Japan	AKL-KIX	0	0	0	14	0	0							
Japan	AKL-NGO	0	0	0	10	0	0							
Domestic	AKL-WLG	0	210	0	0	0	0	0	0	0	0	0	0	152
Domestic	AKL-CHC	0	178	0	0	0	0	0	0	0	0	0	0	140
Domestic	AKL-DUD	0	14	0	0	0	0	0	0	0	0	0	0	0
Domestic	CHC-WLG	0	118	0	0	0	0	0	0	0	0	0	0	0
Domestic	CHC-ZQN	0	28	0	0	0	0	0	0	0	0	0	0	0
Domestic	AKL-ZQN	0	26	0	0	0	0	0	0	0	0	0	0	4
LH Pac	SYD-LAX	0	0	10	0	0	0	56	0	0	0	0	0	0
Domestic	WLG-DUD	0	26	0	0	0	0	0	0	0	0	0	0	0
Tasman	ALL	0	8	14	14	0	184	28	14	0	128	0	0	348
Domestic	ALL	0	600	0	0	0	0	0	0	0	0	0	0	296
SH Pac	ALL	0	6	0	38	0	18	0	0	0	0	18	0	0
Asia	ALL	0	0	22	50	0	0	0	0	0	0	0	0	0
LH Pac	ALL	0	0	42	22	0	0	76	0	8	0	0	0	0
Atlantic	ALL	0	0	14	0	0	0	0	0	0	0	0	0	0

Year 3: weekly departures

	Airline	AirNZ						QF & FJ						
	Craft	B733A	B733D	B744	B763	B762	B738/A320	B744Q	B743	B742	B763Q	B738	A333	B733Q
	Seats	122	136	392	230	200	146	432	420	433	236	154	340	116
Tasman	AKL-SYD	0	0	14	0	0	48	14	14	0	28	0	0	6
Tasman	AKL-MEL	0	0	0	0	0	50	0	0	0	32	0	0	0

Tasman	AKL-BNE	0	0	0	0	0	14	14	0	0	0	0	0	0
Tasman	WLG-SYD	0	0	0	0	0	20	0	0	0	14	0	0	0
Tasman	WLG-MEL	0	0	0	0	0	0	0	0	0	14	0	0	0
Tasman	WLG-BNE	0	0	0	0	0	0	0	0	0	6	0	0	0
Tasman	CHC-SYD	0	0	0	0	0	28	0	0	0	38	0	0	0
Tasman	CHC-MEL	0	0	0	0	0	14	0	0	0	12	0	0	0
Tasman	CHC-BNE	0	0	0	0	0	0	0	0	0	6	0	0	0
Tasman	AKL-PER	0	0	0	10	0	0	0	0	0	0	0	0	0
Tasman	AKL-CNS	0	0	0	4	0	0	0	0	0	0	0	0	0
Tasman	SYD-ZQN	0	0	0	0	0	4	0	0	0	0	0	0	2
Tasman	AKL-NLK	0	4	0	0	0	0	0	0	0	0	0	0	0
Tasman	AKL-NOU	0	4	0	0	0	0	0	0	0	0	0	0	0
SH Pac	AKL-NAN	0	0	0	8	0	12	0	0	0	0	18	0	0
SH Pac	AKL-APW	0	0	0	8	0	0	0	0	0	0	0	0	0
SH Pac	AKL-TBU	0	6	0	4	0	0	0	0	0	0	0	0	0
SH Pac	AKL-RAR	0	0	0	6	0	8	0	0	0	0	0	0	0
SH Pac	AKL-PPT	0	0	0	10	0	0	0	0	0	0	0	0	0
LH Pac	NAN-LAX	0	0	0	6	0	0	0	0	8	0	0	0	0
SH Pac	TBU-APW	0	0	0	2	0	0	0	0	0	0	0	0	0
LH Pac	APW-LAX	0	0	0	2	0	0	0	0	0	0	0	0	0
LH Pac	RAR-LAX	0	0	0	4	0	0	0	0	0	0	0	0	0
LH Pac	PPT-LAX	0	0	0	8	0	0	0	0	0	0	0	0	0
SH Pac	NAN-RAR	0	0	0	2	0	0	0	0	0	0	0	0	0
SH Pac	RAR-PPT	0	0	0	2	0	0	0	0	0	0	0	0	0
LH Pac	AKL-HNL	0	0	0	6	0	0	0	0	0	0	0	0	0

