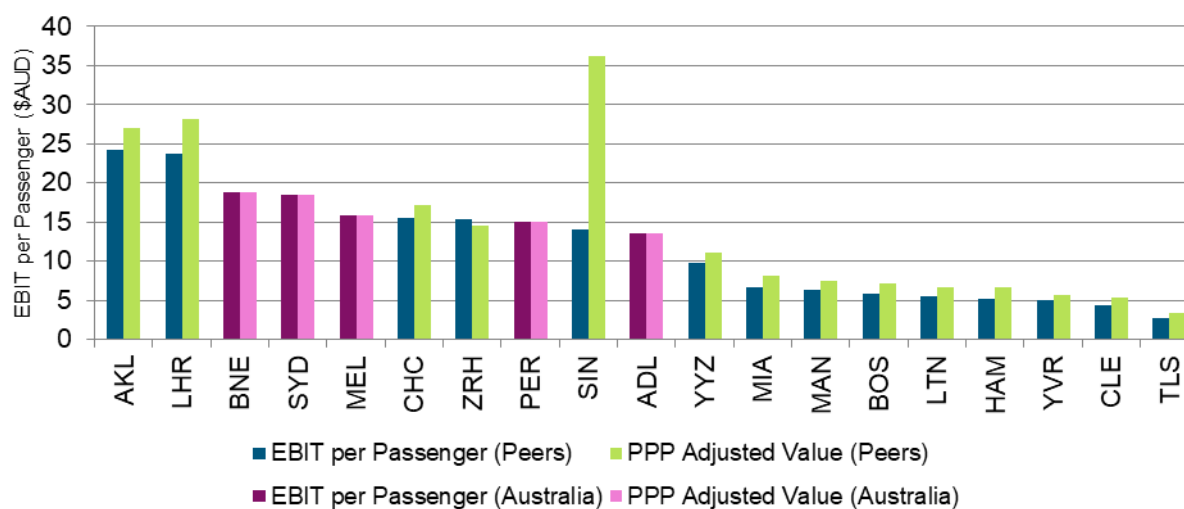
Figure 5-6
Enterprise EBITDA per Passenger
Select Australian and Comparator Airports
Fiscal Year 2015-2016*



Source: InterVISTAS Analysis of Airport Financial and Operational Data

Note: Most recent year of data available for the Australian Airports, comparator airports may have different fiscal year ends
Currencies adjusted using 5-year average exchange rates and PPP adjusted using World Bank data

Figure 5-7
Enterprise EBIT per Passenger
Select Australian and Comparator Airports
Fiscal Year 2015-2016*



Source: InterVISTAS Analysis of Airport Financial and Operational Data

Note: Most recent year of data available for the Australian Airports, comparator airports may have different fiscal year ends
Currencies adjusted using 5-year average exchange rates and PPP adjusted using World Bank data

The Australian airports continue to outperform many of their peers in terms of operating profit per passenger, which is consistent with past performance. But their profits are not the highest among their peers. Sydney was the top ranked airport of the five larger Australian airports. Brisbane has grown its

operating profit per passenger, surpassing Melbourne.³⁹ The airports perform better than most but not all of their peers for operating profit per passenger; this finding is consistent with the previous Productivity Commission report.

EBIT figures may be expected to be higher comparatively for countries with higher tax rates or for airports which need to fully cover their financing costs (at market rates). For example, if a country has higher tax rates (which is often suggested Australia does), that country's airports may have higher profits to cover the tax costs compared to those when tax concessions are available (such as the tax preferred status accorded to bonds issued by United States airport authorities). Publicly owned airports are likely to benefit from explicit or implicit guarantees of their debt and may not need to make a return on equity invested in airport businesses. From an economic standpoint, the existence of higher profits for such reason is a desirable outcome as it may reflect increased allocative efficiency and more importantly, of itself, does not necessarily reflect any abuse of market power.

RoCE.

The "Airport Performance Indicators 2016" report by LeighFisher includes three different return measures: Return on Capital Employed, Return on Shareholder Funds, and Return on Invested Capital. Return on Capital Employed is calculated as EBIT divided by total capital. Figure 5-8 shows the four Australian airports included in the LeighFisher (2016b) analysis, as well as the average for all of the airports in the analysis. The Australian airports all fall below the global average for return on capital employed. The four Australian airports perform better than the (city run) North American Airports on average, though are below the average for the European airports included. An observation that can be made from this is the main influences on the returns for private airports:

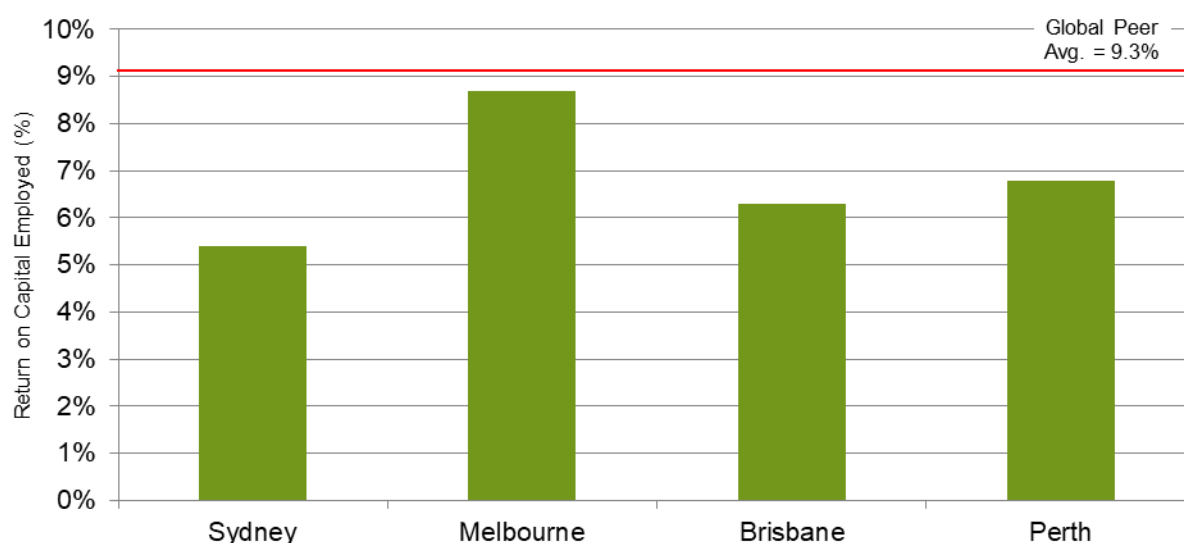
- There is an impact from the original purchase price to acquire the airport or an airport company. Some bidders will have won with undervalued bids, while others may have overpaid compared to the actual value of the airport or airport company. This initial "starting point" value materially affects measures of return on equity and return on invested capital, and these initial starting points varied significantly within Australia.⁴⁰
- The financing structure of the airport company has an impact. Some airports companies are structured as a single entity, simplifying analysis and interpretation. Others are financed via holding companies and other arrangements; the analysis and interpretation of the return on equity/invested capital for the actual company operating the airport may seem high or low then, depending on whether the computation is done based on the financial structure and leverage of the overall corporate group or at the level of the specific airport operating entity.

The LeighFisher (2016b) analysis also includes measures for return on shareholder funds and invested capital. There is ambiguity in these measures for comparability though; the way these returns are measured is unclear, especially given the differences in accounting treatment of equity in different jurisdictions and where airports are government owned and/or not-for-profit organisations. Reliance on the results of these measures would be spurious. The four Australian airports all rank below average on the purported measure of return on invested capital and average or below average (with the exception of Melbourne) on return on shareholder funds (LeighFisher, 2016b, pp. 138-141). We attach no weight to these results due to the definitional and measurement issues we have described.

³⁹ This is true on a per passenger basis; on a level basis, Melbourne has a higher EBITDA value.

⁴⁰ There may also be an impact from the earnings multiple at the time of sale and the relative scale of capital expenditure amongst the airports.

Figure 5-8
Return on Capital Employed
2014-2015



Source: Adapted from LeighFisher (2016b), p. 136

5.5 Investment

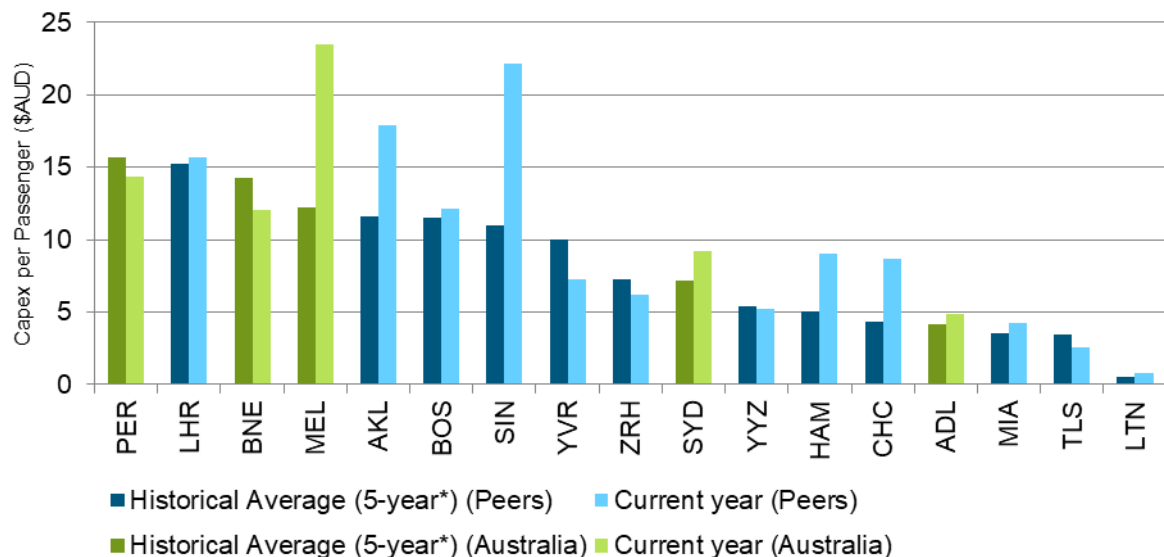
Airport investments are large and the investment programs may take many years. Hence, comparing single year investments levels has limited usefulness. Instead it is more useful to compare multiyear investment programs, which would more accurately reflect the cyclical nature of airport capital investments. By looking at more than one year of data, the analysis would provide a better comparison across airports if they are not at the same point in their investment cycles. As noted, a limitation of this type of analysis is the availability of a long series of data on investments at the airports under comparison.

