OXFORD ECONOMICS AUSTRALIA

FLIGHT PRICE ELASTICITY STUDY: DOMESTIC MARKETS

REPORT PRODUCED FOR BOARD OF AIRLINES REPRESENTATITVES NEW ZEALAND

21ST MAY 2024

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EXECUTIVE SUMMARY

Board of Airlines Representatives New Zealand (BARNZ), Air New Zealand (AirNZ) and Qantas Group have jointly commissioned this study to estimate the impact that higher aeronautical prices may have on future passenger volumes at Auckland Airport.

This report focuses on the domestic passengers for all airlines operating out of Auckland Airport. International passengers are considered separately in the accompanying report *Flight Price Elasticity Study: International Markets*.

Introduction

The academic literature consistently finds a negative own-price elasticity of demand[1] - that is, increases in price (fares) lead to decreases in demand (passenger volumes). The reliability of this relationship "strongly indicates that any policy action that results in higher fares (e.g., taxes, increased landing fees) will result in a decline in demand" (IATA, 2017).

However, the degree of demand sensitivity to price varies significantly across markets and routes. New Zealand is particularly unique relative to other global markets since air transport is the dominant mode of travel to and from the rest of the world and there is limited intermodal competition.

There is therefore a need to estimate bespoke own-price elasticity of demand estimates for Auckland Airport in order to reliably measure the impact of the proposed price rises on future passenger volumes.

Approach

To produce the own-price elasticity of demand forecasts we take an econometric approach. Using flight passenger and price information for the period 2015 to 2019[2], we use a log-log *Ordinary Least Squares* econometric specification which allows us to interpret econometric coefficients as elasticities.

This report has modelled own-price elasticity of demand in two stages. First the responsiveness of total air passenger demand to a weighted average fair price is modelled to capture a general own-price elasticity (see Chapter 3). The analysis is then extended in the following chapter to look at the impact on air passenger demand from increase to the lowest fare bracket. This next stage focuses on the most price sensitive cohort, that are likely to lock in the discount fare deals.

[1] The price elasticity of demand refers to the change in demand when there is a change in price. An elasticity of -0.1 implies that a 1% increase in price will lead to a 0.1% decrease in demand.

[2] Sourced from a combination of IATA, Auckland Airport Statistics, AirNZ data and Qantas flight data. More recent data (2020 onwards) is marked by the COVID-19 pandemic which we see as a transitory occurrence and expect historical patterns to reassert themselves. For this reason, air passenger data from this period was not included in the analysis.

We also include a range of control variables in the model for both stages, to improve the accuracy of the own-price elasticity estimates. Alongside price, the literature suggests that significant drivers of air passenger demand include income; population; migration, competitor fares; seasonal patterns; and, general economic performance.

Price elasticities of demand are applied to baseline forecasts of passenger volumes to derive the marginal impact to passenger volumes for increases to prices.

Forward price path for airport charges have been developed by combining disclosed pricing (PSE 4[3]) with capital costs and building block assumptions that are available in the public domain[4] (PSE 5). This assumes a material increase in CAPEX spending across PSE 4 & 5.

Airport Charges Forward Price Path Key Assumptions

The forward price path has been developed using the following assumptions available in the public arena for capital spending and building blocks models.

Component	Assumption	Source
WACC	WACC of 8.73%	Auckland Airport FY23-27 Price Changes announcement†
Opening Asset Base (FY28)	$4.2bn	AIAL PSE4 Price Setting Disclosure (Schedules) - Closing Asset Base, Schedule 18
Useful Life of Assets	Mid-point of Capex Useful Life by asset type	AIAL FY23 Financial Report
OPEX Spend	FY19 operations expense is used as reference year (to exclude COVID period). This is indexed by CPI to produce operations expenditure over the forward outlook.	AIAL FY 19 Annual Disclosure, Schedule 2
CAPEX Spend	$3.1bn in PSE4 and $3.6bn in PSE5	AIAL Price Setting Disclosure (PSE 4) presentation – commissioned and indicative CAPEX

Varying these assumptions will alter the forward price path and subsequently the marginal impact on air passenger demand.

† *Auckland Airport FY23-27 price changes*, published 08-June-23, https://corporate.aucklandairport.co.nz/news/latest-media/2023/auckland-airport-fy23-27-price-changes

[3] AIAL PSE4 Price Setting Disclosure (commentary), published 17-Aug-23, https://corporate.aucklandairport.co.nz/-/media/Files/Corporate/Investors/2023/Regulation/AIAL-PSE4-Price-Setting-Disclosure---Commentary.ashx

[4] The public references used to develop the airport charges outlook are detailed in Appendix 4.

Results

Our analysis of the impact to passenger ticket prices from increased airport charges implies an own-price impact of [redacted] fewer domestic passengers by FY32. This represents [redacted] decline in traffic, compared to baseline[5].

Fig. 1. Total Domestic Market – Summary results, Economy

Route	Own-Price elasticity of demand[6]	FY23 - FY32 Passenger volumes ('000s)			
		Baseline	100% Price Glide Path	Reduction	% Reduction
Wellington	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Christchurch	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Queenstown	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Dunedin	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Regional Aggregate	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Source: Oxford Economics Australia/Jetstar/AirNZ/Auckland Airport Statistics

** A full passthrough of airport charge increases to passengers is referred to throughout as 100% Price Glide Path.*

The estimated increase in airport charges from proposed expenditure at Auckland Airport is expected to significantly impact passenger demand across New Zealand's domestic airline network. [redacted]

[redacted]

[redacted]

At a carrier level the own-price demand impact becomes even more significant. Fig. 2 presents a summary of the own-price impacts from the *Domestic*

[5] The baseline outlook includes escalation in the minimum air fare for each route. The baseline outlook assumes there are no supply constraints if the planned development doesn't take place.

[6] Elasticity estimates derived in Chapter 4.

[7] Based on purpose of travel estimates, provided to Oxford Economics Australia by AirNZ. See Chapter 4 for details.

Demand Study for AirNZ and *Domestic Demand Study for Qantas Group*, respectively. It is important to note that the results in Fig. 2 below are specifically based on potential increases in the airline's own price as a passthrough of the estimated airport charges price path for the proposed increase in capital expenditure at AIAL. At the carrier level, we do not make any assumptions about cross-price impacts from changes in their competitor's prices. As a result, the carrier level results in Fig. 2 doesn't aggregate to the market results in Fig. 1, as they exclude potential cross-price impacts.

Fig. 2. Own-Price Impact on Demand by Carrier – Summary Results

Carrier	Route	Own-Price elasticity of demand[8]	FY23 - FY32 Passenger volumes ('000s)			
			Baseline	100% Price Glide Path	Reduction	% Reduction
AirNZ	Wellington	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Christchurch	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Queenstown	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Dunedin	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Regional Aggregate	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Jetstar	Wellington	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Christchurch	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Queenstown	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	Dunedin	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Source: Oxford Economics Australia/Jetstar/AirNZ/Auckland Airport Statistics

** A full passthrough of airport charge increases to passengers is referred to throughout as 100% Price Glide Path.*

[8] Elasticity estimates derived in the *Domestic Demand Study for AirNZ* and *Domestic Demand Study for Qantas Group*.