LH Pac	AKL-LAX	0	0	32	0	0	0	20	0	0	0	0	0	0
Atlantic	LAX-LHR	0	0	14	0	0	0	0	0	0	0	0	0	0
Asia	AKL-SIN	0	0	14	0	0	0	0	0	0	0	0	0	0
Asia	AKL-HKG	0	0	8	6	0	0	0	0	0	0	0	0	0
Asia	AKL-TPE	0	0	0	6	0	0	0	0	0	0	0	0	0
Japan	AKL-NRT	0	0	14	0	0	0	0	0	0	0	0	0	0
Japan	AKL-KIX	0	0	0	14	0	0							
Japan	AKL-NGO	0	0	0	14	0	0							
Domestic	AKL-WLG	0	210	0	0	0	0	0	0	0	0	0	0	152
Domestic	AKL-CHC	0	178	0	0	0	0	0	0	0	0	0	0	140
Domestic	AKL-DUD	0	14	0	0	0	0	0	0	0	0	0	0	0
Domestic	CHC-WLG	0	118	0	0	0	0	0	0	0	0	0	0	0
Domestic	CHC-ZQN	0	28	0	0	0	0	0	0	0	0	0	0	0
Domestic	AKL-ZQN	0	26	0	0	0	0	0	0	0	0	0	0	4
LH Pac	SYD-LAX	0	0	0	0	0	0	56	0	0	0	0	0	0
Domestic	WLG-DUD	0	26	0	0	0	0	0	0	0	0	0	0	0
Tasman	ALL	0	8	14	14	0	178	28	14	0	150	0	0	10
Domestic	ALL	0	600	0	0	0	0	0	0	0	0	0	0	296
SH Pac	ALL	0	6	0	42	0	20	0	0	0	0	18	0	0
Asia	ALL	0	0	36	42	0	0	0	0	0	0	0	0	0
LH Pac	ALL	0	0	32	26	0	0	76	0	8	0	0	0	0
Atlantic	ALL	0	0	14	0	0	0	0	0	0	0	0	0	0

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Confidential Appendix D: Air New Zealand and Qantas counterfactual schedules

Appendix E: Modelling Details and Sensitivity Testing

The key inputs into the model are the schedules for the factual and counterfactual. These constitute the number of departures per city-pair, per carrier, per week and are presented in Appendices C and D above.

Another key set of inputs is the business and leisure price elasticities. These are generic parameters across all city-pairs which are then weighted by their applicable shares of business and leisure travellers for each city-pair and averaged to arrive at the price elasticity specific to that city-pair. Given this process, and the fact that the business and leisure shares are obtained from historical data, the parameters of interest are the price elasticities of business and leisure travellers; as such it is these which are subject to sensitivity testing below. The shares of each passenger type by city-pair are reported in Table 37 below.

Table 37: Business and leisure shares of travellers by city-pair

	Business share	Leisure share
AKL-SYD	37%	63%
AKL-MEL	35%	65%
AKL-BNE	24%	76%
WLG-SYD	39%	61%
WLG-MEL	36%	64%
WLG-BNE	22%	78%
CHC-SYD	28%	72%
CHC-MEL	28%	72%
CHC-BNE	21%	79%
AKL-PER	30%	70%
AKL-CNS	25%	75%
SYD-ZQN	32%	68%
AKL-NLK	21%	79%
AKL-NOU	15%	85%
AKL-NAN	15%	85%
AKL-APW	20%	80%

	Business share	Leisure share
AKL-TBU	18%	82%
AKL-RAR	16%	84%
AKL-PPT	18%	82%
NAN-LAX	15%	85%
TBU-APW	15%	85%
APW-LAX	15%	85%
RAR-LAX	15%	85%
PPT-LAX	15%	85%
NAN-RAR	15%	85%
RAR-PPT	15%	85%
AKL-HNL	20%	80%
AKL-LAX	30%	70%
LAX-LHR	30%	70%
AKL-SIN	20%	80%
AKL-HKG	25%	75%
AKL-TPE	20%	80%
AKL-NRT	10%	90%
AKL-KIX	10%	90%
AKL-NGO	10%	90%
AKL-WLG	65%	35%
AKL-CHC	49%	51%
AKL-DUD	48%	52%
CHC-WLG	56%	44%
CHC-ZQN	56%	44%
AKL-ZQN	41%	59%
SYD-LAX	25%	75%
WLG-DUD	54%	46%

Sensitivity Testing

This section reports the sensitivity analysis as carried out on the key parameters contained within the model. All sensitivity tests are carried out under the VBA entry scenario for both the factual and the counterfactual. We begin with all parameters set at their default (or base) values. We then

carry out sensitivity tests where each parameter is varied within a reasonable range of the 'base case' value, *ceteris paribus*, such that the effect of that parameter may be analysed in isolation from any potential offsetting or compounding affects of the other parameters.

