BIS OXFORD ECONOMICS

RESPONSE TO AIRPORT COMMENTS

REPORT PRODUCED FOR BARNZ

SUMMARY OF COUNTER ARGUMENTS

On reviewing Auckland Airport's Reasons Paper, we note the broad points of contention are around the best 'scale' of elasticity to employ and around how costs are allocated to end-consumers.

We present four broad critiques which point to a likely underestimation of the declines in demand from the proposed airport charges. These are summarised below:

1. **Data Driven Approach vs Literature Review:** Directly estimating the price-elasticity of demand using recent airline data for the New Zealand market is likely to yield a more accurate estimate than a broad literature review. We believe InterVISTAS' review doesn't adequately consider how air travel has changed over time, as they have a reliance on older studies, and features a limited focus on studies of the New Zealand market. The removal of business class seats has shifted the market closer to a low-cost carrier model in the domestic market, as well as a rising middle class across Asia, should reduce reliance on high income individuals (who are less price elastic), resulting in more price elastic behaviours overall.

2. **Route-level vs National-Level Elasticities:** A national elasticity captures factors such as a consumer's decision to travel domestically or not, but it does not adequately capture decisions such as the choice of which domestic location to travel to (e.g., choosing to go to Christchurch rather than Auckland). As such, national-level elasticities imply less price-sensitive behaviour than route-level elasticities. However, given the imposition of an airport charge would directly impact a consumer's choice of route and destination (encouraging travel to cheaper routes), it is most realistic to employ route-level elasticities rather than Auckland Airport's/InterVISTAS' proposed national-level elasticity approach.

3. **Airline Revenue Management and Allocation of Price Increases:** Assuming that airlines would allocate the bulk of the increased airport charges onto higher fares vs discounted fares is problematic. Rather airlines, like all businesses, are profit-maximising, and it is not clear that airlines would allocate more of the cost increase to the passengers which make up the bulk of their profits. Rather, we expect airlines would prefer to lose the passengers with the lowest fares, which feature marginal revenues that are very close to the airline's marginal costs (i.e., near zero profitability). This represents the optimal strategy for minimising the impact of cost increases on the airline and would manifest as a reduction in supply, and hence effectively an increase in prices across the board. The net result of which is a more

pronounced decline in PAX volumes than suggested by Auckland Airport.

4. **The Airline Response Function to an Effective Tax:** An increase in the per-passenger airport charge can be effectively modelled as a tax or a per-passenger increase in costs for airlines. This would see market prices come out of equilibrium and cause a parallel upward shift in the supply curve as airlines adjust capacity to bring prices to a new equilibrium resulting in both higher prices overall and lower passenger volumes. This economic model is consistent with our allocation of cost increases per passenger and consistent with more pronounced declines in passenger volumes at the low-fare end of the market.

Each of these critiques is explored in more detail in the following pages.

ECONOMETRIC APPROACH VS BROAD LITERATURE REVIEW

BIS Oxford Economics' key point of difference from the InterVISTAS study has been our ability to directly estimate the price-elasticity of demand. To produce our price elasticity estimates, BISOE has taken an econometric approach using flight passenger and price information for the period between 2015 and 2019[1]. In contrast, InterVISTAS has relied on elasticities from a literature review to develop their estimates.

While we believe it is important to consider the academic literature, as we have done in our own work, the age and relevance of the literature must also be taken into account. This potentially limits the value of a 'pure' literature review relative to a recent data-driven study specifically focused on the New Zealand market.

Critically, air-travel markets have changed significantly over the last decade. The rising middle class across Asia is reducing airline reliance on higher income individuals who are less elastic. This is seeing increasing inbound tourism and should be associated with increased price-sensitive behaviours. Furthermore, the removal of business class seats – bringing the domestic market closer to a low-cost carrier model (LCC) – should also be associated with more price sensitive behaviours.

Indeed, InterVISTAS own work[2] supports this view. In their exploration of differences in price elasticity between regions, they note that, at the time of their 2007 study, price elasticity has been comparably low in for Inter-Asia travel as the "modest sized middle class in many markets suggests somewhat less elastic" behaviours but the emergence of LCCs is counterbalancing this to some extent. In comparison – and likely more akin to Asian tourist demand in today's market – they note South-American travel features "an emerging middle class which makes the market more elastic".

Overall, given the changing nature of the air travel market and the differences between New Zealand and other countries (lower distances, economy only travel, etc.), we believe it is more prudent and more accurate to develop a view of the price elasticity of demand using recent New Zealand specific data.