Looking at the Australian airports and peers, for the most recent fiscal year, the airports had capital investments either above or slightly below their peers (Figure 5-11). But looking at only one year of investment does not accurately portray the longer lifecycle associated with airport investment. Looking at investments over a longer period shows the Australian airports invested either more than, or at least in line with, their peers. The better metric would be to compare a long time series of investment data (say 20 years), but due to data availability, this is not possible here.

Looking at the assets of the Australian airports for the most recent fiscal year, it appears that the Australian airports generally have a higher level of assets per passenger than their peers (Figure 5-12). This may reflect the relative newness of their assets or the value of land contained in the asset bases.⁴¹

⁴¹ For example, U.S. airports have not had to purchase their land and generally pay no rent to use the land. In Canada, airports lease their land but carry no asset value of their lands; lease payments are treated as annual expenses.

Figure 5-9
Capital Expenditure per Passenger, per Year
Select Australian and Comparator Airports
Fiscal Year 2015-2016*



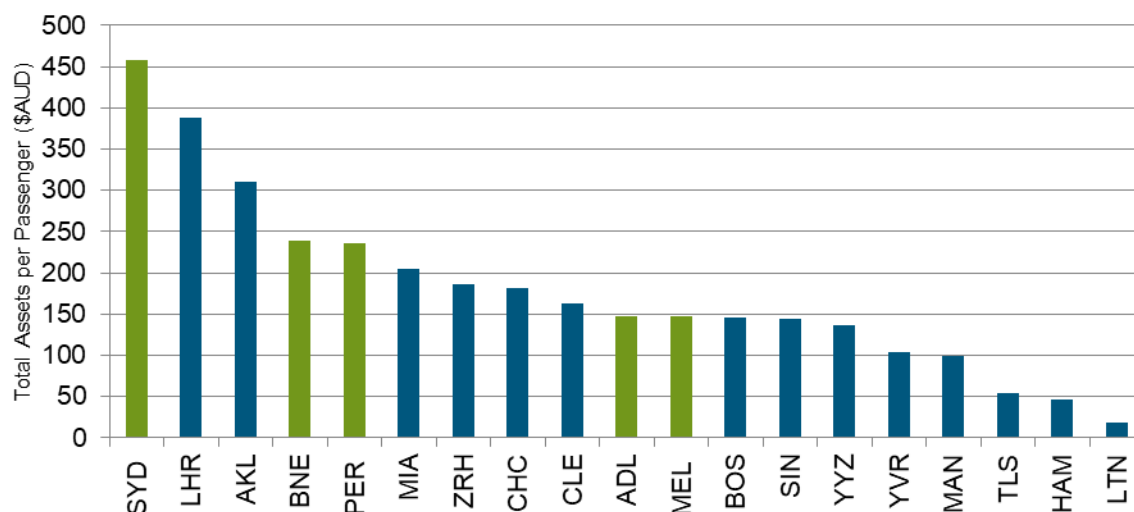
Source: InterVISTAS Analysis of Airport Financial and Operational Data

Note: Most recent year of data available for the Australian Airports, comparator airports may have different fiscal year ends.

*Historical averages calculated subject to availability of data, peer airports range from two to five years for the historical average.

Currencies adjusted using 5-year average exchange rates

Figure 5-10
Total Assets per Passenger
Select Australian and Comparator Airports
Fiscal Year 2015-2016*



Source: InterVISTAS Analysis of Airport Financial and Operational Data

Note: Most recent year of data available for the Australian Airports, comparator airports may have different fiscal year ends

Currencies adjusted using 5-year average exchange rates

5.6 Observations

The Australian airports outperform their peers in terms of lower costs per passenger and higher operating profit per passenger, on average. Financing costs, however, appear higher for the Australian airports compared to many of their peers. An important limitation is the comparison of rack rates versus the actual rates paid by the airlines. There is a level of discounting present at airports, and while information was available on the average discounting at the airports in Australia, the same was not available for the global peer airports; this is a particularly important point for the comparison of the mid-sized airports, where charges appear to be among the higher of the peers. This is only based on rack rates though, and the rack rates are an overstatement of the actual charges. Overall, the current performance of the five larger Australian Airports relative to their peers is generally consistent with the key conclusions of the previous Productivity Commission report.

6 The Performance of Australia's Airports Since 2011

Summary:

Australian airports' airport charges, operating and staff costs and profitability remain within the range of their overseas peers. In general, the Australian airports tend to have lower operating costs but higher profitability. Looking historically, the five largest airports have seen increases in costs, though remain profitable, allowing for increased investments.

6.1 Australian Airports versus Peers

The results for the five largest airports suggests that compared to their peers around the world, Australian airports' airport charges, operating and staff costs and profitability remain within the range of their overseas peers. The exception is with respect to financing charges, which are high, particularly compared to their non-privatized peers. This is similar to the conclusion reached by the Productivity Commission in their 2011 benchmarking review of the five largest airports in Australia.

Looking to the mid-sized airports in the sample compared to their peer airports, Australia's airports perform within the range of their peers with respect to airport charges for some aircraft types, though some Australian airports have the highest charges for other aircraft types. It should be noted, however, that airport charges are based on rack rates, and Australian airports tend to discount from the rack rate generally more than their peers, so the finding of relatively high rates needs to be tempered.

6.2 Australian Airports Since 2011

6.2.1 Airport Charges

In addition to the current performance of the Australian airports against their peers, we have included the historical performance of the Australian airports since the 2011 Productivity Commission Review. Below is a discussion of the changes in charges and select performance metrics.⁴² For comparability, we have included the five largest Australian airports that were the primary focus of the 2011 report. We also include historical charges for a selection of the mid-size airports.⁴³

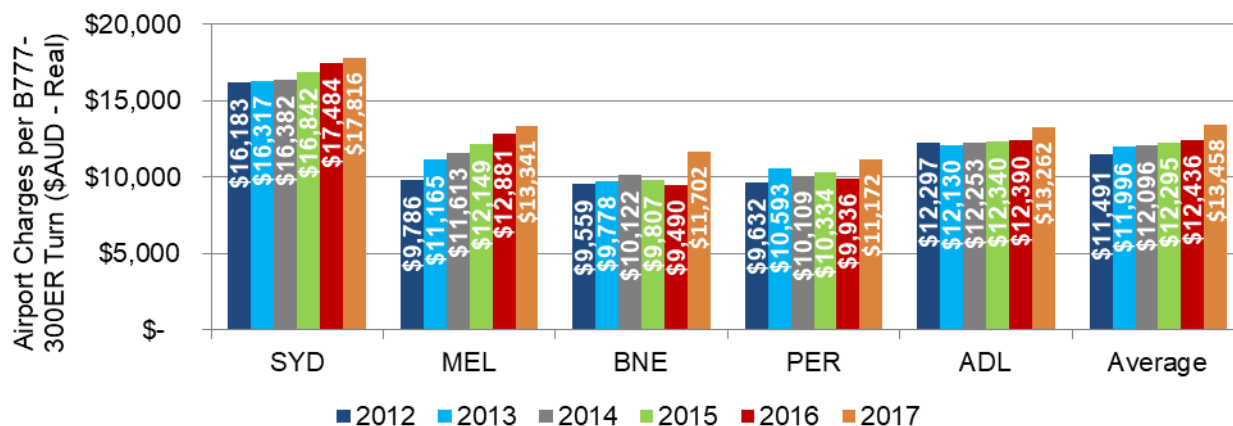
Figure 6-1 includes a historical comparison of the airport charges incurred while turning a Boeing 777-300ER aircraft at Australia's five largest airports in real (inflation adjusted) prices. Sydney features the highest cost per turn in each of the years measured, but is generally within range of its Australian peers in terms of the growth in charges over the period. The average cost per turn for this aircraft type at Australia's five largest airports has increased by 17%, in real terms, during the five years measured.⁴⁴ However, it should be noted that is based on the rack rates for the airports, and not the commercially agreed upon rates, which are lower than the rack rates and was shown to have increased over the past 5 years. International discounts as a percent of the rack rate increased by 7% in this period, so the real growth of fees is likely better represented as 10%, rather than 17%.

⁴² Historical data was not publicly accessible to have an historical comparison for the peer airports as well.

⁴³ Historical charges data was not available for all airports.