1. INTRODUCTION

BARNZ, Air New Zealand and Qantas Group have jointly commissioned this study to estimate the impacts that higher aeronautical prices may have on future passenger volumes at Auckland Airport.

Auckland Airport is the largest and busiest airport in New Zealand, with over 20 million passengers in FY19 – the last full year not impacted by the COVID-19 pandemic. In March 2024, total passenger volumes at Auckland Airport were 87% of the pre-COVID equivalent and are steadily improving[9].

Auckland Airport is currently constrained by its existing legacy infrastructure from when the airport was developed over 50 years ago. Public statements on capital planning suggests Auckland airport is planning redevelopment that will see a period of significant investment in the airport[10]. This includes upgrading existing legacy infrastructure, integrating existing terminals as well as developing new terminal facilities.

The step change in capital investment at AIAL is expected to result in materially higher aeronautical charges for airlines. This study is intended to help inform BARNZ and its members on the impact of the proposed capital investment plan and cost recovery will have on end passenger demand.

Within this report we present a review of existing studies into own-price elasticity of air passenger demand; develop an estimate of airport charge forecast for the planned investment and conduct our own-price demand elasticity study for Auckland's air passenger market and produce forecasts of marginal impact from price rises on air passenger demand outlook.

Alongside this, Skylark who specialise in aviation modelling provide an independent review of the key findings, drawing upon their years of experience analysing passenger behaviour.

To produce the own-price elasticity of demand forecasts we take an econometric approach to analysing the own-price elasticity of demand, using flight passenger and price information for the period of 2015-2019[11].

More recent data (2020 onwards) is marked by the COVID-19 pandemic and subsequently, emerging from the lockdowns, realisation of pent-up demand, which is currently distorting normal behavioural patterns. We see this period of behaviour as a transitory occurrence and expect historical patterns to reassert themselves. For this reason, air passenger data from this period was not included in the analysis.

Alongside price, literature suggests other drivers of air passenger demand include – income effects; general population growth in a region; seasonal patterns for tourism and the general performance of the economy. We consider

[9] Auckland Airport (2024). March 2024 Monthly Traffic Update

[10] Building the gateway New Zealand needs | Auckland Airport

[11] Sourced from a combination of IATA, Auckland Airport Statistics, AirNZ data and Qantas flight data.

controlling for these factors in our modelling, to minimise the bias in the modelling of the relationship between air passenger demand response to price.

For more details on the econometric analysis, please see Appendix A1, A2 & A3.

Finally, we first produce an airport charges price pathway that is developed based on assumptions for capital spending and building blocks, available in the public arena. We then use our analysis of price elasticity of demand to determine the marginal impact on the passenger outlook.

2. LITERATURE REVIEW

This chapter summarises existing estimates of price elasticity of air travel demand in different markets and service classes as well as other key determinants of air travel demand.

2.1 PRICE ELASTICITY OF DEMAND ESTIMATES

The price elasticity of demand refers to the change in demand when there is a change in price. An elasticity of -0.1 implies that a 1% increase in price will lead to a 0.1% decrease in demand.

This section provides a summary of two studies into price elasticity of air travel that are relevant to the New Zealand context.

2.1.1 Global Elasticities – Estimating Air Travel Demand Elasticities (IATA, 2017)

A meta-analysis comparing over 20 price elasticity studies found that increases in price consistently lead to decreases in demand and noted that the persistence of this relationship across the literature “strongly indicates that any policy action that results in higher fares (e.g., taxes, increased landing fees) will result in a decline in demand” (IATA, 2007).

Fig. 3 summarises the results of the IATA meta-study and shows the persistent negative relationship between air fares and passenger traffic demand.

However, as Fig. 3 also shows, the degree of elasticity varies significantly across markets and routes. Though New Zealand is unique relative to many other global markets given there are far fewer substitutes for air travel, there are two key takeaways for New Zealand from the inspection of these results:

(1) Price elasticities on short-haul routes are generally higher than on long-haul routes reflecting the relative ability of passengers to substitute to alternative transport over shorter distances.

(2) Price elasticities faced by individual air carriers is higher than that faced by the whole market, that is, “the more general the applicability of a price change (perhaps due to higher costs or taxes) the less elastic the response” (IATA, 2007). This result is supported by other studies (Zheng & Graham, 2018) including in the New Zealand context (Henderson, 2019).

Fig. 3. Price elasticity estimates by fare change and length of haul

Fare change*	Route Level		National Level		Pan-National	
Haul	Short	Long	Short	Long	Short	Long
Intra North America	-1.54	-1.40	-0.88	-0.80	-0.66	-0.60
Intra Europe	-1.96	-1.96	-1.23	-1.12	-0.92	-0.84
Intra Asia	-1.46	-1.33	-0.84	-0.76	-0.63	-0.57
Intra Sub-Sahara Africa	-0.92	-0.84	-0.53	-0.48	-0.40	-0.36
Intra South America	-1.93	-1.75	-1.10	-1.00	-0.83	-0.75
Trans Atlantic (North America – Europe)	-1.85	-1.68	-1.06	-0.96	-0.79	-0.72
Trans Pacific (North America – Asia)	-0.92	-0.84	-0.53	-0.48	-0.40	-0.36
Europe-Asia	-1.39	-1.26	-0.79	-0.72	-0.59	-0.54

Source: IATA (2007)

** The route elasticity is applicable to a situation where the price of an individual route changes. For example, the fare on Warsaw-Coventry increases but the price of routes from Warsaw to other UK and other European points remain unchanged. The national elasticity applies to situations such as all Warsaw-UK prices changing identically, but the price from Warsaw to other European points being unchanged. Pan-national changes apply where prices from Warsaw to all points in Europe change identically (IATA, 2007).*

2.1.2 Australian Elasticities – Demand Elasticities for Air Travel to and from Australia (BTE, 1995)

An Australian study by the Bureau of Transport Economics (1995) replicates the negative relationship between prices and demand of the IATA study.

Australia is a more applicable comparator for New Zealand since in both countries air transport is the dominant mode of travel to and from the rest of the world. As a result of limited intermodal competition, price elasticity estimates for New Zealand (and Australia) are typically lower than other markets.

There are four key takeaways for New Zealand from the BTE study (results shown in Fig. 4):

1. The price elasticity of Australian leisure passengers to New Zealand destinations is relatively inelastic at -0.23 (shaded in Fig. 4). This result is replicated by a recent study on domestic passenger demand through Auckland Airport which derived a price elasticity estimate of -0.25 (Davi, 2022).
2. Australian passengers have a lower price elasticity than international travellers. This demonstrates that in isolated markets like New Zealand, travel distance can influence price sensitivity.
3. Business travellers are less sensitive to price changes than leisure travellers. This result is also supported by IATA (2007).
4. Elasticity estimates vary significantly between origin regions.

Schiff & Becken (2011) provide further evidence that New Zealand elasticity estimates vary significantly between origin regions. They found that Asian market segments were more sensitive to price changes (elasticity estimates of less than -1.0) compared to travellers from the UK, USA & Germany (relatively inelastic estimates of -0.29 to -0.87). These results support a significant body of literature which finds income is a key determinant of air travel demand (discussed in more detail below).

