OUTBOUND LOCAL AIRPORT PASSENGER TRAVEL PATTERNS AND BEHAVIOURS: A CASE STUDY FROM AUSTRALIA

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Introduction

Most of the tourism literature is focused on understanding the travel patterns and behaviors of tourists while 'on transit to a destination' (Lohmann and Pearce 2010, Lew and McKercher 2002), 'at the destination' (Lew and McKercher 2006) or 'in-between destinations' (Lue, Crompton, and Fesenmaier 1993, Oppermann 1995). This reflects the natural inclination and interests of tourism academics to study 'tourists', and in a less extension 'visitors', rather than travellers in general. In addition, a number of tourism organizations are devoted particularly in attracting tourists, including the accommodation sector and destination management organizations (DMOs), rather than generating tourists. Airports are one of the few large tourism stakeholders within any given place interested both in the inbound as well as in the outbound market.

There are several themes relevant to airports in regards to the travel patterns and behaviors of air passengers 'at origin', including airport ground access (Jou, Hensher, and Hsu 2011), use of car parking spaces, retail behavior at airport terminals (Chung, Wu, and Chiang 2013) and competition between airports (Pels, Nijkamp, and Rietveld 2003, Ishii, Jun, and Van Dender 2009).

This paper is part of a larger research project sponsored by Queensland Airport Ltd at the Gold Coast Airport (OOL). In order to contextualize the results presented in this research it is appropriate to mention that OOL targets preliminary low cost carriers flying internationally and domestically. Qantas, the major national legacy full service carrier offers flights between OOL and Sydney, with

Virgin Australia, operating on a 'hybrid' business model (Lohmann and Koo 2013) flies to most state capital cities. International routes link Japan, Malaysia, New Zealand and Singapore, predominantly served by Asian low cost carriers.

The research project aimed to study the travel pattern behavior of outbound local air passengers, particularly with the purpose to provide a comprehensive analysis of passengers' travel patterns and behaviours in regards to (1) the choice of airport and the competitive advantage of the studied airport in regards to its main competitor, Brisbane Airport (BNE); (2) the ground travel pattern behavior to reach the airport, including the choice of transport mode and the use of car parking; (3) the use of retail stores at the airport. The study innovates by collecting data from a large sample of passengers (n=2,575), while at the same time analyzing the previously mentioned data in regards to the overall passenger trip, including flight destination, main destination during the trip, number of nights as part of the trip and travel group. The dependent variable in this paper is the distance between passengers' home postcodes and the airport.

Methods

The survey developed for this research include a number of questions associated with key aspects of the passenger's travel pattern and behavior to and while at the airport and the choice for the particular airport. Some of the questions asked were: home postcode, reasons for flying out of that particular airport, size of travel group, mode of transport used to arrive at the airport, use of car park facilities (on-site or off-site) and reason for choice of car park, flight number, visitation to other destinations in the country or overseas, number of nights away in the trip, consideration to use the other airport in the region, purchase at the retails located at the airport.

The survey was uploaded on iSurvey app and carried out with passengers waiting to board inside the airport terminal. A sample of 2,575 passengers starting their trips at the terminal (outbound market) was collected during the months of October and November 2013. Those passengers were selected on the basis of their home postcodes within a catchment area of approximately 140km radius, in order to

include part of BNE's catchment area, in the North, as well most regional towns in the South. Postcodes' epicenters were plotted on Google Maps and the shortest route to the airport was identified and measured. The descriptive statistics of travel distance is shown in Table 1.

Table 1 Descriptive statistic of travel distance

Descriptive statistics	Travel distance (km)
Minimum	1.70
Maximum	140.00
Mean	42.75
Standard deviation	32.55

Albeit the questionnaire was designed for passengers travelling both domestically and internationally, the survey was only carried out in English as it aimed local residents. Only passengers over the age of 18 were approached and when travelling on a group just one person in the group was invited to take part in the survey.

Data analysis

Outbound local airport passenger travel patterns and behaviors

Travel patterns and passenger behaviors were all dummy variables (0="Not selected"; 1="selected") and were categorized into three main characteristics: (1) airport selection; (2) parking; and (3) trip.

The airport selection characteristics include affordable airfares, proximity to home, easy to access, preferable flight schedule, preferable airline, preferable airport, and not preferable other airport (BNE). Choice of car park site was considered as parking characteristics. The selection percentage for each variable is listed at Table 2.

Table 2 Reasons for flying out of OOL

Airport selection characteristics	*Select percentage (%)*
Affordable airfares	40.9
Proximity to home	24.1
Easy to access	19.7
Preferable flight schedule	9.5
Preferable airline	12.4
Preferable airport	5.1
Not preferable other airport	0.6
Car park	25.3

Trip characteristics were measured by total travel people in one trip, trip purpose and trip duration. The definitions of the dummies and selection percentage of trip characteristic variables are shown as Table 3.