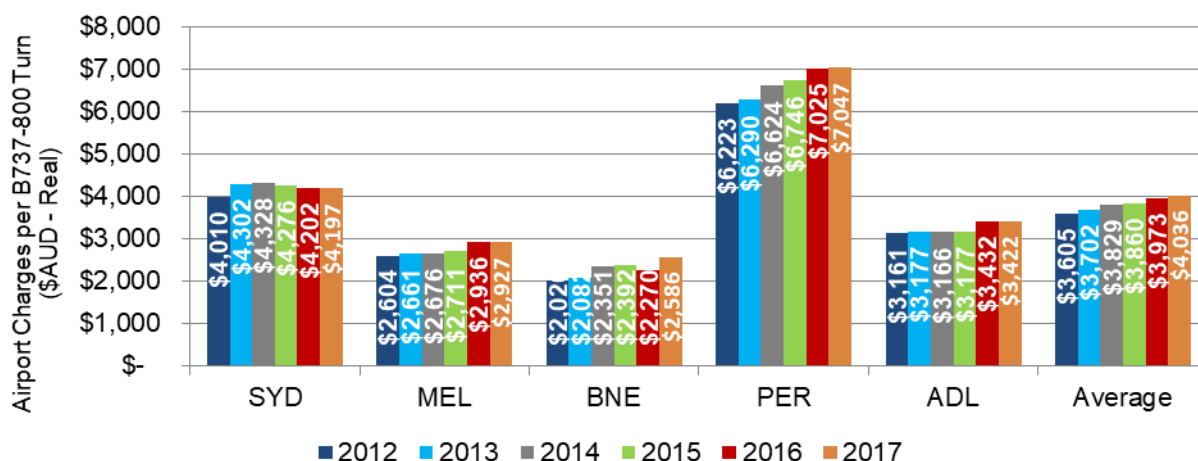
⁴⁴ This is the arithmetic average across the airports.

Figure 6-1
Airport Charges Example
777-300ER Aircraft – Large Airports⁴⁵
Real Prices – 2017 AUD
International Charges
2012-2017



Source: InterVISTAS Computations based on Airport Charges Schedules, CPI from Australian Bureau of Statistics
Security charges included in calculation

Figure 6-2
Airport Charges Example
737-800 Aircraft – Large Airports⁴⁶
Real Prices – 2017 AUD
Domestic Charges
2012-2017



Note: MEL is 2015 domestic terminal charge, inflated by CPI for 2016 and 2017 as information on their terminal charges was not available

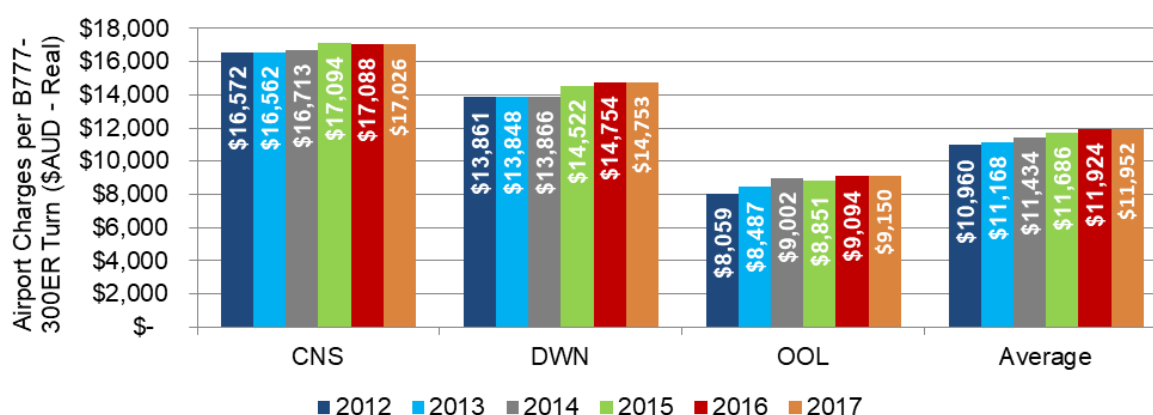
Source: InterVISTAS Computations based on Airport Charges Schedules, CPI from Australian Bureau of Statistics
Security charges included in calculation

⁴⁵ This is the arithmetic average across the airports.

⁴⁶ See previous footnote.

Similarly, Figure 6-2 includes a historical comparison of the airport charges incurred while turning a domestic Boeing 737-800 aircraft at Australia's five largest airports in real (inflation adjusted) prices. Perth features the highest cost per turn in each of the years measured, but the growth is roughly that of the average. The average cost per turn for this aircraft type at Australia's five largest airports has increased by 12%, in real terms, during the years measured.⁴⁷ It should be noted that these charges represent the rack rate, and do not have the average discount of 24% for domestic charges at Australian airports.

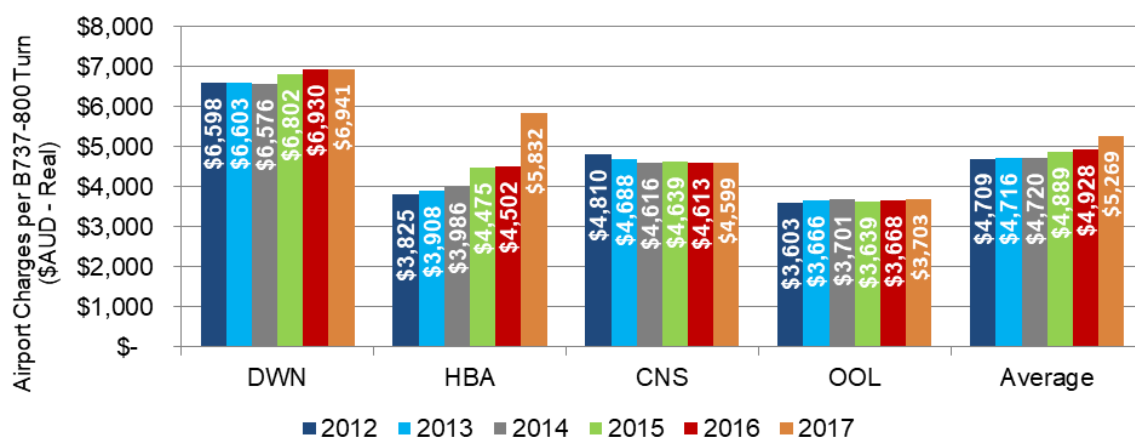
Figure 6-3
Airport Charges Example
777-300ER Aircraft – Mid-Sized Airports
Real Prices – 2017 AUD
International Charges
2012-2017



Source: InterVISTAS Computations based on Airport Charges Schedules, CPI from Australian Bureau of Statistics
Note: Hobart excluded as they do not have international service; Canberra excluded as they do not publish international charges
Security charges included in calculation

⁴⁷ This is the arithmetic average across the airports.

Figure 6-4
Airport Charges Example
737-800 Aircraft – Mid-Sized Airports
Real Prices – 2017 AUD
Domestic Charges
2012-2017



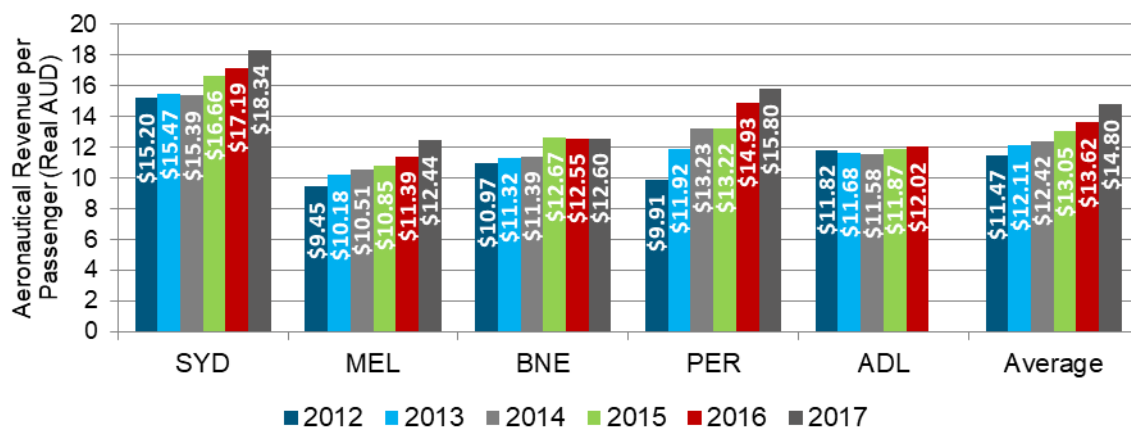
Source: InterVISTAS Computations based on Airport Charges Schedules, CPI from Australian Bureau of Statistics
Security charges included in calculation

Figure 6-3 and Figure 6-4 show the real growth in airport charges for the mid-sized Australian airports. For an international flight on a 777-300ER, the average cost per turn at Australia's mid-sized airports has increased by 6.3%, in real terms, during the years measured.⁴⁸ Similarly, for a domestic 737-800 aircraft, the average cost per turn at Australia's mid-sized airports has increased by 11.9%, in real terms. Cairns has the highest cost per year for international charges but growth has been below the average (2.7%). For domestic services, Darwin has the highest cost per year but growth has been below the average (5.2%).

Figure 6-5 shows the change in aeronautical revenue per passenger at the 5 larger airports between 2012 and 2017. On a per passenger basis, Sydney has the highest aeronautical revenue, while Melbourne has the lowest. Perth has experienced the largest growth over the period, likely tied to increased investment at the airport. In real terms, aeronautical revenue per passenger grew on average 4% annually at the airports.

⁴⁸ This is the arithmetic average across the airports.