Fig. 4. Price elasticities for Leisure and Business Travel by origin country by direction of travel

	Overseas Residents to Australia		Australian Residents to Overseas	
	Leisure	Business	Leisure	Business
Germany	-1.23	-0.55	-0.50	-
Italy	-0.56	-	-0.29	-0.19
UK	-1.79	-0.21	-0.14	-0.20
Japan	-0.79	-0.24	-1.16	-
Korea	-0.50	-0.20	-1.14	-0.4
Taiwan	-0.83	-	-1.19	-
Indonesia	-1.46	-0.62	-0.48	-0.01
Malaysia	-0.78	-	-0.95	-
Singapore	-1.86	-0.22	-0.54	-0.12
Fiji	-0.80	-	-0.53	-
New Zealand	-0.68	-0.16	-0.23	-0.34
USA	-1.85	-0.45	-0.64	-

Source: Bureau of Transport Economics (1995)

2.2 OTHER DETERMINANTS OF DEMAND

There are many factors which affect the demand for air travel, moderate the effect of price on demand and therefore influence the price elasticity of different market segments. Some of the key determinants of demand are discussed below.

2.2.1 Income

Several studies have found income to be a main determinant of air travel, with a high degree of price elasticity (among others Gillen, 2004; Park & Koo, 2014; Graham, 2018).

Income elasticities are commonly found to be between 1 and 2 – that is, a 1% increase in income leads to a 1-2% increase in demand for air travel - indicating air travel increases at a higher rate than incomes (IATA, 2007).

In previous empirical studies income has been measured as disposable income, consumer expenditure, gross domestic product, gross domestic product per capita and even as a total wealth or assets.

As noted by IATA (2007) including an income variable isolates the effects of a shift along the demand curve (such as would be caused by a price change) from the effect of a shift in the demand curve (as might be caused by a change in income levels). The strength of this result in the literature led us to control for income in our model specifications (see Appendix A1).

2.2.2 Population

Population has a direct effect on the size of the market or potential demand and therefore any increase in population has the potential to increase demand for travel between two locations.

Many price elasticity of demand models in the literature control for population since failing to account for market size can lead in biased estimates if omitted from the model specification (IATA, 2007). The strength of this result in the literature led us to control for population in relevant model specifications (see Appendix A1).

2.2.3 Migration

Migration flows can influence international tourism flows through several channels (Okafor, 2022; Seeteram, 2012):

- In the context of outbound tourism, it may be expected that migrants will travel back to their birth country.
- Business related travel through established business connections in the home country.
- Finally, as the pool of immigrants grows, New Zealand is likely to be more exposed to the culture of other countries and this may generate interest among New Zealanders in overseas destinations.

Genc (2013) estimated the impact of immigration on tourism flows in New Zealand and found that, all else equal, a 1 % increase in immigration leads to a 0.21 % increase in the number of visitors from that country.

Similarly, an Australian study by Seetaram (2012) estimated demand elasticities for international short-term departures from Australia and found that immigration was the second largest driver of long-run demand, with a 1% increase in immigration leads to a 0.6% increase in short-term departures).

The strength of this result in the literature led us to include migration in some international model specifications (see Appendix A1).

2.2.4 Competitor Fares

Competitor fares have been found to have an impact on demand for individual airlines. This is also known as cross-price elasticity of demand – the impact on demand for two or more substitutable products when the price of one changes.

Park & Koo (2014) estimated cross-price elasticises for several airlines operating in the United States and found that a 1% increase in a competitor's air fare increases demand for an alternative airline by 0.2% to 1.4%.

The strength of this result in the literature led us to control for competitor fares in the model specifications for individual airlines (see Appendix A1). For the total market analysis this is not a relevant consideration. While alternative modes of transport is one such substitution risk, the time trade-off makes this a low risk alternative, as we discuss in Chapter 3.

2.2.5 Competitor Routes

Beyond competition between carriers at the route level, the academic literature has also found cross-price elasticity of demand between domestic and international routes – that is, domestic and international flights are substitutes to some extent.

Athanasopoulos et al. (2014) found the strongest substitution impacts from domestic Australian to international routes is for closer international destinations (NZ and Asia). This result is supported by Nicolau & Mas (2006) and Forsyth & Dwyer (2009).

This hypothesis was not tested in this study. We were not able to ascertain if fall in air passenger demand in response to price was owing to passengers choosing not to fly or from passengers choosing an alternative flight path. We expect a combination of both these forces contribute to the own price elastic coefficients derived in this study, as discussed in Chapter 3.

2.2.6 Seasonal factors

Air travel demand is seasonal due to, amongst other things, seasonal weather patterns and holiday periods. A study by the Bureau of Transport Economics found that seasonal dummy variables were a significant explanatory variable in their leisure demand model (BTE, 1995).

The strength of this result in the literature led us to control for seasonal factors by using moving annual averages and adding further dummy variables where needed. See Appendix A1 for more details on the methodology and approach to estimation.

3. PRICE ELASTICITY FOR DOMESTIC DEMAND: AGGREGATE STUDY

This chapter analyses the responsiveness of demand to weighted average flight prices on domestic routes to and from Auckland. Air travel demand within New Zealand can be broken into two separate segments. Namely, domestic demand on trunk routes and domestic demand on regional routes.

Trunk routes refer to the major domestic travel routes which comprise of the bulk of domestic air demand. Regional routes connect key regional areas to the main domestic hubs within the country. This report breaks down the study of air passenger demand by domestic trunk routes and regional routes. The results are discussed within this chapter.

3.1 DOMESTIC DEMAND FOR TRUNK ROUTES

The trunk routes are a key portion of domestic air traffic, comprising 71% on average between 2015 and 2019 of all inbound domestic traffic to Auckland airport. [redacted]

[redacted]

Passengers travel between these routes for a number of purposes – ranging from tourism to migration, visiting family and friends to business related travel. Auckland is the business capital of New Zealand, representing 37% of GDP in FY19.

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	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[12] Own price elasticity of demand refers to the response in air passenger demand to changes in fares on that route. In this case, the fares used for the analysis on each route reflect a weighted average of fares across carriers on this route.

[13] If demand has a price elasticity coefficient less than 1.0 (i.e. a 1% increase in price has a <1% demand response), demand is said to be *inelastic*. Conversely, demand with a price elasticity coefficient greater than 1.0 is classified as *elastic* demand.

[14] https://www.newzealand.com/int/travel-times-and-distances-calculator/, New Zealand travel time and distance calculator

[redacted]

[redacted]

[redacted]

[redacted]

3.2 DOMESTIC DEMAND FOR REGIONAL ROUTES

Auckland is also a main connecting hub for regional routes. Carriers operate between Auckland and over 15 regional routes daily. In this section, we estimate the aggregated price elasticities of demand for passengers on key regional routes linking main regional areas with Auckland Airport. Regional passenger volume represents [redacted] of total domestic traffic through Auckland Airport between 2015 and 2019 and has been relatively stable.

[15] If demand has a price elasticity coefficient less than 1.0 (i.e. a 1% increase in price has a <1% demand response), demand is said to be *inelastic*. Conversely, demand with a price elasticity coefficient greater than 1.0 is classified as *elastic* demand.

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[redacted].

4. DOMESTIC DEMAND ELASTICITY: DETAILED STUDY

4.1 INTRODUCTION

In this chapter, we take a deeper look at own-price elasticity of demand. We extend the work from Chapter 3, by focusing on the price responsiveness of the total market demand to minimum price fares.