Table 3 Trip characteristics

Number of people in the group	*Percentage (%)*
1 person. Travelling alone	59.5
2 people	30.0
3 people	5.7
4 people	3.0
5 people	0.9
6+ people	0.8
Trip purpose	*Percentage (%)*
Leisure/Holiday	32.4
Visiting friends and relatives	43.6
Business (but not business event)	15.4
Business events (convention, conference, seminar)	4.5
Other events, including festivals and sports	1.7
Commuting (travelling to my place of work)	2.4

Trip duration	*Percentage (%)*
None. Day trip	21.3
1 night	4.9
2-3 nights	22.5
4-5 nights	18.5
6-7 nights	12.7
8-10 nights	7.4
11-14 nights	4.9
15-30 nights	4.1
31+ nights	3.7

Model specification and regression analysis

In order to investigate the relationship between travel pattern and behavior of outbound airport passengers, regression analysis (RA) was adopted in this study. RA techniques have long been central to the field of economic statistics/econometrics. Usually, RA is used to ascertain the causal effect of one variable upon others, e.g. the effects of travel distance on passengers' choice of airports or airlines in this study. To explore these issues, the underlying variables of interest are assembled and RA is employed to estimate the quantitative effect of the independent variables upon the dependent variable.

Using standard notation, the linear regression model can be written as

$$y_t = \alpha + x_t\beta_t + \varepsilon_t, \quad t = 1,\ldots,T \tag{1}$$

where y_t is the dependent variable, x_t is a $(K \times 1)$ vector of observations on the independent variables, α is the intercept, β_t is a $(K \times 1)$ vector of unknown regression coefficients, and ε_t is an unobservable disturbance term.

In this study, the dependent variable is travel distance from home postcode to airport. A total of 2,575 observations have been estimated. All the passenger travel pattern and behavior variables are independent variables, which include airport selection characteristics, parking characteristics and trip characteristics.

The naive pooled RA model is specified as follows

$$Y = X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + \varepsilon, \quad (2)$$

where Y is an $(K \times 1)$ vector of distance from home to airport,
X_1 is an $(K \times N_1)$ matrix of airport selection characteristic variables,
β_1 is a $(N_1 \times 1)$ vector of a coefficient of X_1,
X_2 is an $(K \times N_2)$ matrix of parking characteristic variables,
β_2 is a $(N_2 \times 1)$ vector of a coefficient of X_2,
X_3 is an $(K \times N_3)$ matrix of trip characteristic variables,
β_3 is a $(N_3 \times 1)$ vector of a coefficient of X_3,
ε is an $(K \times 1)$ vector of random errors,
N is a number of explanatory variables $(N_1 = 7, N_2 = 2, N_3 = 3)$, and
K is a number of observation, 2,575 observations.

The impact of passenger travel behavior on travel distance

Regression model

In line with regression formulate (2) and the definition of variables, Table 4 reports the regression results. It is clear from Table 1 that most variables are statistically significant at 0.1 confidence levels.

The coefficient of the affordable airfares is positive and statistically significant as expected. In other words, the more price sensitive travelers are willing to travel longer distances to have cheaper airfares. The coefficient of proximity to home and easiness to access the airport are both negative. These variables can represent passengers tend to select the closest airport. From the result, the

impact of home location is greater and more significant than airport accessibility.

Table 4 Main reason for flying out of OOL: regression results

Variables	*Coefficients*	*t-statistics*
Affordable airfares	11.568	2.121
Proximity to home	-31.259	-5.763
Easy to access	-2.933	-0.533
Preferable flight schedule	14.056	1.846
Preferable airline	4.562	0.652
Preference to OOL	-33.483	-2.309
Preference to BNE	-36.323	-1.785
Car park selection	0.100	2.128
Total travel people in one trip	-2.233	-1.315
Tripurpose	-1.346	-0.700
Trip duration	2.023	2.019
R^2		0.730
Adjusted R^2		0.862

The coefficient of preferable flight schedule and preferable airline are positive. It indicates that local passengers who consider flight schedule as important live further away to the airport or are willing to travel longer distances to the airport. Because the airport in this paper operates as a low cost airport, passengers living further away will choose it predominantly due to lower airfares.

Similar to the impact of proximity to home, the coefficients of the 'preference to OOL' and 'preference to BNE' are both negative and significant. Due to the negative sign, passengers who prefer OOL will tend to live closer. These results show a different perspective in

regards to ‘preferred airline’. If only considering the location of the airport, passengers will prefer to choose a nearby terminal. However, when low cost airlines are in the picture, travelers will not mind to travel longer to have cheaper airfares. As to not preferable other airport variable, it represents there is a competitive airport nearby and it has negative influence to travel distance.

The coefficient of total number of people travelling is negative. In other words, larger groups of travellers will tend to choose nearby airports.

Cluster Regional Analysis

In order to further explore passenger travel behaviours in the study area, home postcodes were gathered into five different regions. In most cases, similar geopolitical boundaries were used to group the regions (Figure 1). One region was the immediate surrounding area of the airport, comprising the Gold Coast city in Queensland and the Tweed City in Northern New South Wales. Then the remaining four regions were allocated surrounding the Tweed City-Gold Coast area, two in the North (Logan Region and Brisbane) and two in the South (Yamba Region and Ballina-Lismore and Tweed Region).