Figure 6-5
Aeronautical Revenue per Passenger
Real Prices – 2017 AUD
Australian Airports – Top 5
FY 2011/2012 – 2016/2017*



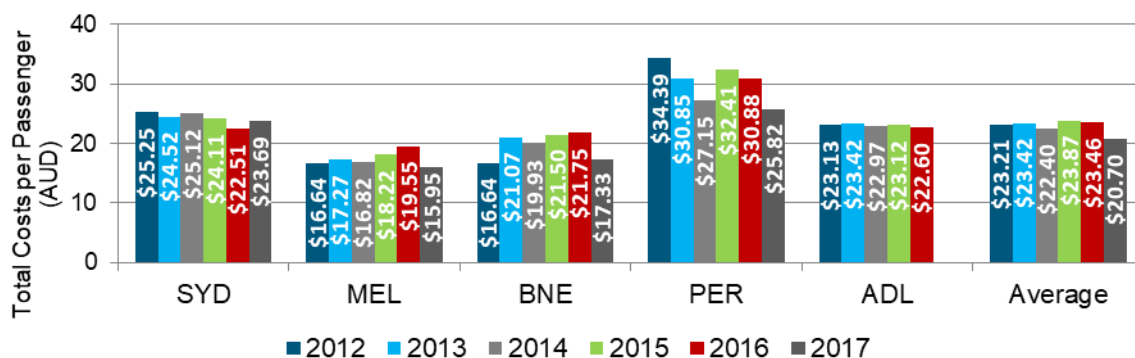
Source: InterVISTAS Analysis of Airport Financial and Operational Data, CPI from Australian Bureau of Statistics
*FY2016/2017 data not available for Adelaide; 2017 average is the four other airports only.
Security revenue included in calculation

6.2.2 Operating Performance

Total Cost.

Figure 6-6 compares the total costs per passenger incurred by Australia's five largest airports, measured on a per passenger basis. Historically, Perth has had the highest total cost, though this has been falling over the past five years. Much of this cost is related to investments made at the airport. Sydney has the second highest costs per passenger, though they have had fairly stable costs over the past five years, though falling in recent years.

Figure 6-6
Total Costs per Passenger
Real Prices – 2017 AUD
Australian Airports – Top 5
FY 2011/2012 – 2016/2017*



Source: InterVISTAS Analysis of Airport Financial and Operational Data, CPI from Australian Bureau of Statistics

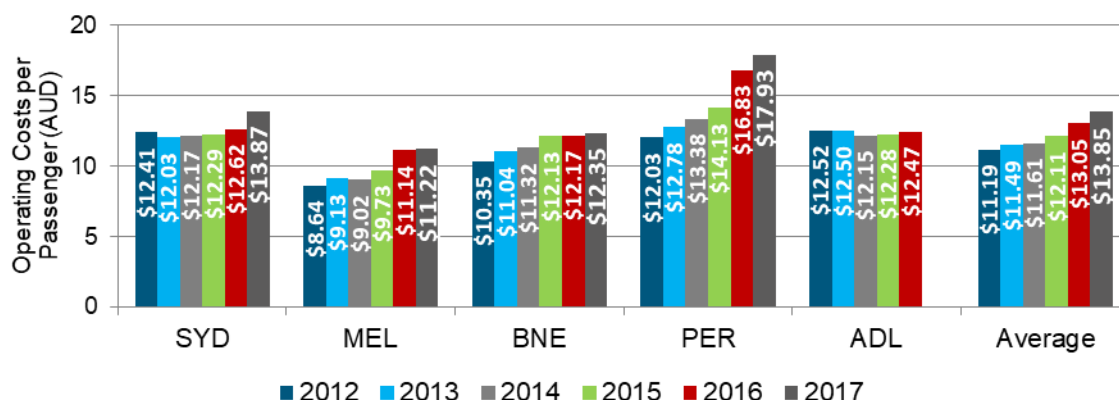
*FY2016/2017 data not available for Adelaide; 2017 average is the four other airports only.

Note: Data for Sydney Airport sourced from the airport, and excludes costs related to the West Sydney Airport project. Sydney data averaged from calendar year end to fiscal year end June.

Operating Cost.

Perth airport currently features the highest operating costs per passenger, as shown in Figure 6-7. Overall, the airports examined have experience small but steady increases in operating costs during the past five years.

Figure 6-7
Operating Costs per Passenger
Real Prices – 2017 AUD
Australian Airports – Top 5
FY 2011/2012 – 2016/2017*



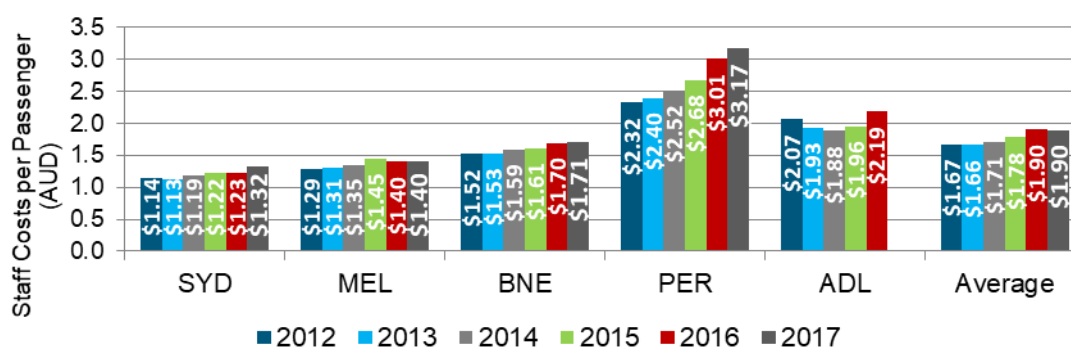
Source: InterVISTAS Analysis of Airport Financial and Operational Data, CPI from Australian Bureau of Statistics

*FY2016/2017 data not available for Adelaide; 2017 average is the four other airports only.

Staff Costs.

Figure 6-8 shows staff costs per passenger over the past five years. Airports are capital intensive and labour costs are a small portion of both total costs and operating costs. Real average labour cost per passenger grew from \$1.67 in 2012 to \$1.90 in 2017 (14%). All airports experienced an increase, with Perth experiencing the fastest increase (37%).

Figure 6-8
Staff Costs per Passenger
Real Prices – 2017 AUD
Australian Airports – Top 5
FY 2011/2012 – 2016/2017*

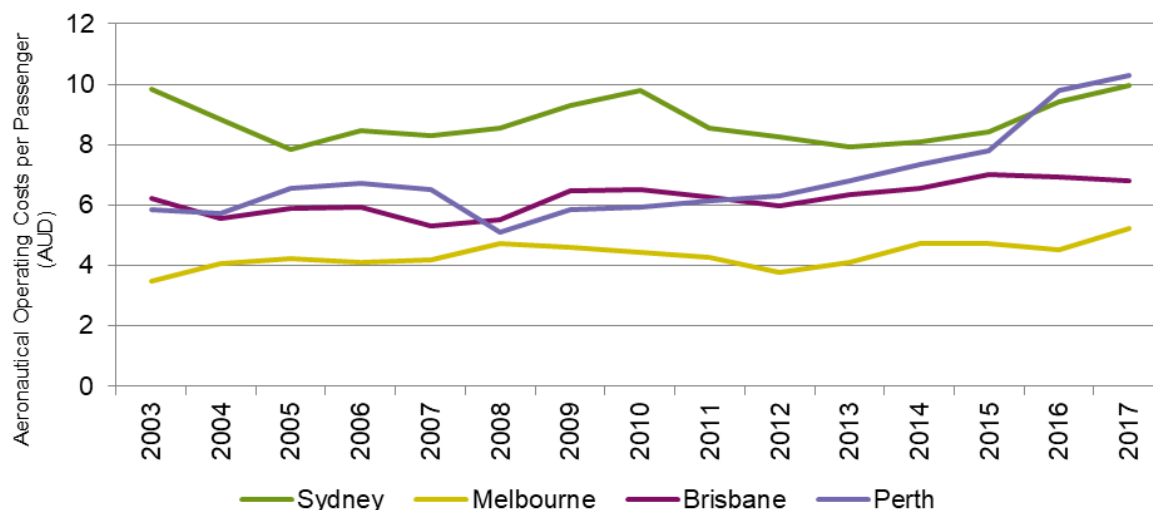


Source: InterVISTAS Analysis of Airport Financial and Operational Data, CPI from Australian Bureau of Statistics
*FY2016/2017 data not available for Adelaide; 2017 average is the four other airports only.

Aeronautical Cost since 2003.

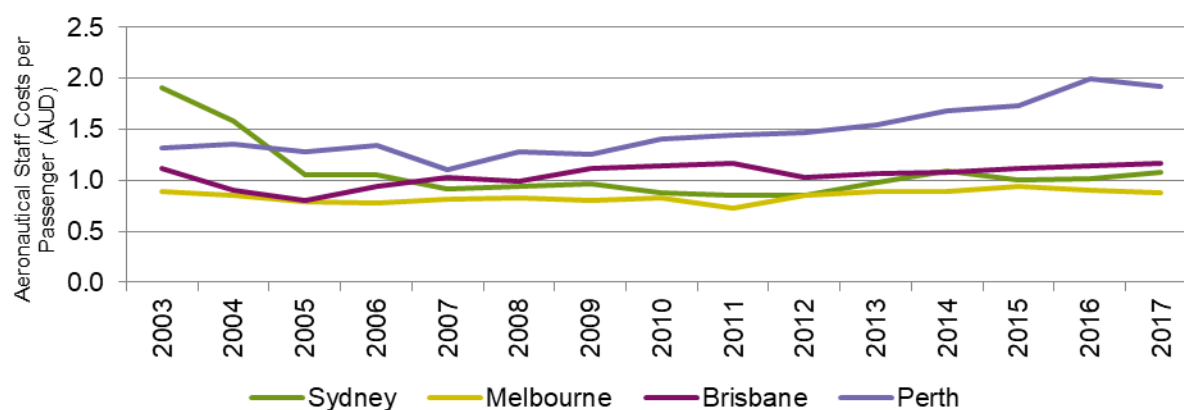
For the four airports under airport monitoring, data is available to both extend the historical analysis, and focus on the aeronautical costs of the airports. Figure 6-9 shows the growth in aeronautical operating costs at the four largest airports since 2003, in real terms. While Sydney has the highest level of aeronautical operating costs over the period, Perth has the highest aeronautical operating costs on a per passenger basis. All airports have seen an increase in per passenger costs over the past 15 years, ranging in real terms from 0.1% to 4% annually, on average. Of course, during this period airport investment has expanded dramatically and is a key driver of higher costs. In comparison, Figure 6-10 shows the growth in aeronautical staff costs over the period. With the exception of Perth, staff costs have remained fairly stable over the years, though the trend shows increases after 2012.