We take this approach to control for cross-class substitutions. A limitation of looking at total passenger demand response to a weighted average fare is that this masks the response to a change in fare structure across ticket classes.

For example, if there are substantial increases in fare price for the higher fare categories, this would increase the weighted average fare. However, passengers may choose to still fly but substitute to a lower fare type. Therefore, the aggregate regression results would yield conservative coefficients for own-price elasticity.

We look to address this limitation within this section. By focusing the analysis on movement in the minimum fare, this limits the opportunity for fare driven cross-class substitution. This gives us a more accurate view of the portion of passengers lost when fares increase.

The analysis in this section makes use of more granular data, provided by each of the carriers in the domestic market and aggregated for total market analysis. This data differs from that used Chapter 3, which sources IATA data. Please note this when comparing results from Chapter 3.

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- [redacted]
- [redacted]

4.2 DESCRIPTIVE STATISTICS

To better understand the behaviour of historical passenger and fare movements, we analyse the descriptive statistics for air travel on each route. Specifically, this section presents descriptive statistics on three key areas:

- The purpose of travel
- Passenger distribution across fare types
- The ratio of average-fare-prices to minimum-fare-prices

This analysis is useful for understanding the composition and drivers of demand for each route. The results are then used to inform the results from the own-price elasticity of demand analysis in the subsequent sections.

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Fig. 15. Own-Price Elasticity Coefficient of Air Passenger Demand, by route

	Fare	Wellington	Christchurch	Dunedin	Queenstown
All PAX	Average	[redacted]	[redacted]	[redacted]	[redacted]
	Minimum	[redacted]	[redacted]	[redacted]	[redacted]

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	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	-0.74	-0.44	-0.64

[redacted]

5. AIR PASSENGER DEMAND OUTLOOK: DETAILED STUDY

This chapter establishes the baseline passenger outlook across the domestic trunk and regional routes in New Zealand and investigates the own-price impact on demand as a result of estimated increased airport charges as outlined from the proposed increase in expenditure at AIAL. This uses the own-price elasticity of demand estimates in Chapter 4.

5.1 BASELINE PASSENGER DEMAND OUTLOOK

Domestic air travel demand collapsed with the onset of the COVID-19 pandemic in FY20. The imposed lockdowns and travel restrictions limited travel and domestic passenger numbers continued to decline through FY22. Passenger numbers fell to 41% of pre-COVID-19 levels (FY19) across the four trunk routes. The high-traffic routes to Auckland from Christchurch and Wellington were hit the hardest, whilst the adventure capital of New Zealand, Queenstown, was slightly more insulated from the decline in demand.

Demand is forecast to increase over the outlook thanks to a successful vaccine rollout and subsequent removal of travel restrictions. Domestic passenger demand is expected to rebound strongly as a result. As illustrated in Fig. 18, we forecast *Economy* passenger demand across the domestic routes in FY24 to be nearly double that of FY22. The latest passenger volumes have seen a strong pick-up in demand and we expect that to continue through the remainder of this financial year.

Fig. 18. Baseline Passenger Demand Outlook by route, Economy

[redacted]

Passenger volumes are expected to surpass pre-COVID (FY19) levels by FY25. Over the medium to long run we forecast domestic passenger demand to increase 5.5% p.a. over the 8 years to FY32. Following the period of disruption caused by the pandemic, demand growth is expected to taper off, returning to similar levels seen over the FY16 to FY19 period.

5.2 PRICE GLIDE PATHS

BIS Oxford Economics has estimated an airport charges price path for the proposed increase in capital expenditure at AIAL. This assumes a total of $6.7bn in CAPEX is spent through PSE 4 & 5[18]. Fig. 19 lists the proposed increases in airport charges. Nominal airport charges for domestic travellers are proposed to increase from $6.70 in FY22 to [redacted] in FY32.

Fig. 19. PSE3/PSE4/PSE5 nominal airport charges by passenger type, NZD

Type	'22	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32
International	25.3	23.3	32.8	36.7	41.1	46.1	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Domestic	6.7	6.7	10.3	11.8	13.5	15.5	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Regional	4.7	4.7	7.1	8.1	9.3	10.7	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Source: Oxford Economics Australia / AIAL Disclosures/ Commerce Commission/ AIAL PSE4 Price Setting Disclosure commentary (17 August 2023) used for PSE4 prices.

[redacted]

[redacted]

[18] This assumption is based on AIAL disclosures & Jarden research. Additionally, Auckland Airport in their 8-June 2023 market release note $1.7 bn of spend will be allocated towards a new domestic facility. Most of this ($1.3 bn) has been allocated to domestic aeronautical charges.

[19] A price glide path refers to the path of proposed increases in airport charges between FY22 and FY32 at a pass through rate of between 40% and 120%. This provides a continuum of potential price increases on airfares based on the current charges that are still under consideration.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

6. SKYLARK REVIEW

6.1 INTRODUCTION

Skylark Consulting Group ("Skylark") understands that Auckland International Airport Limited ("AIAL") is planning a period of significant investment and requires an independent validation on the impact of price impacts of the change of capital investment on future passenger volumes. This section contains the review of BIS / Oxford Economics' ("BIS") analysis of elasticity and the impact of price, undertaken by Skylark.

6.2 LITERATURE REVIEW

6.2.1 Explanation of Terms

Elasticity is an economic concept used to measure the response of one variable to a change in another. In particular, the pertinent metric in this case is to analyse *demand elasticity.* Demand elasticity measures the change in demand for a product or service given a change in another variable. In this case BIS is attempting to understand the response of demand to changes in air fares. Typically, demand will fall as prices increase. However, there are multiple variables that impact passenger demand and cleanly isolating the impact of changes to air fares can be difficult.

The standard accepted methodology for studying price elasticity of air fares is to look at the observed changes in air fares and the impact this has on demand (passenger traffic data). The value of demand elasticity will vary depending on the context in which it is considered. In air transport, there are five primary levels for which demand elasticity can be estimated:

- Fare Class Level: Passengers choose between different fare classes on an individual airline.
- Carrier Level: Passengers choose which carrier (when there are a number of carriers operating the same route), reflecting demand for each airline on a specific route
- Route or Market Level: Passengers facing fare changes across all carries operating a route will have fewer substitution options than changes at the carrier level
- National Level: Passengers facing increased prices on all routes to and from a particular country could only avoid fare changes using a different mode of transportation
- Pan-National Level: Change in price across a regional level, for example, imposed aviation taxes in the EU. Substitution options are minimal.

Cross-price elasticities also exist where, in response to price changes, demand shifts onto a substitute or complimentary product or service. For example, if first class fare prices increased, demand for the other fare classes may increase.

6.2.2 InterVISTAS report

The InterVISTAS report[22] prepared for IATA included an extensive literature review on air fare demand elasticities, with 23 studies examined in total. General findings are summarised below.

Across all 22 studies, there was evidence of increases in air fares leading to a reduction in passenger demand. The extent of this impact was dependent on the following factors:

- **Reason for Travel:** Business travellers were in general less elastic (i.e. less sensitive) to fare changes than leisure passengers. While business travellers do decline as fares increase, the impact is greater for leisure passengers who typically have more flexibility in travel plans.
- Short-Haul versus Long-Haul: In general, short-haul routes appeared more elastic than long-haul, in part due to the greater options for substitution in different modes of transport for short-haul routes.
- Carrier Versus Market Versus National: Some studies indicated demand elasticity is higher for some individual carriers than for the whole market, while others saw the opposite trend.
- Income Elasticities: All of the studies indicated air travel increases at a higher rate than incomes.