The regression result of overall model is listed in Table 5. From the overall regression result, the coefficients of the dummies of domestic or international flight, affordable airfares, preferred airline, used parking facilities and do not like Brisbane airport are all positive and significant. In other words, these variables are all major factors while passengers select airport. On the contrary, the coefficient of dummies of proximity to where I live is negative and significant.

The coefficient of flying distance is positive and significant. In order to exploring how flying distance affect each region, individual analysis is conducted for each region.

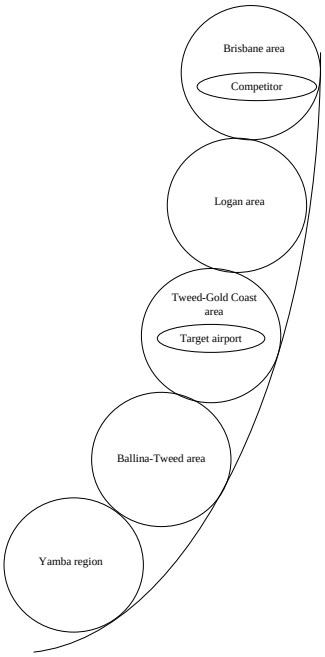

Figure 1 The five designated catchment areas and its related postcodes

Table 5 Regression result of overall model

Independent variable	Coefficient	t-value
Domestic or international flight	1.459	43.368
Flying distance (km)	0.00006	5.278
Proximity to where I live	-0.154	-4.402
Affordable airfares	0.261	5.062
Preferred airline	0.433	3.878
Use parking facilities	0.069	2.076
Do not like Brisbane airport	0.376	2.014
R square		0.977
Adjusted R square		0.954

Note: Dependent variable: five different catchment areas.

Local models exploring the relationship between travel distances with all significant variables in overall model in each region. This data are categorized into five groups with the same definition of dependent variable in overall model. The dependent variable for all local models is distance from home to airport. The regression results of each region are discussed as follows.

Yamba region

The local model of Yamba region is shown at Table 6. The coefficient of dummies of domestic or international flight is also positive and significant as they are in the overall model. In other words, the airport choice for passengers from Yamba region is influenced by whether passengers are travelling domestically or internationally. Furthermore, the coefficient of flying distance is also positive and significant in this region. The impact of flying distance is larger while passengers travel longer.

Comparing with the overall model, passengers from this region think besides domestic or international flight and flying distance all other factors which including proximity to where passenger lives, affordable airfares, preferred airline, use parking facilities and do not like Brisbane airport are not significant enough for them. This situation is likely to be influenced by the lack of an alternative choice of airport.

Table 6 Significant results for the Yamba region

Independent variable	Coefficient	t-value
Domestic or international flight	90.920	19.977
Flying distance	0.008	2.062
R square		0.989
Adjusted R square		0.979

Ballina-Tweed area

The local model of Ballina-Tweed region is shown at Table 7. The coefficient of dummies of how did you travel to the airport, flight schedule and affordable airfares are all positive and significant. On the other hand, the coefficient of dummies of proximity to where I live is negative and significant. Unlike the overall model, passengers

from this region considered travel modes and flight schedule are both important factors.

Table 7 Significant results for the Ballina-Tweed region

Independent variable	Coefficient	t-value
How did you travel to airport	66.140	17.119
Proximity to where I live	-7.274	-1.767
Flight schedule	15.668	2.990
Affordable airfares	11.243	2.302
R square		0.941
Adjusted R square		0.877

Tweed-Gold Coast area

The local model of Tweed-Gold Coast area is shown at Table 8. The coefficients of dummies of proximity to where passenger lives and travel modes are both positive and significant. Passengers fro m Tweed-Gold Coast region are more influenced by their home location and transport modes they can choose. Furthermore, the coefficient of flying distance is also positive and significant in this region. The impact of flying distance is larger while passengers travel longer.

Table 8 Significant results for the Tweed-Gold Coast region

Independent variable	Coefficient	t-value
Proximity to where I live	15.353	18.517
How did you travel to airport	4.363	10.939
Flying distance	0.003	7.777
R square		0.759
Adjusted R square		0.575

Logan area

The local model of Logan area is shown at Table 9. The coefficient of dummies of travel model is positive and significant and it means travel modes is an important factor for the passengers from this area. Similar with Yamba and Tweed-Gold Coast region, the coefficient of flying distance is also positive and significant in this region. The impact of flying distance is larger while passengers travel longer.

Table 9 Significant results for the Logan region

Independent variable	Coefficient	t-value
How did you travel to airport	62.399	42.664
Flying distance	0.002	3.148
R square		0.980
Adjusted R square		0.959

Brisbane area

The local model of Brisbane area is shown at Table 10. The coefficient of dummies of travel modes is positive and significant and it means travel modes is an important factor for the passengers from this area. Similar with Yamba, Tweed-Gold Coast and Logan region, the coefficient of flying distance is also positive and significant in this region. The impact of flying distance is larger while passengers travel longer.

Table 10 Significant results for the Brisbane region

Independent variable	Coefficient	t-value
How did you travel to OOL	28.294	8.813
Flight distance	0.011	63178
R square		0.854
Adjusted R square		0.724

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