Before presenting the sensitivity results we summarise here for completeness the values that each parameter is assigned as its base value. These are presented in Table 38 below.

Table 38: Base case values

Parameter		Value
Natural growth:	Tasman	4.4%
	Domestic	3.4%
	SH Pac	5.0%
	Asia	8.0%
	LH Pac	4.0%
	Atlantic	4.0%
Price elasticities:	Business	-0.7
	Leisure	-1.65
Capacity elasticity		0.125
VBA/FSA cost differential		20%
VBA+/FSA cost differential		7.50%

Natural (or trend) growth rate of the air travel market

In the model below we have specified growth rates on a regional basis (i.e. individual parameters for Tasman, domestic etc). However, we present here the effect of increasing (and decreasing) all growth rates by the same number of percentage points such that the aggregate (or global) effect of changes in the growth rate of the air travel market is obtained. We analyse the sensitivity of the model to changes in the base growth rates of plus and minus 2 percentage points. For example, if the base growth rate is 4% p.a. we test values from 2% p.a. to 6% p.a. The results of this are presented in Table 39.

Table 39. Effect of Natural Growth Rate

	Growth rate increased by 2 percentage points			Growth rate decreased by 2 percentage points		
Year	Total benefits	Total detriments	Total trade off	Total benefits	Total detriments	Total trade off
1	$156	$51	$105	$156	$47	$109
2	$419	$23	$396	$420	$20	$400
3	$584	$16	$568	$588	$13	$574
4	$559	$17	$542	$562	$13	$549
5	$526	$17	$509	$530	$13	$517
Total	$2,244	$124	$2,120	$2,256	$107	$2,149

The price elasticity of travellers

To analyse the impact of changes in the price elasticity of demand we increased and decreased the elasticity of both the business and leisure travellers by plus and minus 0.2.

Table 40: Effect of price elasticities

	Price elasticity increased by -0.2			Price elasticity decreased by 0.2		
Year	Total benefits	Total detriments	Total trade off	Total benefits	Total detriments	Total trade off
1	$156	$41	$116	$156	$62	$94
2	$420	$16	$404	$420	$30	$390
3	$586	$10	$576	$586	$21	$565
4	$560	$10	$550	$560	$21	$539
5	$528	$10	$518	$528	$21	$507
Total	$2,250	$87	$2,163	$2,250	$155	$2,095

The capacity elasticity of demand

To examine the effect of changes in this parameter we varied its base value by plus and minus 0.02, the results of which are presented in Table 41 below.

Table 41: Effect of capacity elasticity

	Capacity elasticity increased by 0.02			Capacity elasticity decreased by 0.02		
Year	Total benefits	Total detriments	Total trade off	Total benefits	Total detriments	Total trade off
1	$156	$49	$107	$156	$50	$107
2	$420	$21	$398	$420	$22	$397
3	$585	$15	$570	$586	$14	$572
4	$560	$15	$545	$561	$14	$546
5	$528	$15	$513	$529	$15	$514
5 yr Total	$2,249	$115	$2,134	$2,252	$115	$2,137

FSA/VBA cost differential

The sensitivity of the model to this parameter was examined by varying the base value by plus and minus 10 percentage points. The results of this analysis are presented in Table 42.

Table 42: Effect of VBA/FSA cost differential on Tasman and domestic

	VBA cost differential increased by 10 percentage points			VBA cost differential decreased by 10 percentage points		
Year	Total benefits	Total detriments	Total trade off	Total benefits	Total detriments	Total trade off
1	$156	$43	$113	$156	$55	$101
2	$420	$13	$407	$420	$31	$389
3	$586	$6	$580	$586	$24	$562
4	$560	$6	$554	$560	$23	$537
5	$528	$6	$522	$528	$23	$505

Total	$2,251	$75	$2,176	$2,250	$157	$2,093

FSA/VBA+ cost differential

This parameter was analysed by incrementing the base value by plus and minus 5 percentage points. Table 43 summarises the results of this analysis.