[1] BISOE (2023). Flight Price Elasticity Study: Domestic Markets. Data was sourced from a combination of IATA, Auckland Airport Statistics, Air New Zealand and Qantas flight data.

[2] InterVISTAS (2007). Estimating Air Travel Demand Elasticities. Accessed via https://www.iata.org/en/iata-repository/publications/economic-reports/estimating-air-travel-demand-elasticities---by-intervistas/ on 11/08/23.

ROUTE-LEVEL VS NATIONAL-LEVEL ELASTICITY

INTRODUCTION

The expected *price elasticity of demand* is a key point of contention and has material impacts on the likely scale of the reduction on passenger demand from Auckland Airport's proposed charges. Auckland Airport has noted their preference for national-level elasticities (as estimated by InterVISTAS) rather than route-level elasticities (as estimated by BISOE).

We maintain that route-level elasticities are a better fit to estimating the impact of an increase in airport charges. Below we document why we believe this to be the case, highlighting the impact of selecting different levels of aggregation (based in part on InterVISTAS own work) as well as critiquing the assumption that sub-national substitution effects (e.g., mode switching) are small.

THE RELATIONSHIP BETWEEN ELASTICITIES AND LEVEL OF AGGREGATION

Different levels of aggregation are more appropriate for different policy considerations, where ultimately the level of aggregation is linked to the availability of travel mode substitutes.

Based on InterVISTAS and IATA[3] publications we have compiled the below list of aggregation levels:

- **Airline/Air Carrier Level:** This level reflects a consumer's choice between different airlines and routes. This is most appropriate for capturing situations where a tax or policy affects different airlines differently. For example, this can include sanctions or restrictions against a single airline on a route.
- **Route/market level:** This level reflects a consumer's choice between different routes/destinations within a country. It is most appropriate for capturing situations where travel costs increase for all carriers on a route. For example, due to an increase in airport charges.
- **National level:** This level is most appropriate for capturing situations where travel costs increase for all routes to/from a country. For example, this could include a nation-wide tax on departures.
- **Pan-national level:** This level is most appropriate for capturing situations where travel costs increase at a regional level, for example a European Union wide tax on air travel.

At the national level, behaviour is less elastic than at the route level. This is because travellers imposed with fare increases on all national air travel can only avoid this increase by using another mode (which may not always be possible), travelling to another country, or not travelling at all. Conversely, route level elasticities represent a passenger's choice to travel to an alternative domestic airport/route, travel to an alternative country, travel by another mode (including mixed modes), or not travel at all.

[3] IATA Economics Briefing No 9 - Air Travel Demand; accessed via https://www.iata.org/en/iata-repository/publications/economic-reports/air-travel-demand/ on 11/08/23.

The UK Civil Aviation Authority, as part of an assessment of the market power of Stansted airport[4] also summarises that, the higher the level of aggregation, the lower the relevant price elasticity will be:

> *In particular, fare elasticities facing a particular carrier can be expected to be high because, if a carrier increases its fare unilaterally, it is likely to lose passengers to other carriers operating the same route. However, a Pan-national price change (such as an oil-price increase) can be expected to have a smaller effect on demand because passengers have more limited possibilities of substitution.*

APPROPRIATE USE OF ELASTICITIES

We believe the use of national elasticities, as employed by Auckland Airport/InterVISTAS to estimate the impact on demand, is inappropriate in this context. National elasticities do not adequately capture possible substitution effects by mode of travel and for substitution between different destinations in the domestic New Zealand market. Increased charges at Auckland Airport would likely induce both of these factors across all routes which flow through the airport.

We note IATA's guidance on the matter – which is based on InterVISTAS work and is consistent with our critique:

> *"The correct elasticity value to use in analysing an air transport policy decision depends on the type of question being asked. The impact on demand of higher travel costs on a given route due to a rise in airport landing charges requires a different (higher) elasticity than when examining the traffic impact of a wider travel cost increase due to a passenger tax on all routes in a country."*[5]

If a regional aggregate (national elasticity) was adopted, as proposed by InterVISTAS, the elasticity would understate the effects of price increases, leading to a misleading view regarding the impact on air passenger demand. As such, BISOE maintains our view of favouring a route level elasticity over a national elasticity in computing the effect on PAX demand.