InterVISTAS then supplies ranges of elasticities from the reviewed literature in combination with their independent analysis. The explanatory variables in the regression analysis included: average fare price, GDP, population, route distance, substitute goods, real exchange rates, and time variables, with an emphasis on the importance of GDP and population.

The analyses were broken out using the following datasets:

[22] Estimating Air Travel Demand Elasticities, InterVISTAS Consulting Inc, 2007

- U.S. DOT Data Base 1B for U.S. domestic market data
    - Price elasticity estimates between -0.8 to -1.5, mildly inelastic to elastic
    - Income elasticity in the range of 1.0 and 1.8, elastic
    - Population estimates between 0.5 to 1.8, inelastic to elastic
- IATA's Passenger Intelligence Service for analysis of world regions
    - Price elasticity estimates between -0.8 to -0.9, mildly inelastic
    - Income elasticity in the range of 1.2 to 1.5, mildly elastic to elastic
    - Population estimates did not yield a statistically significant result
- UK International Passenger Survey for analysis of the UK outbound market
    - Price elasticity estimates between -0.4 and -2.9
    - Income and population elasticities were not used as input figures were only available at national levels

The consensus is that demand for airline services is generally both price elastic and income elastic. GDP is a commonly used as a proxy for income; it has a benefit over GDP per person as a proxy as it includes a population effect.

This finding has been replicated in the InterVISTAS report, with different price elasticities depending on the context. A further finding was that if all carriers on a route, or on multiple routes between markets experience a price increase, demand becomes less elastic due to the lack of substitutes.

As a result, for a specific carrier on a given route, increasing fares will likely result in reduced demand, and vice versa. If this fare increase is implemented across all carriers on the route, the reduction in demand will be less. If all carriers on a wide number of routes increase fares by a similar proportion, the reduction in demand will be mitigated yet further. In summary, the wider the application of a price, the less elastic the demand response will be. This has obvious implications for Auckland, as the increase in charges affects all flights. Note that the proportional impact on demand should be less for high-fare routes than low-fare routes given the proportional impact on travel costs will also be lower.

6.2.3 Sapere Research Group [23]

Report prepared for the Ministry for Primary Industries. Authored by Vhari McWha and Kieran Murray.

This study estimates the possible impacts of a NZD 22 fare increase by airlines on the number of inbound tourists to New Zealand. The study relied on price

[23] Effects of an increase in travel ticket price on New Zealand tourism, Sapere Research Group, 2015

elasticity of demand of international visitors to New Zealand from the comprehensive study by Schiff and Becken (2011).

Fig. 23. Price Elasticity of Arrivals to New Zealand by Purpose of Visit, Schiff & Becken (2011)

Segment	Elasticity	Standard Error
Australia FIT Holiday	-0.26	0.11
Australia FIT VFR	-1.05	0.42
Australia Tour	-0.31	0.13
UK Holiday	-0.52	0.25
US FIT Holiday	-0.29	0.12
US Tour	-0.78	0.17
Japan Tour	-1.55	0.48
South Korea All	-1.75	0.64
China FIT	-1.65	0.73
China Tour	-1.09	0.55
Germany All	-0.87	0.41

Source: Schiff & Becken (2011). Note: VFR denotes "visiting friends and relatives". The study distinguished between fully independent travellers "FIT" with those travelling as part of a tour. n/a categories omitted for clarity.

The key results of the report are summarised below.

Australia

The largest absolute reduction in visitors is in the segment of Australian travellers to New Zealand visiting friends and relatives ("VFR"). However, the elasticity estimate of -0.26 for holiday visitors appears understated although this is expected to be lower than VFR given the ability to substitute another holiday destination.

UK

The study did not yield elasticity for VFR or business travellers from the UK to New Zealand, suggesting these visitors do not respond to small changes in price (in this case an $22 increase). Instead, the study suggests that when total price of travel increases, on the ground expenditure by UK VFR travellers falls.

US

As with the UK, US VFR and business travellers' segments did not yield statistically significant elasticity estimates in this study. It is therefore estimated that there will only be a small reduction in travel from an increase in price.

6.3 REVIEW OF BIS OXFORD ECONOMICS' METHODOLOGY

Input data from 2015-2019 was used for the analysis. This is a relatively short period for a regression analysis with an expected economic driver, but remains, in Skylark's view, sufficient for a credible analysis. Skylark agrees with the decision to exclude the years following 2019 for the following reasons:

- Air travel was highly suppressed during the Covid-19 pandemic when travel restrictions were in place.
- Travel in 2022, although returning towards pre-pandemic levels at a rapid pace (October 2022 at 76%), also does not reflect typical travel trends due to the pent up demand following two years of suppressed travel, as well as the need to use up flight or holiday vouchers so postponed trips from cancellations during the pandemic.
- Even towards the end of 2022, travel trends are likely still not indicative of typical trends due to the global cost of living crisis, affecting not only New Zealand but also the other countries that are key routes in New Zealand's air travel network.

BIS has produced elasticities at route, market and aggregate (domestic) levels. Skylark has confidence that analysis at all levels have been approached in a reasonable way given the limited data available for the thinner routes and smaller markets. It has proven necessary for a diverse selection of variables to be utilised in the regression analysis to obtain credible results which conform to an intuitive view of the likely drivers. While not ideal – it is clearly preferable to limit the variables as far as is practical for inter market/route comparability – the data limitations meant it was necessary.

BIS has also sought to tackle the issue of transfers between fare classes by analysing the lowest fare tier. Transfers to a cheaper class are not possible and so reduced demand in that class is equivalent to a reduction in flying passengers. This approach is imperfect (see our reservations below) but, in our opinion, provides a clearer and more accurate picture of likely traffic loss as it is less 'contaminated' by cross-class substitutions.

6.3.1 Reservations on Methodology

While the methodological approach of deriving elasticities using changes in a single fare class may be logically consistent, typical airline pricing behaviour means increasing airport charges may not directly result in the expected loss of traffic. This is because airlines are aware that higher fare classes are relatively inelastic, and so they have a tendency to pass cost increases on to those classes in a disproportionate manner. Taken to the extreme – as a thought experiment – cost increases passed solely to the highest fare class are likely to result in higher cross-fare substitution and a lower level of aggregate traffic loss than if fares are increased uniformly across all fare classes. This will, of course, result in a reduction in average fare prices and lower airline margins.

Airline response strategies may also include the early closure of lower fare classes in an attempt to maintain overall yields (i.e. there are fewer tickets at lower price points). Finally, airlines may also choose to absorb some or all additional costs and accept the loss of margin as the cost of retaining traffic.

Note that in all the airline behaviours discussed, cost increases translate to a negative impact on an airline's business either through reduced passenger numbers or reduced margin. Lower-than-expected traffic losses, should that occur, do not necessarily translate to a lower economic impact on the airline.

6.4 REVIEW OF BIS OXFORD ECONOMICS' RESULTS

OE's report focusses primarily on historically observed elasticities derived from historic relationships between fares and demand levels. OE rightly notes that historic meta-studies of air fare elasticities ascribe significantly higher levels of elasticity at a route or airline level compared to a market or national level. This is because passengers can substitute travel with one airline for another on the same route, or can substitute a given route with another.