Figure 6-9
Aeronautical Operating Costs per Passenger
Real Prices – 2017 AUD
Australian Airports – Top 4
FY 2002/2003 – 2016/2017



Source: ACCC Regulatory Accounts, CPI from Australian Bureau of Statistics
Note: Perth passenger data sourced from airport for 2005-2017

Figure 6-10
Aeronautical Staff Costs
Real Prices – 2017 AUD
Australian Airports – Top 4
FY 2002/2003 – 2016/2017



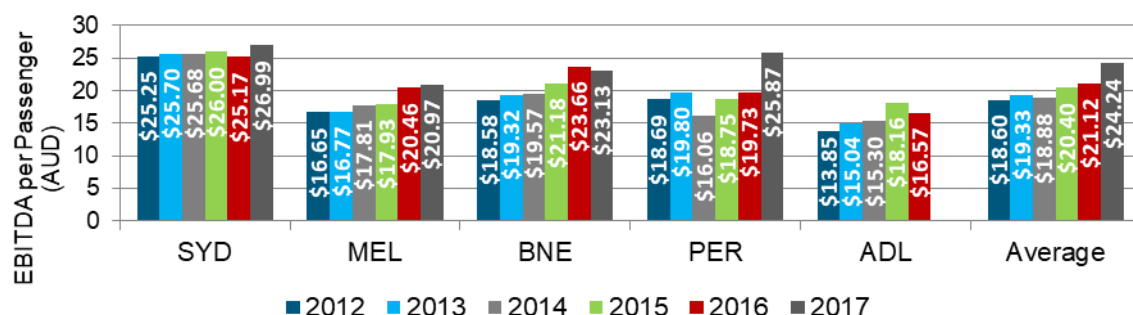
Source: ACCC Regulatory Accounts, CPI from Australian Bureau of Statistics
Note: Perth passenger data sourced from airport for 2005-2017

6.2.3 Profitability

Figure 6-11 compares the real EBITDA generated by Australia's five largest airports, measured on a per passenger basis. Historically, Sydney has had the highest EBITDA by a significant margin. However, a higher rate of growth at Brisbane has narrowed the gap, and Perth is now on par with or

higher than Sydney. As noted earlier, generating sufficient returns is important for funding future investments.

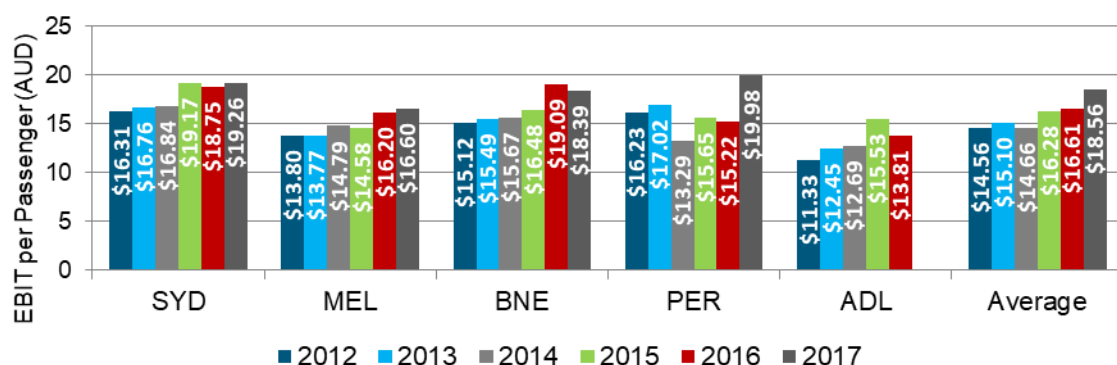
Figure 6-11
EBITDA per Passenger
Real Prices – 2017 AUD
Australian Airports – Top 5
FY 2011/2012 – 2016/2017*



Source: InterVISTAS Analysis of Airport Financial and Operational Data, CPI from Australian Bureau of Statistics
*FY2016/2017 data not available for Adelaide; 2017 average is the four other airports only.

Figure 6-12 shows results for EBIT. These figures are much lower, reflecting the burden of depreciation on major capital investments. EBIT, of course is not a measure of profit per se, as it must cover taxes and debt financing costs, and leave an adequate amount to provide a return on equity capital.

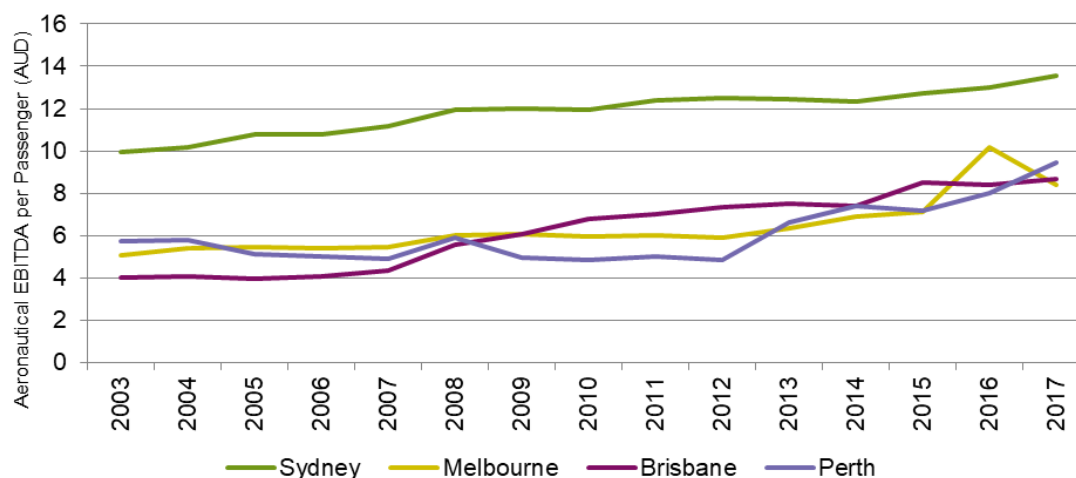
Figure 6-12
EBIT per Passenger
Real Prices – 2017 AUD
Australian Airports – Top 5
FY 2011/2012 – 2016/2017*



Source: InterVISTAS Analysis of Airport Financial and Operational Data, CPI from Australian Bureau of Statistics
*FY2016/2017 data not available for Adelaide; 2017 average is the four other airports only.

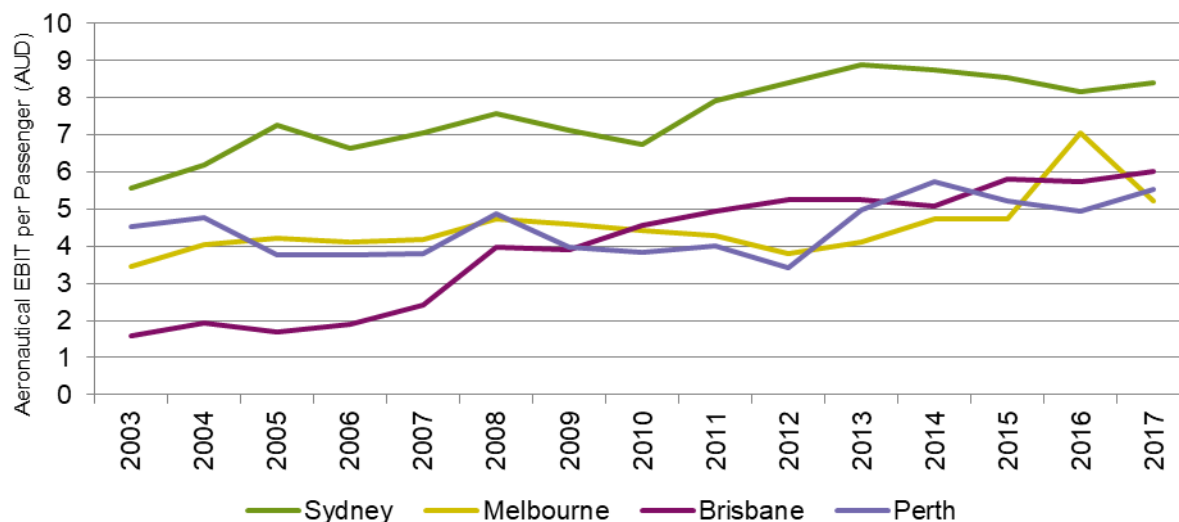
For the four airports under airport monitoring, data is available to both extend the historical analysis, and focus on the profitability of the aeronautical business alone. Figure 6-13 and Figure 6-14 shows the growth in aeronautical EBITDA and aeronautical EBIT at the four largest airports since 2003, in real terms. While Sydney has the highest level of profitability over the period, the largest annual growth in aeronautical EBITDA and EBIT is attributed to Brisbane. All airports have seen an increase in real aeronautical profitability over the past 15 years, ranging in real terms up to 9% annually, on average.

