

**Review: Report of Dr Michael
Tretheway**

**Evidence on the Impact of Market Structure on
Average Air Fares in the trans-Tasman Market,
1999-2006**

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21 September 2006

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Introduction

1. Dr Michael Tretheway has submitted to the Australian Competition and Consumer Commission (ACCC) a statement entitled “Evidence on the Impact of Market Structure on Average Air Fares in the trans-Tasman Market, 1999-2006, dated 21 August 2006. This Statement was prepared for counsel to Air New Zealand.
2. I have been asked by Wellington International Airport to review Dr Tretheway’s study from the perspective of whether the report applies sound and accepted principles of statistical and econometric analysis. I am not an expert in the economics of the airline industry.
3. I have been provided with a copy of the “non-confidential version” of Dr Tretheway’s report, which is published on the ACC website.¹ Excluded from this version of the report are all of the tables with regression results, which make it difficult to comment on specific empirical results and the appropriateness of the interpretations, statistical tests and so on.
4. Despite these limitations, I have identified some potentially important criticisms of this study, which I outline below.

Conclusions from the review

Definition of a Low Cost Carrier (LCC) (beginning on page 5, section 2.25)

5. Dr Tretheway assumes implicitly throughout his analysis that both Pacific Blue and Emirates are essentially different in their very nature from Full Service Airlines (FSA) (e.g., the incumbent firms Qantas and Air New Zealand or other potential competitors). Dr Tretheway characterises Pacific Blue and Emirates as Low Cost Carriers (LCC). Maybe this characterisation can be easily supported by their respective cost structures and/or range of services, but support for this simple distinction across airlines certainly doesn’t appear in this report. Nor is the distinction evident from the public marketing of the two firms, with Emirates “appeal to travellers seeking extra luxury and comfort” in its attempt to gain “a clear lead with an overall superior product” in the top-end of the market.² Emirates markets itself on its webpage as a “full service” airline.³ Dr Tretheway’s assumption that Emirates and Pacific Blue, for the purposes of competition

¹ <http://www.accc.gov.au/content/index.phtml/itemId/744922/display/submission>

² Emirates President, Tim Clark, quoted in the National Business Review, September 15, 2006, in an article on the launch of a new-generation flat bed which includes in-seat massage and 600 video channels on a 48cm screen.

³ <http://www.emirates.com/nz/AboutEmirates/AboutEmiratesNZ/AboutEmiratesNZ.asp>

analysis, should be viewed as a LCCs and Qantas and Air New Zealand as FSAs, should be explained and supported.

6. The notion behind Dr Tretheway's assumption that Emirates and Pacific Blue should be characterised as LCCs and Qantas and Air New Zealand as FSAs, is that the entry of a LCC would have an additional impact on airfares beyond the associated effect on any measure of market concentration (e.g., the Herfindahl-Hirschman Index (HHI)). The obvious motivation for including indicator variables for the presence of Emirates or Pacific Blue in subsequent regressions is that these carriers are different from the incumbents and from other potential competitors. Otherwise, their effects on airfares would be entirely captured by measures of market concentration (e.g., HHI). For example, Dr Tretheway states at paragraph 5.6.8, that if the TNA were to operate on the Auckland to Melbourne route, Qantas and Air New Zealand would have a combined capacity of 80.7%. If Pacific Blue and Emirates are not essentially different in nature, then Dr Tretheway's results suggest that this increase in concentration would increase average fares on this route by roughly 15%.
7. Dr Tretheway should provide some justification up front for stripping out the presence of both Pacific Blue and Emirates on the trans-Tasman routes from the HHI.

Lack of any Regression Output (beginning on page 34, section 5.5)

8. Because of a claim on "Restriction of Publication", all of the tables with regression results are excluded from this public report. This obviously makes it difficult to say much about specific empirical results and the appropriateness of the interpretations, statistical tests, etc. In some cases, it's unclear what explanatory variables have been included or excluded from a particular regression. However, a number of issues are obvious even without the regression results. One point that is unclear is the length of the sample period. The author claims to have data from 1999 through 2006, but makes references to a 60-month, or five-year period (page 35, section 5.5.6).