Table 43: Effect of VBA+/FSA cost differential on domestic

	VBA cost differential increased by 5 percentage points			VBA cost differential decreased by 5 percentage points		
Year	Total benefits	Total detriments	Total trade off	Total benefits	Total detriments	Total trade off
1	$156	$51	$106	$156	$48	$108
2	$420	$23	$397	$420	$21	$399
3	$586	$16	$570	$586	$14	$572
4	$560	$16	$545	$560	$14	$546
5	$528	$16	$513	$528	$14	$514
Total	$2,250	$120	$2,130	$2,250	$110	$2,140

Confidential Appendix F: Alternative counterfactual

Freehills

18 December 2002

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Matter no 80296334
Doc no Sydney\004318019

Mr Tim Grimwade
General Manager, Adjudication
Australian Competition and Consumer Commission
470 Northbourne Avenue
DIXON ACT 2602

By email

Dear Mr Grimwade

Trade Practices Act 1974
Applications for authorisation lodged by Qantas Airways Limited and Air New Zealand Limited

We refer to our letter of 9 December 2002 enclosing Confidential Appendix F to the NECG Report "Alternative counterfactual".

Following a request by the New Zealand Commerce Commission, Air New Zealand has agreed to release for the public register the first two and last three paragraphs of Appendix F. Air New Zealand maintains its claim to confidentiality for the balance of Appendix F.

Accordingly, we attach a version of Confidential Appendix F to the NECG Report for the public register, with the confidential matter deleted.

Yours faithfully
Freehills

Michael Gray
Partner

Confidential Appendix F: Alternative Counterfactual

While both airlines believe that in the absence of the Alliance they will continue to compete aggressively, it is not clear that such a situation could be sustained even over the period being analysed. In particular, the losses that Air New Zealand currently sustains on its Tasman and long-haul operations would become increasingly difficult to subsidise from its domestic profits, as Qantas continued to grow and compete aggressively in domestic New Zealand.

In the absence of substantial Government funding, the relative strengths of the airlines suggest that it would be Air New Zealand that would be forced to scale back its operations and in the longer-term possibly exit the market entirely. Without knowing the Government's intentions with respect to the funding of Air New Zealand to compete with Qantas, we have assumed it would be Air New Zealand that would retract its operations in response to sustained competitive pressure from Qantas domestically and Qantas and other airlines internationally. Hence, we requested Air New Zealand to provide NECG with the counterfactual schedule that it would most likely implement in the event that it could no longer sustain its full service operations. In this appendix, we set out the details of this counterfactual and its implications for New Zealand.

[Confidential matter deleted]

The implications for the welfare of New Zealand depend on the response of other airlines to Air New Zealand's weakened position. If other airlines move quickly to replace the capacity of Air New Zealand then there may be limited detriment in terms of available capacity. The impact on price will depend on which airline fills the Air New Zealand void. For example, if Qantas moves to fill any reduction in Air New Zealand capacity then the outcome for consumers is likely to be very close to the outcome of the Alliance, but without a national flag carrier. This is more likely to be the case on the Tasman, domestic New Zealand and Pacific routes (via Air Pacific). If another airline moves to fill the vacated capacity, such as Singapore, United or a VBA, then there may be little difference in the level of competition between this counterfactual and the increased competition counterfactual, the only difference being that the competition is provided by other airlines, not Air New Zealand.

Having said that, there are some important implications for New Zealand of this scenario eventuating. Alternative carriers are not going to be either willing or able to provide the same support for in-bound tourism, as they will not have the range of long haul services that Air New Zealand has. As a result, we would expect that the substantial share of the burden of tourism promotion that is now borne by Air New Zealand would need to be shifted onto the New Zealand government.

Additionally, only Air New Zealand has rights to provide the direct flights that currently account for the bulk of New Zealand air freight. Were Air New Zealand to retrench on the scale set out above, we would expect freight availability to decline.

Appendix G: Cournot Competition and the Airline Industry

This section outlines the empirical and theoretical support for the usage of Cournot competition as a model of oligopolistic behaviour in the airline industry. Economists frequently use the Cournot model of oligopoly because it is a relatively simple, tractable and coherent theoretical framework. Several recent papers analysing the airline industry have used models based on Cournot competition, including Clougherty (2002), Brueckner (2001), and Haugh and Hazledine (1999). In general, a model should be judged not by its assumptions but by what it can explain. In this light, both empirical and theoretical support for the Cournot model is discussed here. Some alternatives to Cournot competition are briefly considered.

Empirical support

Two papers by James Brander and Anming Zhang (1990, 1993) empirically estimate conduct parameters (or 'conjectural variations') for a set of duopoly airline routes in the United States. The earlier paper is a static analysis using cross-sectional data, while the latter is a dynamic analysis using panel data.