Figure 6-13
Aeronautical EBITDA per Passenger
Real Prices – 2017 AUD
Australian Airports – Top 4
FY 2002/2003 – 2016/2017



Source: ACCC Regulatory Accounts, CPI from Australian Bureau of Statistics
Note: Perth passenger data sourced from airport for 2005-2017

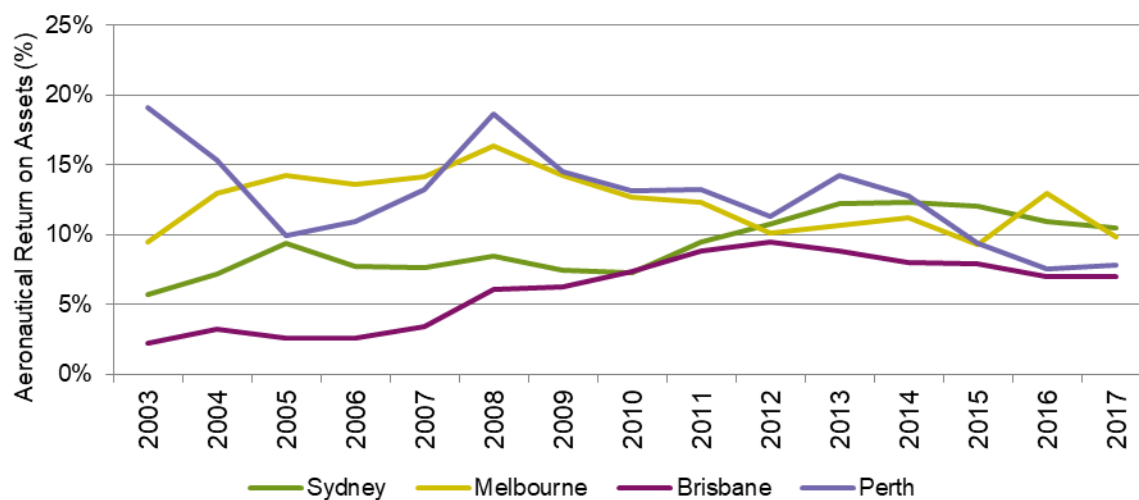
Figure 6-14
Aeronautical EBIT per Passenger
Real Prices – 2017 AUD
Australian Airports – Top 4
FY 2002/2003 – 2016/2017



Source: ACCC Regulatory Accounts, CPI from Australian Bureau of Statistics
Note: Perth passenger data sourced from airport for 2005-2017

Given the overall profitability of the aeronautical business at the four largest airports, another metric that would provide insight into the aeronautical operations is a measure of the return on assets (RoA). Return on assets is commonly calculated as the net profit divided by total asset value and is comparable to a pre-tax nominal cost of capital. As the net profit (after taxes) is not available disaggregated to the aeronautical business level, return on assets here is calculated as the aeronautical earnings before interest and tax (EBIT) divided by aeronautical assets. Figure 6-15 shows the historical RoA for the four largest airports since 2003. The gap between the RoA of the four airports was reduced significantly over the period, from around 17% to 4%. This has been a combination of improved returns for the low performing airports and lower returns for Perth, from 19% to 8%. In addition to this, while revenue on a per passenger basis has increased at the airports, return on assets has either remained stable or fallen. This is likely a reflection of the higher levels of investment made at the airports in recent years.

Figure 6-15
Return on Assets
Aeronautical Business Only
FY 2002/2003 – 2016/2017



Source: ACCC Regulatory Accounts

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Appendix B – List of Assumptions for Airport Charges Calculations

The following are a list of assumptions made to calculate the airport charges at the various airports.

International Flights:

- International flight operations
- Turn time of 2 hours
- One jetbridge used
- 484 seat capacity
- 80% Load Factor
- GPU use (only one GPU)
- Preconditioned air use
- 100% O&D passengers, 0 connecting
- Use of common-use terminal equipment (CUTE) is assumed
- Assumed to be "normal operation". Therefore, peak period pricing schemes were ignored
- Discounted pricing for late night/early morning was also ignored
- Emissions and noise-based charges were excluded from analysis
- Any carrier-specific discounts (eg. volume discounts) were ignored
- IROPS-related fees (such as deicing or diversions) were ignored
- Navigation-related charges were excluded
- Assuming no transit passengers

Domestic Flights:

- Domestic flight operations
- Turn time of 1 hour
- Jetbridge use
- 162 seat capacity
- 80% Load Factor
- GPU use
- Preconditioned air use
- 100% O&D passengers, 0 connecting
- Use of common-use terminal equipment (CUTE) is assumed
- Assumed to be "normal operation". Therefore, peak period pricing schemes were ignored.
- Discounted pricing for late night/early morning was also ignored.
- Emissions and noise-based charges were excluded from analysis
- Any carrier-specific discounts (eg. volume discounts) were ignored
- IROPS-related fees (such as deicing or diversions) were ignored
- Navigation-related charges were excluded
- European domestic flights are assumed to be within the Schengen area
- Assuming no transit passengers

In addition common to both types of flights:

- All turboprops are assumed to not be using jet bridges
- Turn time for all widebodies is assumed to be 120 minutes, and 60 mins for all narrowbodies

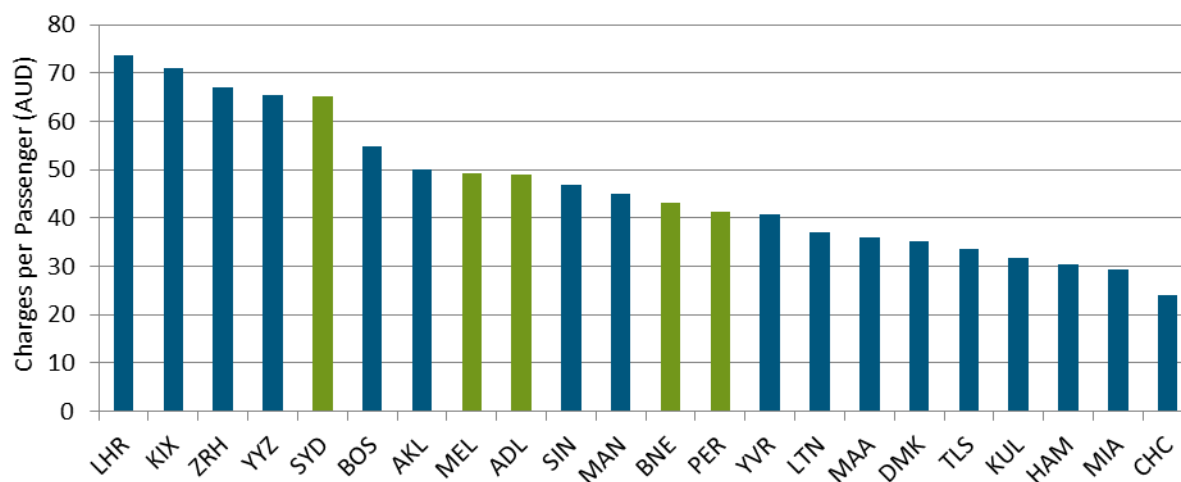
Appendix C – Airport Charges by Aircraft Type

The charges estimated in Figure C-1 include airports which may not currently have A380 services; they have been included for illustrative purposes, but we note charges at those airports could potentially increase if major infrastructure investments would be needed to accommodate the aircraft.

In addition to the assumptions listed in Appendix B, for Figures C-1 to C-6, there are additional assumptions for specific airports:

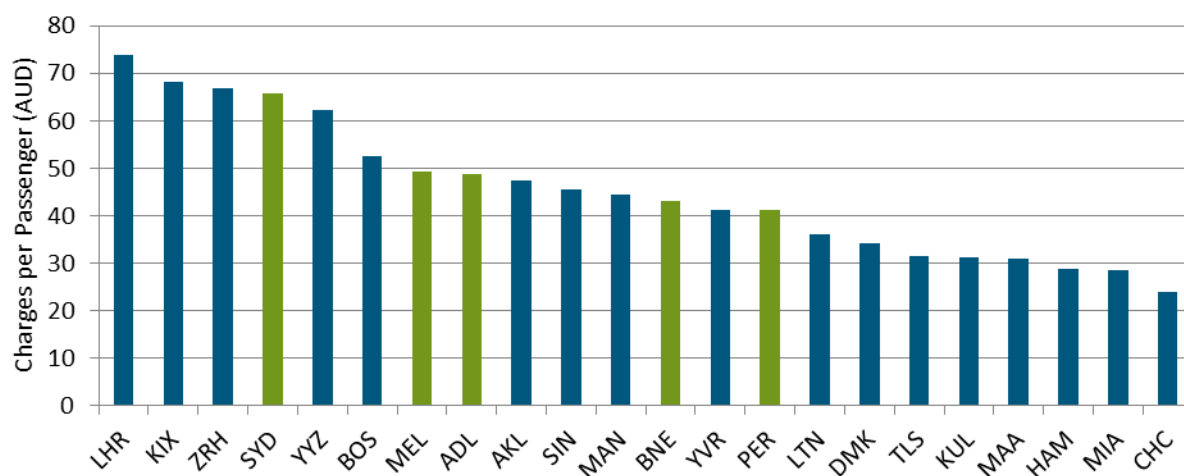
- Melbourne does not have domestic terminal charges included in their rack rates (they are commercial agreed upon), so the charges would be understated in the domestic comparisons. The 2015 domestic charge has been used, and inflated by CPI.
- Osaka has a different passenger charge for adults and children. As there is no estimate for the number of children per movement, we have assumed all passengers are adults. The charges for Osaka would then be the maximum charges, although compared with other benchmark reports Osaka is generally among the higher end of rankings
- For Singapore, all flights are assumed to be international, as they do not have domestic services.