A 'Step-Wise' Regression Approach (beginning on page 35, section 5.5.2)

9. Dr Tretheway sequentially adds explanatory variables to his regression models building up to what he considers is the most preferred specification. Although this may be useful as a descriptive device for understanding relationships in the data, it is generally not a recommended practice. Firstly, the order in which the regressors are added to the model can have a substantial impact on both the estimated coefficients and their statistical significance. For example, would the inclusion of other explanatory variables influence both the estimated size and statistical significance of LCC capacity indicators in section 5.7.8? Would we get similar results in a specification that included other hypothesised determinants of air fares?
10. Secondly, these statistical tests are essentially invalid until we reach the final, correct specification. Even worse, the author seems to introduce and then later

discard some explanatory variables from subsequent specifications, often with no justification. For example, there is a good argument for the inclusion of 'Costs per Seat Kilometre' in these air fare regressions. This explanatory variable was introduced in section 5.5.25. Although it was found to significantly influence air fares, it was never included in the final, preferred specification in section 5.8.2. No justification was given the exclusion of this cost variable, and there was no indication of how its exclusion might have affected other key regression results.

The Use of a Linear Time Trend (beginning on page 35, section 5.5.5)

11. I am always uncomfortable by the use of linear time trends. They are essentially 'measures of ignorance' in not being able to attribute time-dependent changes in the dependent variable (average air fares in this case) to anything meaningful. This is particularly problematic if one of the key explanatory variables (the HHI measure of concentration) has an obvious time trend (as suggested, but not shown in this public document). The inclusion of the time trend might by itself obscure any measurable effects associated with the HHI. That is, Dr Tretheway's conclusion that an increase in concentration may not result in higher prices might be due to the linear time trend he incorporated into his analysis, rather than the realities of the market he is attempting to model.
12. In place of this linear time trend, it would have been far better to include either the cost series measure (used in some regressions) or an index of airfares in the world or in this particular region. Both would have been preferable to a simple linear time trend, since they would capture what is closer to the 'counterfactual' of what trans-Tasman airfares would have otherwise been over the sample period.

The Definition of the Herfindahl-Hirschman Index (page 40, section 5.6.1)

13. One of the key variables for this regression analysis is the measure of market concentration. The HHI is based on "capacity offered by the carriers". Dr Tretheway admits in footnote 33 that it would have been better to have constructed this variable from traffic data rather than capacity data - 'actual' compared to 'potential' concentration. Beyond this issue, there is no further discussion on the construction of this key variable. I assume that it's based on capacity of the carriers Air NZ and Qantas along with all other carriers. However, if Freedom and Jetstar are included as separate carriers this could have distorted this measure of concentration, since they are not legitimate competitors for Air NZ and Qantas. More details on the construction of the HHI are essential here.

The Lack of Importance for LCC Capacity (page 46, section 5.7.8)

14. The author claims that the entry of a LCC at even low capacity levels (less than 12.5%) produces the "... lion's share of the price reducing effect." While this appears to be true from his regression analysis, it should be emphasised that the

fare-reducing effect is more than 50% higher if the capacity level is over 25% and this difference is statistically significant.

15. Some care is also required in interpreting these results, as Dr Tretheway has not explained the counterfactual against which these price effects should be compared. For example, in paragraph 2.2.19, Dr Tretheway presents his finding of a fare reduction of \$24.91, when “Emirates or Virgin Blue operates on trans-Tasman but neither carrier services the route in question”. Dr Tretheway comments at paragraph 2.2.20 that this, and other, “fare reducing effects are larger than any potential effect from the market concentration measure.” Emirates and Virgin Blue are of course already operating on the trans-Tasman. If Dr Tretheway’s estimates are correct, consumers should already have benefited from that entry through an average reduction in fares of \$24.91.
16. Because Emirates and Virgin Blue have already entered the trans-Tasman market, the increase in penetration required by Emirates or Virgin Blue to offset any potential effect of higher concentration may be greater than Dr Tretheway implies. For example, at paragraph 2.2.17, Dr Tretheway says that:

The best case that could be made for a market concentration effect on average fares requires use of a statistically insignificant finding, which in any event is relatively small. If this weak result were to be used, and I am not recommending its use, then applying the potential increase in the HHI with the proposed TNA would result in a fare increase of roughly 6% or \$10-\$15 per passenger. This compares to the roughly \$38 fare reducing impact of Pacific Blue on trans-Tasman routes.