Substitution at a route level is a common phenomenon. The growth of the low cost sector resulted in several airports losing market share as airlines operated from alternative airports offering lower airport charges. An example is Brussels Airport in Belgium, where low cost operators launched services from nearby Charleroi leading to Brussels' primary airport losing market share. Although the distance from Brussels City to Charleroi is some 60 km more than the distance from Brussels City to Brussels Zaventem airport (significant in European terms), the substitution effect was strong. Similar effects have been experienced in Stockholm (between Arlanda and Skavsta), Frankfurt (Hahn and Frankfurt) and Manchester (Liverpool and Manchester)

Another type of substitution exists for transfer traffic. Transfer passengers are highly footloose. For example, a passenger from Edinburgh (UK) to New York would be happy to transfer through Amsterdam, Dublin, or London. Although factors such as minimum connect time are important, a transfer passenger would value strongly fare differential in making a choice of connecting airports.

OE comments that substitution effects in the New Zealand and Auckland context are limited given geographical factors. This generally accounts for the relatively low elasticities that OE presents. Skylark agrees with this assessment but would make the following points:

From a domestic perspective, Auckland abuts the catchment areas of Hamilton and Rotorua. Increasing fare differentials between Auckland and those airports will have the effect of strengthening the business case for additional domestic or international routes from Hamilton and Rotorua. This is the case even if the scope for Hamilton and Rotorua to capture traffic to/from Auckland is limited. This is likely to put pressure on the profitability of Auckland routes.

- Skylark also note that airlines in general locate aircraft to maximise profitability. From this perspective Auckland is competing for service provision not just with Hamilton and Rotorua but with (say) Christchurch, Wellington and Sydney for given airline fleets.

- From an international perspective, as discussed above, the result of fare differentials between Auckland and other international arrival points (in particular Wellington) is likely to be to divert transfer passengers to those alternative points. So a passenger from Hamilton would be more likely to fly to Sydney via Wellington rather than take a direct flight from Auckland. Wellington has several large scale unserved markets such as Canberra and the Gold Coast[24] – these routes would become more viable from Wellington if a cost differential opens up between Wellington and Auckland. This impacts both international routes and domestic feeds.
- Inbound international tourists are often relatively indifferent as to the port of arrival and departure. An example is provided by Asian inbound passengers. As OE notes, New Zealand attracts significant inbound traffic from Asia. It is likely that a high proportion of such traffic is leisure. Although Skylark understands that Auckland Airport has the highest proportion of such inbound traffic, it is not clear that visiting Auckland City is a top priority for visitors. The largest category is North Asian, and in particular Chinese. A Tourism New Zealand report stated that a top priority for Chinese visitors is 'wildlife activities' which are by no means exclusive to Auckland[25]. Visiting Auckland City explicitly does not appear to be a priority. In this context. It is likely that many Chinese visitors undertake a tour of the country more generally and would consider departing or arriving from a different port than Auckland, and thus would take an onward domestic fright from that other airport to the detriment of Auckland traffic. In 2019, Auckland accounted for the majority of arrivals from China[26] (c.80%) but substantial minorities arrived at Christchurch and Queenstown. Some 35% arrived via Australia indicating potentially a wider choice of arrival points in New Zealand. In this context, a price change at Auckland alone is highly likely to affect the distribution of (for example) Chinese arrivals to New Zealand. Similar effects are likely to exist for travellers from Europe and North America.[27]

In summary, although Skylark agrees with OE's conclusion that substitution effects are limited in the NZ context compared to elsewhere in the Asia-Pacific region or globally, for the reasons given above Skylark would expect route impacts and specific O&D market impacts to be material. On this basis, OE's elasticity impacts appear to be moderately conservative at route level compared to Skylark's a priori view, and particularly on trunk routes.

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[24] http://www.therouteshop.com/profiles/wellington-airport
[25] https://www.tourismnewzealand.com/assets/insights/market-overview/china-visitor-information-july-2020.pdf
[26] https://figure.nz/chart/2XpWUk7dR7YJzPbv-QaX6HL9FQTm3Zm1F
[27] https://www.newzealand.com/uk/trips-and-driving-itineraries/8-14-days/. Possibly usable – many of these itineraries start from Christchurch rather than Auckland

Nevertheless, Skylark believes that the outturn elasticities are credible and fall within the range of expected values considering the market and the impact of passenger mix. The discussion presented on the behaviour of different passenger types is consistent and provides a robust and rational explanation for variations between routes, although some variation may be better ascribed to a data set which is only available for a limited period.

6.4.1 Pandemic-Induced Changes to Passenger Mix

Skylark recently undertook a study into the effect of the pandemic on business traffic for the UK CAA[28], which included interviews with a wide variety of businesses. This concluded that the surge in the use of on-line communication tools such as Teams and Zoom, and the consequent uptick in 'acceptance' of e-meetings as an acceptable substitute for face-to-face meetings for some purposes, will lead to a permanent reduction in business travel. There was also a secondary, but more limited, effect of companies trying to reduce their carbon footprint, which they are required to report emission by law in some jurisdictions.

Skylark believes the report's findings are equally applicable to business travel in New Zealand.

In the context of this report, this means that leisure travellers will increase as a proportion of total passengers as airlines adjust their focus to maintain traffic levels. As this type of passenger is more elastic to price changes than business traffic, then the current and future average elasticity is expected to be materially higher than that calculated from historical (pre-pandemic) data. As an isolated effect, this would translate into higher traffic losses from an increase in fares than would be expected from a study of historical data.

6.5 ANCILLARY ANALYSIS OF POTENTIAL SUBSTITUTIONS

The ability of a passenger to substitute an alternative route to their destination is likely to reduce demand elasticity. This summary analysis highlights alternatives for potential Auckland passengers. 2019 was chosen as the year to be evaluated as this matches the final year of the BIS analysis.

Whilst Qantas does not operate domestic routes within New Zealand, low-cost carrier Jetstar (wholly owned subsidiary of Qantas) has one of its operating bases at Auckland Airport and competes with multiple domestic routes provided by Air New Zealand.

[28] http://publicapps.caa.co.uk/docs/33/CAP2366A.pdf

[redacted]

6.5.1 Overlap of International Routes from Auckland & Wellington

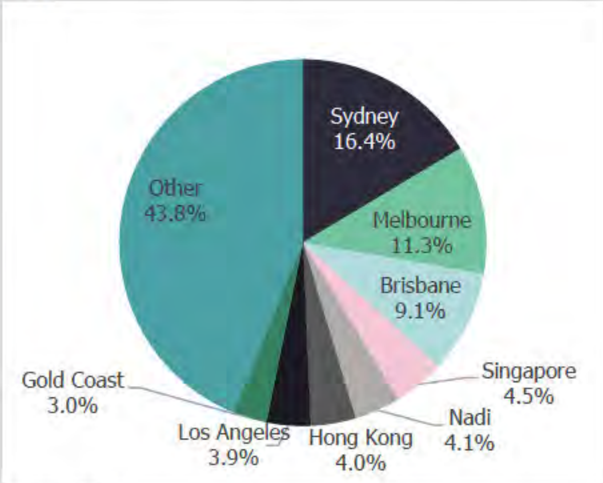
Five of the top eight international destinations from Auckland were also served from Wellington. In all cases, Auckland provided at least four times the departing seats.