Figure C-1
Airport Charges for A380 Aircraft (International) – Large Airports
Per Passenger, Excludes Taxes (Turnaround basis)



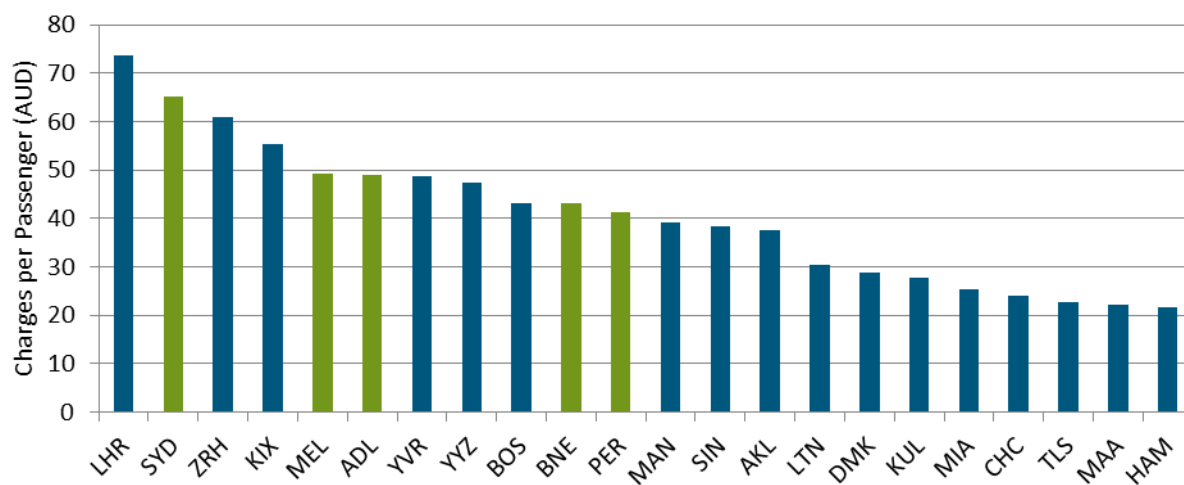
Source: InterVISTAS Computations based on Airport Charges Schedules

Figure C-2
Airport Charges for B777-300ER Aircraft (International) – Large Airports
Per Passenger, Excludes Taxes (Turnaround basis)



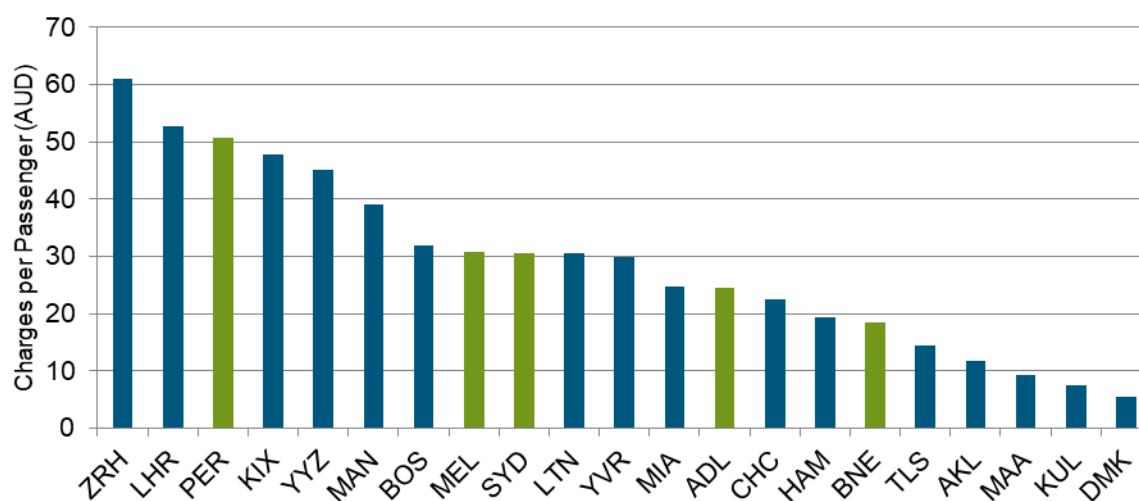
Source: InterVISTAS Computations based on Airport Charges Schedules

Figure C-3
Airport Charges for B737-800 Aircraft (International) – Large Airports
Per Passenger, Excludes Taxes (Turnaround basis)



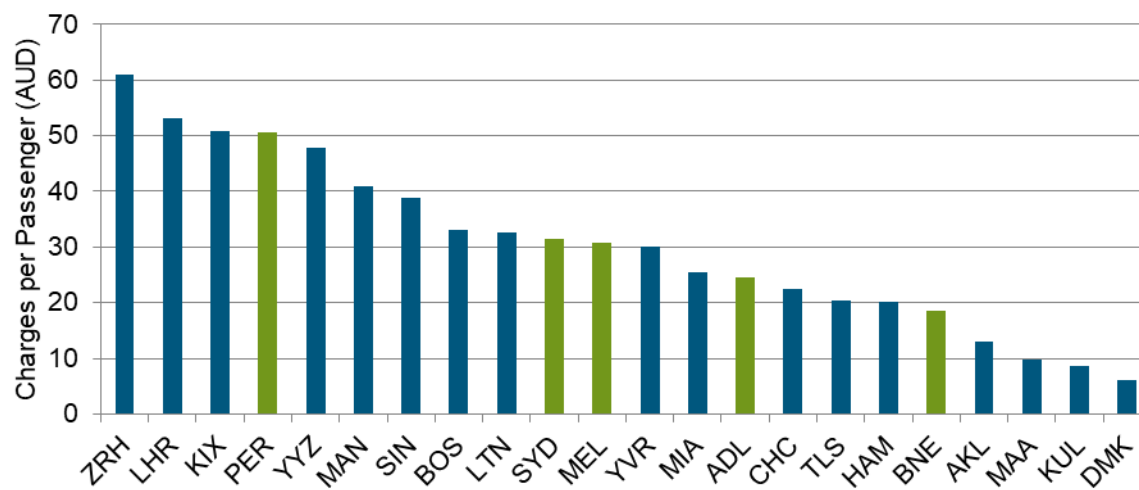
Source: InterVISTAS Computations based on Airport Charges Schedules

Figure C-4
Airport Charges for B737-800 Aircraft (Domestic) – Large Airports
Per Passenger, Excludes Taxes (Turnaround basis)



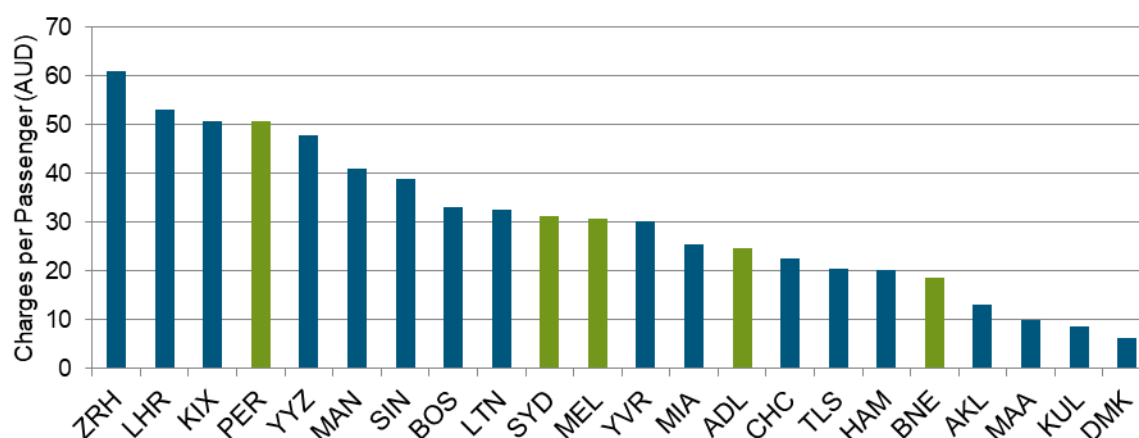
Source: InterVISTAS Computations based on Airport Charges Schedules
MEL is 2015 domestic terminal charge, inflated by CPI

Figure C-5
Airport Charges for Bombardier Q400 Aircraft (Domestic) – Large Airports
Per Passenger, Excludes Taxes (Turnaround basis)



Source: InterVISTAS Computations based on Airport Charges Schedules
MEL is 2015 domestic terminal charge, inflated by CPI

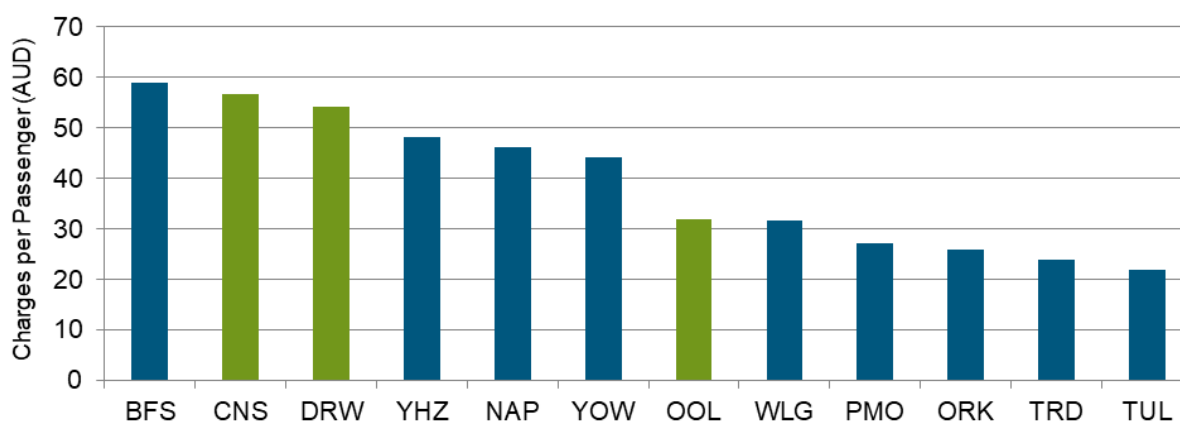
Figure C-6
Airport Charges for Embraer 190 Aircraft (Domestic) – Large Airports
Per Passenger, Excludes Taxes (Turnaround basis)