MODAL SUBSTITUTION CAN BE SIGNIFICANT

InterVISTAS states that modal substitutions could realistically only account for a small portion of domestic passenger movement and the available options would be limited – with the additional travel costs and limited options for substitutions deterring passengers from switching.

However, we believe this understates the significance of personal vehicles as a competing mode of transport. While we have been unable to locate data specifically for New Zealand, the US Bureau of Transportation Statistics does report on the modal mix for different travel distances.[6]

The figure below illustrates that, for Americans, the vast majority of trips of less than 800km utilise personal vehicles rather than air travel. Only past the 1200 KM mark does air travel start to make up

---

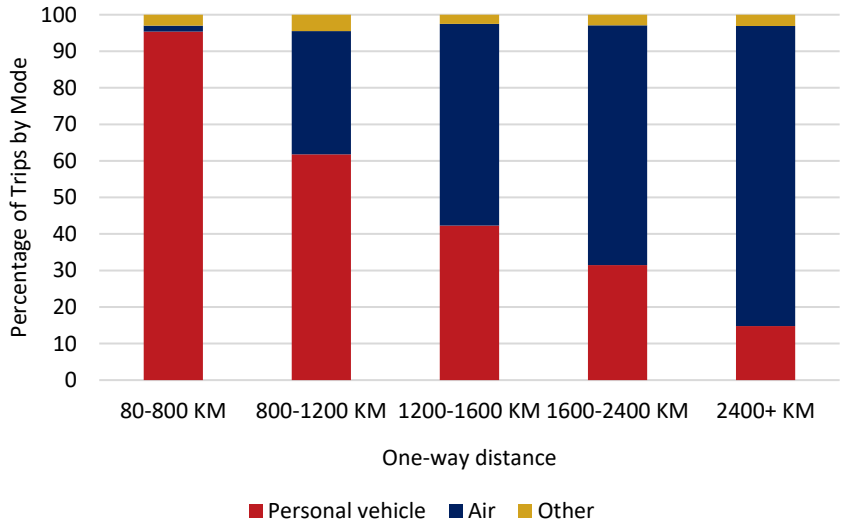
[4] Stansted Market Power Assessment, Annex 3; accessed via https://www.caa.co.uk/media/qcrcutdj/annex-3-stansted-s-own-airport-charge-elasticity-a-summary-of-the-evidence-and-research.pdf on 11/28/23

[5] IATA Economics Briefing No 9 - Air Travel Demand; accessed via https://www.iata.org/en/iata-repository/publications/economic-reports/air-travel-demand/ on 11/08/23.

[6] Long Distance Transportation Patterns: Mode Choice; accessed via https://www.bts.gov/archive/publications/america_on_the_go/long_distance_transportation_patterns/table_04 (converted into KMs using a ratio of 1.609) and https://www.bts.gov/archive/publications/america_on_the_go/long_distance_transportation_patterns/entire on 11/08/23

the majority of trips. We note the driving distance between Auckland and Wellington is approximately 640km.

Figure 1: Mode Share by Distance Travelled



While we suspect New Zealand features far less of a preference for car-use over long distances than the US, we do not believe it is reasonable to conclude that mode switching would be an insignificant part of the dynamic.

Reinforcing our view are the comments from the Skylark Consulting Group. In their review of our work, as published in our report, they note increasing fare differentials between Auckland and other airports in New Zealand would strengthen the case for additional routes from other airports (e.g., Hamilton, Rotorua, and Wellington), even if the scope to capture traffic from Auckland is limited.

Indeed, Skylark suggest that our elasticities may be conservative. Comparisons against average elasticities based on literature reviews[7, 8] suggest that our elasticities are closer to the lower end of the typical expected range of average elasticities. This reinforces our view that it is more reliable and more prudent to employ our route-level elasticities to develop estimates of the impact on passenger volumes.

[7] IATA Economics Briefing No 9 - Air Travel Demand; accessed via https://www.iata.org/en/iata-repository/publications/economic-reports/air-travel-demand/ on 11/08/23.

[8] Brons, M., Pels, E., Nijkamp, P., & Rietveld, P. (2002). Price elasticities of demand for passenger air travel: a meta-analysis. Journal of Air Transport Management, 8(3), 165–175. https://doi.org/10.1016/s0969-6997(01)00050-3

COST ALLOCATION / AIRLINE REVENUE MANAGEMENT

INTRODUCTION

The method of allocating price increases to passengers is another key point of contention, with Auckland Airport/InterVISTAS suggesting that price increases would be allocated to less price sensitive passengers with more expensive undiscounted tickets rather than sale (discounted) fares.