Fig. 25. Top International Routes from Auckland, 2019 Departing seats

Airport	Auckland	Wellington
Sydney	1,141,678	269,662
Melbourne	787,417	169,595
Brisbane	631,264	118,307
Singapore	312,534	-
Nadi	282,473	21,023
Hong Kong	275,826	-
Los Angeles	269,047	-
Gold Coast	208,537	29,826

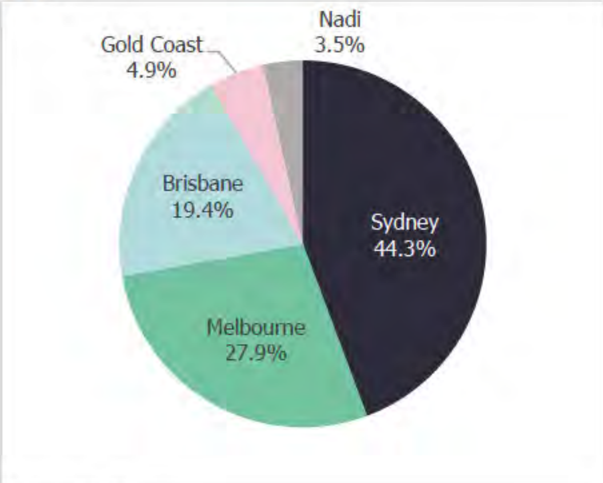
Source: OAG

Fig. 26. Top International Destinations from Auckland by Seat Capacity, 2019



Source: OAG

Fig. 27. Top International Destinations from Wellington by Seat Capacity, 2019



Source: OAG

6.5.2 Overlap of Domestic Routes from Auckland & Wellington

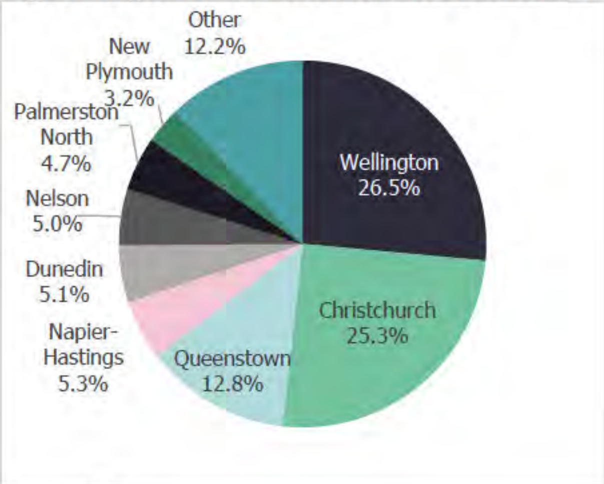
While the overlap between Auckland and Wellington on domestic routes has poor substitutability for traffic originating in New Zealand, it provides alternatives for arriving international travellers with another domestic destination. All of the top eight domestic routes from Auckland are also served from Wellington, with the exception of Wellington itself. Volumes on these routes are more similar than for the top international routes served from both airports, but in no case does Wellington have more outbound seats to the top domestic destinations than Auckland.

Fig. 28. Top Domestic Routes from Auckland with Overlap at Wellington, 2019 Seat Capacity

Airport	Auckland	Wellington
Wellington	1,492,681	n/a
Christchurch	1,427,035	588,923
Queenstown	722,164	157,969
Napier-Hastings	298,494	86,666
Dunedin	285,912	167,528
Nelson	279,584	215,951
Palmerston North	266,544	22,800
New Plymouth	180,628	52,586

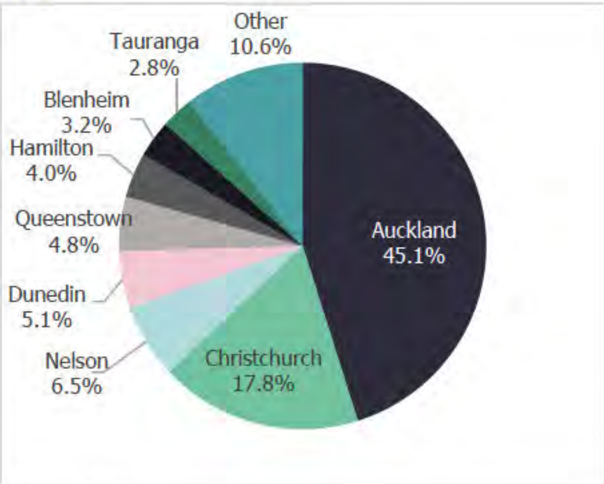
Source: OAG

Fig. 29. Top Domestic Destinations from Auckland by Seat Capacity, 2019



Source: OAG

Fig. 30. Top Domestic Destinations from Wellington by Seat Capacity, 2019



Source: OAG

Fig. 31. Domestic Routes from Auckland, 2019

Source: OAG

Fig. 32. Domestic Routes from Wellington, 2019

Source: OAG

6.5.3 Routes from Hamilton and Rotorua

There is possible substitution between Auckland and the (relatively) nearby airports of Hamilton and Rotorua. The former alternative is c.90 minutes' drive-time from Auckland, and the latter is c.150 minutes.

Fig. 33. Routes from Hamilton and Rotorua with Overlap at Auckland, 2019 Seat Capacity

Airport	Auckland	Hamilton	Rotorua
Wellington	1,492,681	131,700	51,586
Christchurch	1,427,035	89,692	64,872
Palmerston North	266,544	22,750	-
Auckland	-	-	56,336

Source: OAG

Fig. 34. Destinations from Hamilton by Seat Capacity, 2019

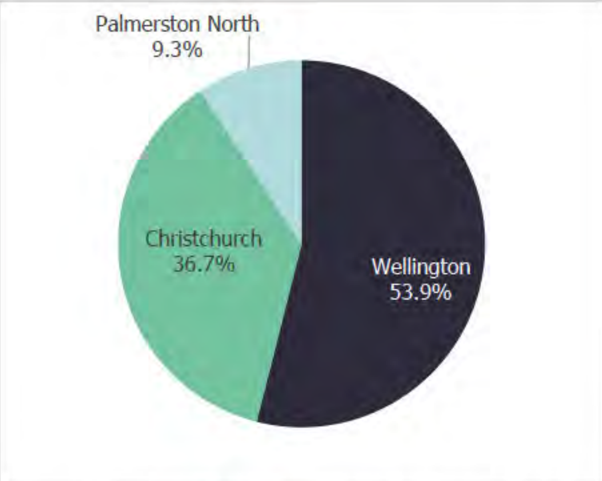
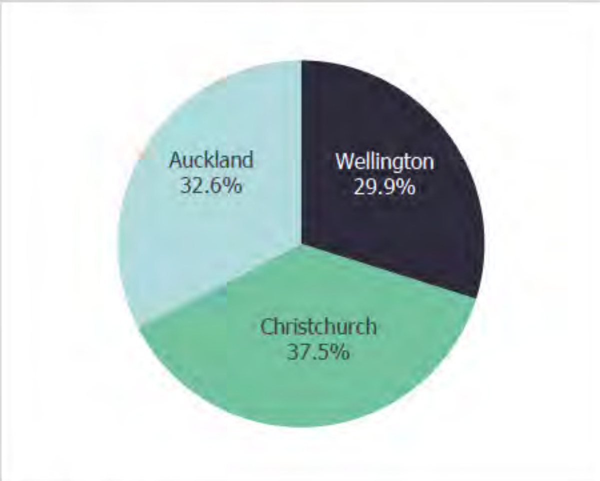


Fig. 35. Destinations from Rotorua by Seat Capacity, 2019



Source: OAG. Note: There are no international routes from Hamilton or Rotorua.