Source: InterVISTAS Computations based on Airport Charges Schedules
MEL is 2015 domestic terminal charge, inflated by CPI

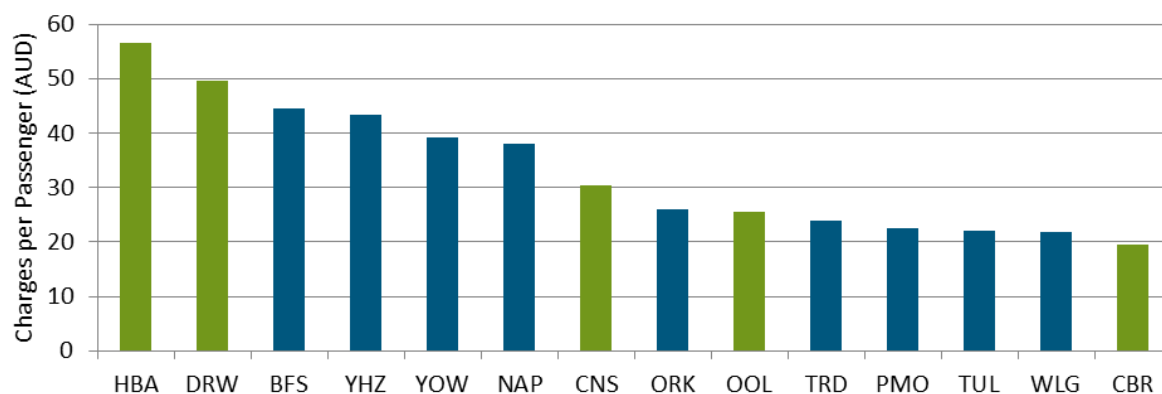
The following charts (C-7 to C-10) are the other aircraft calculated for the mid-sized airports. As they do not have the larger aircraft regularly servicing these airports (i.e., the A380 and B777), these aircraft types have been excluded from the analysis. In addition, as Hobart does not have international services, they are not included in the comparison for international charges.

Figure C-7
Airport Charges for A330 Aircraft (International) – Mid-Sized Airports
Per Passenger, Excludes Taxes
2017



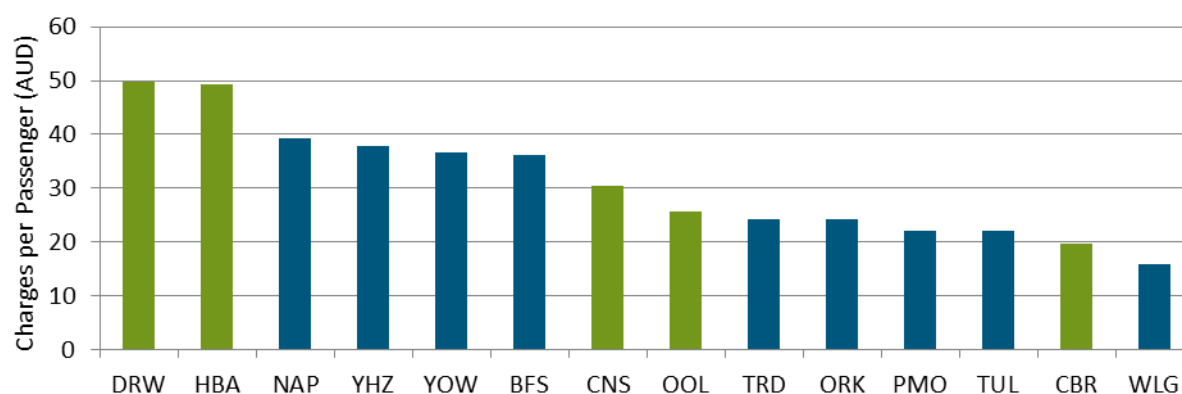
Source: InterVISTAS Computations based on Airport Charges Schedules
Note: Hobart excluded as they do not have international service; Canberra excluded as they do not publish international charges
Currencies adjusted using 5-year average exchange rates
Security charges included in calculation

Figure C-8
Airport Charges for A330 Aircraft (Domestic) – Mid-Sized Airports
Per Passenger, Excludes Taxes
2017



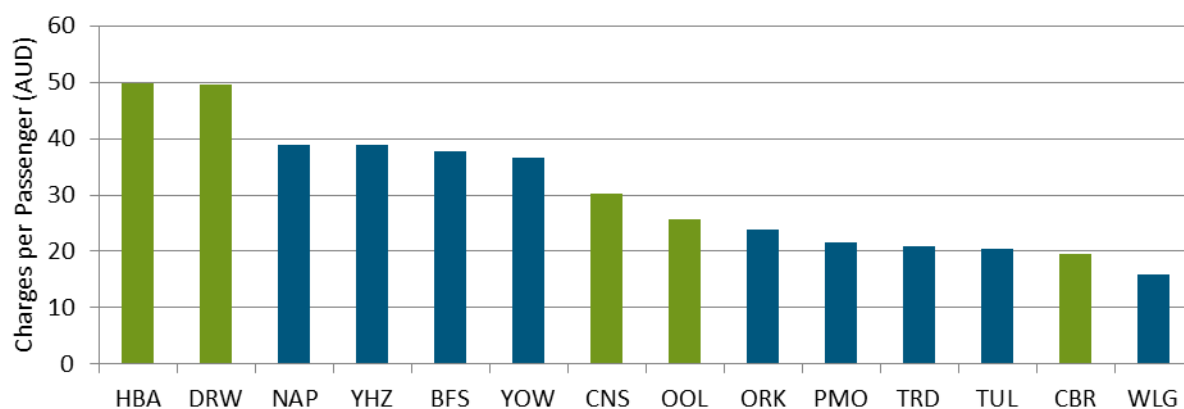
Source: InterVISTAS Computations based on Airport Charges Schedules
Currencies adjusted using 5-year average exchange rates
Security charges included in calculation

Figure C-9
Airport Charges for Bombardier Q400 Aircraft (Domestic) – Mid-Sized Airports
Per Passenger, Excludes Taxes (Turnaround basis)



Source: InterVISTAS Computations based on Airport Charges Schedules

Figure C-10
Airport Charges for Embraer 190 Aircraft (Domestic) – Mid-Sized Airports
Per Passenger, Excludes Taxes (Turnaround basis)



Source: InterVISTAS Computations based on Airport Charges Schedules

It should be noted that the rack rates for Canberra, as with the other airports, do not reflect the commercial practice the airport uses to determine their charges. As well specific to Canberra, the publicly published rack rates have not been updated in recent years. For consistency with the treatment of the other airports they have been included in the analysis, but any results here should be used with caution that they are not reflective of the true charges at the airport.

Appendix D – List of Airport Codes

IATA Code	Airport
ADL	Adelaide
AKL	Auckland
BFS	Belfast
BKL	Cleveland
BNE	Brisbane
BOS	Boston Logan
CBR	Canberra
CHC	Christchurch
CNS	Cairns
CVG	Cincinnati OH
DMK	Bangkok Don Mueang
DRW	Darwin
DUB	Dublin
HAM	Hamburg
HBA	Hobart
KIX	Osaka Kansai
KUL	Kuala Lumpur
LHR	London Heathrow
LTN	Luton
MAA	Chennai
MAN	Manchester
MEL	Melbourne
MIA	Miami
NAP	Naples
OOL	Gold Coast
ORK	Cork
PER	Perth
PMO	Palermo
RVS	Tulsa
SIN	Singapore
SYD	Sydney
TLS	Toulouse
TRD	Trondheim
WLG	Wellington
YHZ	Halifax
YOW	Ottawa ON
YVR	Vancouver BC
YYZ	Toronto Pearson
ZRH	Zurich

Appendix E - Exchange Rate Impact

The following table (Table E-1) shows the exchange rate impact on the ranking of the 5 larger airports and their peers for a B777 aircraft. While the magnitude of the charges does change based on the exchange rate used, with the exception of the PPP conversion, the ultimate rankings do not change. The difference under the PPP rate is not surprising though, as it reflects the purchasing power of the countries, rather than just the power of the currencies. It should be noted that under the different choices of conversion rates, the Australian airport is not the highest charge among its peers, the relative ranking only decreases.

Table E-1
Impact of Exchange Rate on Overall Rank
Airport Charges for B777 Aircraft

	AUD (2016 Avg Exchange Rate)		Change in Ranking based on Conversion Metric			
	Charges	Ranking	AUD (5-year Average)	AUD (Current Rate)	US PPP (2016)	SDR (2016)
LHR	\$20,294	1	-	-	▼2	-
SYD	\$17,816	2	-	-	▼3	-
YYZ	\$16,985	3	-	-	▼1	-
SIN	\$13,193	4	-	-	▲2	-
MIA	\$8,697	5	▼1	-	▼1	-
KUL	\$8,402	6	▲1	-	▲5	-
ZRH	\$18,594	1	-	-	▼2	-
BOS	\$15,984	2	-	-	-	-
MEL	\$13,341	3	-	-	▼1	-
DMK	\$9,770	4	-	-	▲3	-

Source: InterVISTAS analysis of airport charges and exchange rates from the Reserve Bank of Australia and XE.com

List of Abbreviations

ACCC	Australia Competition and Consumer Commission
ACI	Airports Council International
ASQ	Airport Service Quality
ATRS	Air Transport Research Society
CAPEX	Capital Expenditure
DEA	Data Envelopment Analysis
EBIT	Earnings before interest and taxes
EBITDA	Earnings before interest, taxes, depreciation and amortization
LHR	Light handed regulation (LHR can also denote London Heathrow Airport)
PM	Performance Measurement
PPP	Purchasing Power Parity
RoA	Return on Assets
SFA	Stochastic Frontier Analysis



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