We note that *if airlines are allocating costs as described* (see the Supply Response section for a note on this), then price sensitivity is only part of the dynamic when considering the potential use of airline revenue management to reallocate costs among passengers. We maintain that increased charges can be readily allocated to low fare customers, and that this can represent an optimal profit maximising decision. This cost increase effectively translates to airlines attempting to sell fewer discounted tickets.

As the airport charges impose a marginal cost per passenger, airlines would be less willing to offer discounted fares at or near the marginal cost of air travel. This would therefore have the effect of shifting the overall price distribution among tickets. Thus, a reduction in the number of low fare tickets and an increase in prices are two sides of the same coin.

AIRLINE REVENUE MANAGEMENT

The degree and direction to which an airline can re-allocate cost impacts between different types of passengers is primarily a function of two opposing factors:

1) **The relative elasticity of different fare classes**: All else being equal, sale (discounted) fares would likely exhibit more sensitivity to price rises than more expensive undiscounted fares. Hence, an airline may be able to minimise the net impact of an airport charge by allocating more of it to fare classes with higher elasticities (i.e., closer to zero). This is the willingness-to-pay factor noted by InterVISTAS in page 26 of Auckland Airport's Reasons Report.
2) **The revenue or profitability associated with different fare classes:** Airlines are profit-maximising entities. All else being equal, an airline would seek to protect more profitable passengers rather than just overall passenger counts. As the loss of a discounted fare is much less of a concern to the bottom-line than the loss of a premium fare, airlines could minimise the net impact of an airport charge by allocating more of it to fare classes with lower profitability.

While the elasticity factor (1) is highlighted in Auckland Airport's "Reasons Report", the profitability factor (2) is not. Given the conflicting nature of these two factors, it may not be immediately obvious what the net impact of airline revenue management is likely to be. The net result is determined by the size of the relative differential of *elasticities* between high and low fare customers, and the size of the differential between the *total profit* associated with those customer types.

We expect the latter factor will be more prominent, driving airlines to allocate a large portion of costs to low fare passengers, resulting in a larger decline in passenger volumes than suggested by Auckland Airport and InterVISTAS. This is because:

1) The profit differential is large:

Airlines have moved away from business-class seats in favour of economy-only travel in the domestic New Zealand market, with this configuration proving stable over the past decade.

For airlines to have maintained this configuration over such a long period suggests that the profitability associated with business class seats for short-haul domestic travel is low compared with the benefits of additional seats and the likely comparably high price sensitivity among those high fare passengers (otherwise they would have simply increased business class ticket prices).

Instead airlines have shifted their approach to fare segmentation in the market. The price differential in fares is now largely driven by service-related extras (e.g., booking flexibility), time related factors (peak vs off-peak flight time), and how far ahead the booking is made. While the fare differential is notably smaller than the typical business-class vs economy-class differential, we believe all these factors have low marginal costs for the airline (vs the cost of fewer seat for business class sections) and hence drive increased profit differentials between high and low fare passengers.

Conversely, we expect that discount fares are near the marginal cost of a seat for airlines, and as such we expect high profitability differentials between fare classes in the market today.

2) **The range of elasticities between passengers is likely compressed within a small band:**

The move away from business-class seats in the domestic market is indicative of higher than usual price sensitivity among higher-fare customers and hence a compressed range of elasticities between these and low-fare customers.

The academic literature[9] suggests that business class and first class customers are less price sensitive than their economy counterparts, in part due to high value of time, preference for amenities/comfort, and the size of the difference between these factors between cabins.

With economy-only domestic routes unable to offer these points of differentiation and with a lower price gap between fare classes, we expect the range of elasticities is much smaller.

Indeed, if it was so simple to extract more profit from inelastic customers, airlines would have been well placed to do so from their revenue management systems. This reinforces our expectation of a tight band around the range of potential elasticities.

Overall, the small range of difference in elasticities and the large range in profitability is indicative of a stronger preference for protecting more profitable customers rather than protecting the number of passengers for its own sake. Airlines which do not do this may see a notable fall in profitability relative to their competitors. This would manifest as a reduction in the number of low fare tickets available.

The net result is a high level of cost allocation towards lower fee customers. Indeed they may see a disproportionate share of costs allocated towards them, depending on the size of the overall profit and elasticity differentials. Nonetheless, we believe a uniform allocation of costs is a reasonable middle ground.