Fig. 36. Routes from Hamilton, 2019

Source: OAG

Fig. 37. Routes from Rotorua, 2019

Source: OAG

Abbreviations

Abbreviation	Definition
AIAL	Auckland International Airport Limited
BTE	Bureau of Transport Economics
IATA	International Air Transport Association
PSE3/PSE4/PSE5	Price Setting Event 3/4/5
UK	United Kingdom
USA/US	United States of America

A1 PRICE ELASTICITY OF DEMAND MODEL SPECIFICATIONS

This section presents the econometric results for the demand price elasticity modelling for each route, by cabin class.

Data Sources

The air passenger demand and fare data used for this modelling were sourced from a combination of IATA, Qantas and AirNZ provided data. The data was available from 2015 onwards, at a quarterly frequency.

Data beyond 2020 was excluded from the sample as this period is marked by the pandemic and subsequently, emerging from the lockdowns, realisation of pent-up demand, which is currently distorting normal behavioural patterns. We see this period of behaviour as a transitory occurrence and expect historical patterns to reassert themselves over the long run.

The model was developed using data on a moving annual basis, in order to preserve datapoint for modelling while removing some seasonality out of the model.

Other economic data was sourced from Haver Analytics.

Modelling Approach & Robustness Checks

The econometric modelling results are presented for each route and by cabin class (where applicable). To model price elasticity of demand, we used a log-log *Ordinary Least Squares* econometric approach. This allows us to interpret econometric coefficients as elasticities.

The model also includes other economic drivers as control variables, to minimise bias on the coefficient of fare price. These included a combination of income per capita, GDP per capita, unemployment rate, exchange rate (for international markets) and population as well as dummy variables to capture seasonality or to control for extreme outliers that were not explained through economic drivers but may bias the coefficients. The control variables were chosen on the basis of literature and our prior understanding of economic drivers of demand.

While seasonal dummies were considered in the model, these were not always required as much of the seasonality was remove in converting the quarterly datasets to moving annual aggregates.

In developing the model specification for each demand segment, we used stepwise regression of the combination of control variables to come up with the most optimal model specification. Additionally, given the limited historical time series (data only goes back to 2015), the estimated models and historical relationships we have identified are subject to some uncertainty. Therefore, in our model selection we prioritised minimising residuals and checking for heteroscedasticity[29] and exercised some judgement on the sensibility of the coefficients.

One of the challenges in these demand-price model studies is that the model can also suffer from endogeneity, where the fare price can impact demand response, but demand response can also impact fare price. This can bias the price elasticity coefficient. To address this, we have used lags in fare price as previous period fare price may impact current period demand but current period demand will not impact previous period flight fares. Seetaram (2012) also notes that there is often a lag between when the ticket is purchases and when the trip is taken, further supporting the inclusion of a lagged fare price in the model specifications.

A1.1 WELLINGTON – ECONOMY

[redacted]

[redacted]

[redacted]

[redacted]

A1.2 CHRISTCHURCH – ECONOMY

The following model was found to be the best fit for Christchurch *Economy* class air passenger demand, where:

[29] Heteroskedasticity refers to correlation or trend in residuals which can imply that a model has been mis-specified and suffers from omitted variable bias.

[redacted]

[redacted]

[redacted]

[redacted]

A1.3 QUEENSTOWN – ECONOMY

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

A1.6 NELSON – ECONOMY

[redacted]

[redacted]

[redacted]

[redacted]

A1.7 PALMERSTON NORTH – ECONOMY

[redacted]

[redacted]

[redacted]

[redacted]

A1.8 REGIONAL AGGREGATE – ECONOMY

[redacted]

[redacted]

[redacted]

A2 PRICE ELASTICITY OF DEMAND MODEL SPECIFICATIONS: DETAILED STUDY

Total Demand vs. Minimum Fare Price, by route

The following models were found to be the best fit for domestic trunk air passenger demand, where:

$MAA(Fare)_{t-1}$: is the average low cost fare offered by airlines that service the route, lagged one quarter. A negative price elasticity coefficient implies that as fare price's increase, air passenger demand falls.

$MAA(Real\ Income\ per\ Capita)_{t-1}$: is the moving annual average income per capita, lagged one quarter. A positive coefficient reflects that as individuals get wealthier, all else held constant, their propensity to spend on travel increases.

$MAA(Real\ GDP\ per\ Capita)_{t-1}$: is the moving annual average GDP per capita. A positive coefficient reflects that as economic conditions improve, adjusting for increases to population, individuals get wealthier and all else held constant, their propensity to spend on travel increases.

$MAA(Population)_{t-1}$: is the moving annual population, lagged one quarter. This captures the general population and therefore volume of air travel. A positive coefficient reflects that as the general population increase there is greater volume of air passenger travel.

$Dummy\ variables$: exclude significant outlier events from the estimation and are included to stabilise the residuals and therefore improve the performance of the model specification. A Sep-17 dummy was included to account for a potential partial data point at the start of the sample period. This accounts for passengers that flew in that period but purchased before the beginning of the dataset.

[redacted]

A3 PRICE ELASTICITY OF DEMAND MODEL SPECIFICATIONS: REGIONAL ROUTE SEGMENTED DEMAND ANALYSIS

This section presents the detailed elasticity estimates for the trunk and regional analysis, segmenting demand by various splits. The results are discussed in detail in Chapter 4.

$MAA(Fare)_{t-1}$: is the average low-cost fare offered by airlines that service the route, lagged one quarter. A negative own-price elasticity coefficient for this implies that as fare prices increase, air passenger demand falls.

[redacted]

A4 AIRPORT CHARGE MODELLING DATA SOURCES

To understand the impact that Auckland Airport's proposed capital spend will have on passenger demand, we developed an estimated price path of airport charges over price setting event 5.

The following sources were used as reference to develop the pricing path for this analysis:

Building Blocks Model Data References

Component	Assumption	Source
WACC	8.73%	Auckland Airport FY23-27 Price Changes announcement†
Opening Asset Base (FY28)	$4.2bn	AIAL PSE4 Price Setting Disclosure (Schedules) - Closing Asset Base, Schedule 18
Useful Life of Assets	Mid-point of Capex Useful Life by asset type	AIAL FY23 Financial Report
OPEX Spend	FY19 operations expense is used as reference year (to exclude COVID period). This is indexed by CPI to produce operations expenditure over the forward outlook.	AIAL FY 19 Annual Disclosure, Schedule 2
CAPEX Spend	$3.1bn in PSE4 and $3.6bn in PSE5	AIAL Price Setting Disclosure (PSE 4) presentation – commissioned and indicative CAPEX

† *Auckland Airport FY23-27 price changes*, published 08-June-23, https://corporate.aucklandairport.co.nz/news/latest-media/2023/auckland-airport-fy23-27-price-changes

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