17. The \$38 figure mentioned by Dr Tretheway appears to be his estimate of the price effect of “Emirates or Virgin Blue provide service, but with 12.5001% to 25% or less of total seat capacity on the route (which the author states in paragraph 2.2.19, 5.9.4, and 5.11.11, as amounting to \$36.87). However, this figure includes the \$24.91, which consumers have gained through Emirates and Virgin Blue entry onto the trans-Tasman. Hence, were prices to rise as a result of the TNA by \$10-\$15 on routes in which Emirates and Virgin Blue do not currently provide service, Emirates and or Virgin Blue would need to penetrate that route with capacity at greater than 12.5% ($\$36.87 - \$24.91 = \$11.96$). If Virgin Blue and Emirates already operate on the route, but provide less than 12.5% of the capacity, they would need to increase capacity to more than 25% ($\$55.52 - \$36.87 = \$12.64$).

The Inclusion of Traffic Volume as an Additional Explanatory Variable (beginning on page 47, section 5.8.2)

18. Dr Tretheway notes that price and quantity (traffic volume) may be jointly determined in the market. Yet, traffic volumes may themselves influence airfares through things like economies of scale (i.e., other things constant, higher volumes may reduce airfares). He uses fuel price and population as instruments in his two-stage, least-squares estimation to allow traffic volume to be endogenous in this system. Now up to this point, Dr Tretheway had found that only the introduction of a LCC reduced airfares, *not* a reduction in industry concentration. Once traffic volume is appropriately considered as a determinant of airfares, *the author finds that a reduction in industry concentration lowers airfares even after the effects of*

the LCCs are included. This effect is statistically significant. This is the first evidence in this study that the TNA would lead to higher airfares. Yet, the author rejects the plausibility of these results because the estimated coefficient on traffic volume has the “wrong sign”, citing overseas evidence that higher traffic volumes tend to reduce airfares. It may be that the higher costs of operating in these specific New Zealand/Australian routes (that have higher traffic volumes) are actually associated with fare-increasing effects. Thus, Dr Tretheway may have been hasty in rejecting these results. (I’ll return to this issue in point 14 below.)

‘Indirect Evidence’ of the Importance of Concentration on Air Fares (page 56, section 6.2.7)

19. In reviewing a recent paper by Itoh and Lee (2003), Dr Tretheway suggests that this previous work highlights the importance of LCC entry compared to concentration. Itoh and Lee find that “... the fare reducing impact of entry by an LCC was larger, the more concentrated the market.” But this conclusion itself provides indirect evidence for the importance of market concentration in raising airfares. For example, the withdrawal of a LCC could have a much larger fare-increasing effect in a more concentrated market as a result of the TNA.

The Exclusion of ‘Fixed Effects’ from These Regressions (related to footnote 13 on page 23)

20. Dr Tretheway uses a panel of monthly airfare data across two airlines and nine distinct air routes between pairs of cities (three on either side of the Tasman Sea) over the period 1999-2006. It’s common with panel data to allow for individual or time-specific effects (or both). The former could be introduced by allowing for separate intercept terms for all nine routes. Any estimates for the impacts of the introduction of new competitors or changes in overall market concentration would come from the resulting *within* estimators (i.e., where these route-specific indicator variables are included as regressors). I fail to understand why such an approach was not used by Dr Tretheway. Firstly, statistical tests can be used to judge the appropriateness of the inclusion of these fixed effects. Secondly, there would be little need under this fixed effects approach to worry about traffic volumes (since these are going to be fairly constant across this short sample period on specific routes). The use of fixed effects would largely preclude the need to use two-stage, least-squares estimation (as discussed in footnote 7). Although the *between* estimators are also of interest, as suggested by Dr Tretheway in this footnote, there is little reason to dismiss this fixed approach on purely theoretical grounds.

Applying and Extending the Regression Results to Specific Sectors

21. One of the potential uses of the general regression results provided by Dr Tretheway would be to make inferences about the effects of the TNA on specific air routes. For example, what effects would this agreement have on the trans-Tasman airfares into and out of Wellington? This is currently impossible without seeing the actual regression output. More importantly, the availability of the actual data used to generate these regression results would allow the testing of numerous alternative

hypotheses (e.g., whether the effects of concentration are relatively more important in certain sectors). Barriers to entry on particular routes would have to be factored in to any application of general findings to the unique circumstances of particular airports.