[9] Brons, M., Pels, E., Nijkamp, P., & Rietveld, P. (2002). Price elasticities of demand for passenger air travel: a meta-analysis. Journal of Air Transport Management, 8(3), 165–175. https://doi.org/10.1016/s0969-6997(01)00050-3

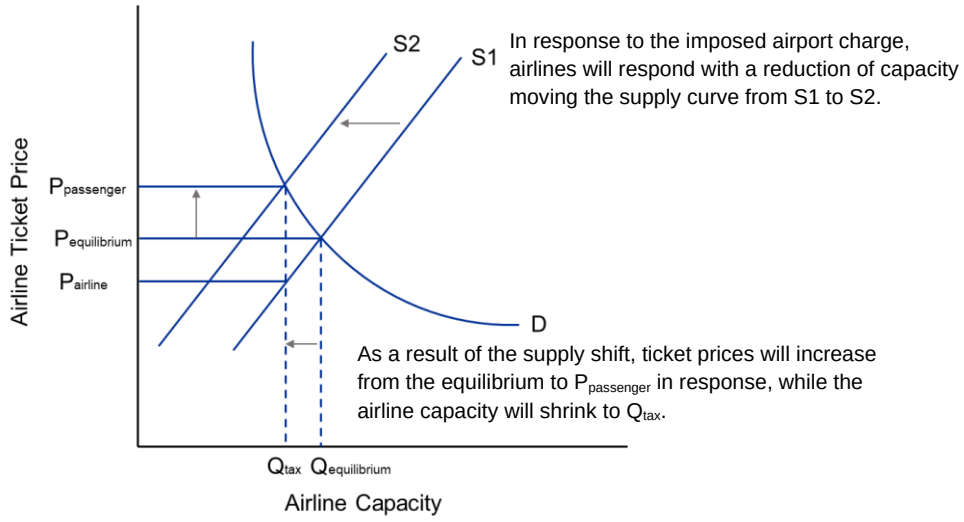
SUPPLY RESPONSE

Capacity on an airline flight is perishable by nature which means that all unsold stock is forfeited and will subtract from an airline's potential revenue. As profit maximising entities, airlines will aim to sell as much of the available capacity for the maximum price possible. The perishability of seats and the competitive dynamics of the market means airlines have comparably limited ability to control price, but rather can respond by adjusting capacity.

The extra airport charge will ultimately detract from the airline's retained share of profits as the rise in airport costs diminishes the prices charged to each passenger. However, this cannot be sustained over the longer term as airlines exist in a competitive market and discounting their component share to provide the same demand/supply equilibrium for a consumer will result in subnormal profit.

This can be most clearly represented as a supply response to an effective tax on airlines. A 'tax' imposed on a producers' goods/services will lower the price received by that producer below the optimal equilibrium price, creating an incentive for the producer to respond with a decrease in quantity supplied. For consumers, the demand curve is unchanged, they simply move up and to the left along the curve, consuming less due to the higher price. Whereas the producers' shift represents the shifting of the entire supply curve to the left – as the cost increase is present at all points along the supply curve.

Figure 3: Supply and Demand Curve – Response to Airport Charges



This corresponds to airlines reducing capacity across all price points to push the price back up to the equilibrium. Substantial time is required for an airline to adjust route capacity due to short-term fixed capacity levels and the importance of frequency to sustain yield. As a result, over the short-term airlines do not have a choice but to absorb the cost of the imposed airline charge.

Quantity and price shift over time, with the impacts then flowing through to passengers.

Since the airport charge is a fixed amount whatever the price of a ticket (rather than an ad valorem charge), the shift up and to the left in the supply curve would be the same across all prices. Hence the slope of the curve would be unchanged. This corresponds directly to our proposed method of allocating costs – where all ticket prices increase by the same amount.

We note the air passenger market is not uniform, rather there are several differentiated markets providing different price/quality mixes (i.e., high vs middle vs low tier). The upward curve shift in

supply is the same across all markets, though the slope of the demand curve is different, creating a more pronounced drop in demand for lower tier customers.

This supply response is notably consistent with our proposed approach of allocating costs on a unit basis per customer.

12/09/2023

The modelling and results presented here are based on information provided by third parties, upon which BIS Oxford Economics has relied in producing its report and forecasts in good faith. Any subsequent revision or update of those data will affect the assessments and projections shown.