In the first paper, Brander and Zhang set up a framework that under different parameterisations allows for a Bertrand, Cournot, or cartel-type duopoly. They investigate which of these frameworks is supported by data on 33 Chicago-based airline routes served by United Airlines and American Airlines for the third quarter of 1985. Their main overall finding is that the Cournot model receives the best support from the data. In particular, they conclude on p. 580 that:

> ... we found strong evidence against the cartel hypothesis and against the highly competitive Bertrand hypothesis. Cournot behavior falls within what we take to be the plausible range for this set of markets, taking into account the various errors and approximations that underlie our reasoning.

In their second paper, Brander and Zhang perform a more complex dynamic analysis using cross-sectional data. The time-series element of the data allows for more complex competitive structures to be incorporated in their analysis. In particular, they allow for regime-switching models (see, for example, Green and Porter (1984)) in which firms switch between periods of tacit collusion and punishment. Brander and Zhang again empirically investigate a conjectural variations type framework, using data on 16 Chicago-based city-pairs from the fourth quarter of 1984 to the fourth quarter of 1988. In general they found that the regime-switching models were most appropriate,

and commented that the airlines' behaviour in punishment phases was much closer to the Cournot outcome than the Bertrand outcome.

Theoretical support

The Cournot model assumes that firms choose outputs and then the market price adjusts to equate demand with supply. This may seem unrealistic because we usually think of firms choosing prices rather than quantities. However, a theoretical paper by Kreps and Schienkman (1983) showed that if firms do indeed compete in prices but are capacity constrained, then the mode of competition is equivalent to Cournot.

In particular, if firms must first choose and commit to a capacity level before competing in prices, then the outcome of this two-stage game is equivalent to the outcome of a traditional one-stage Cournot game in which firms just choose quantities. This result of course depends on the capacities that are chosen in the first stage being 'sunk', so that they have commitment value. This assumption is obviously violated in any industry after a long enough time period has elapsed so that capacities can be changed. Airlines are no exception, and for any given route it should be relatively easily for an airline to reallocate its resources so as to quickly increase or decrease capacity on that route. However, the airline as a whole is likely to be somewhat capacity-constrained in the medium term as changing its overall capacity will require changing the size of its aircraft fleet, which is costly.

Consideration of alternatives

Alternatives to Cournot competition do exist, and in this section we compare possible alternatives with the Cournot framework.

First, it seems not unreasonable to assert that airlines do have some market power. That is, they have some ability to raise their price above that of their rival(s) without losing their entire market share. This rules out ordinary Bertrand competition as a model of the airline industry.

Instead, we could imagine that airlines' market power comes from branding, or 'horizontal differentiation'. Airlines essentially sell a homogeneous product, but have some ability to raise

prices because consumers perceive them as being different.[211] The typical approach to modelling such an industry is to use a location or 'Hotelling' type model where firms and consumers are positioned in a 'product space'. Such a model may seem appropriate for the airline industry in which airlines position themselves as being 'full service' or 'value based', or by using marketing to distinguish themselves from competitors.

The downside of such models is that they are difficult to apply and generate empirical predictions from, as they require a number of parameters to be estimated (namely, the 'location' of each firm in the product space). This difficulty increases with the number of firms, and leads to greater data requirements and further possibilities for estimation errors.

Thus the Cournot model has an advantage over horizontal differentiation models in that it captures the realistic feature that firms have some market power, without making the framework unnecessarily complicated and without requiring a large number of parameters to be estimated.

Finally, it is worth noting that, given the characteristics of the relevant markets, the Cournot model is more appropriate that an alternative "dominant firm facing a competitive fringe" model.

The dominant firm facing a competitive fringe model is relevant in industries characterised by one large firm (dominant firm) with a large market share and many smaller firms (competitive fringe) with very small market shares each.

For the dominant firm, the strategic trade-off[212] is that a high price may increase profit per unit sold but decrease the quantity the dominant firm can sell for two reasons:

- market demand decreases with price; and
- the fringe's supply increases with price

Under general conditions[213], all firms, including the competitive fringe, make positive profits. The profit of the dominant firm is lower than it would be without the competition from the fringe,

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211 Petrol stations and soft drinks are other examples where horizontal differentiation is prevalent.

212 this explains the kink of the residual demand curve

213 The model and the general conditions are presented, for example, in Carlton D W and Perloff J M, 1990, *Modern Industrial Organization*, Harper Collins, at pages 185 onward.

because the residual demand[214] is less than the market demand, which implies that the price is lower than if the dominant firm had a monopoly position. On the other hand, and more importantly, the profit of the dominant firm is higher than it would be under a Cournot competition, with other firms having some degree of market power rather than passively and competitively following the lead of the dominant firm.

Accordingly, the dominant firm facing a competitive fringe is an intermediate situation between the monopoly case and Cournot competition – this is relevant both for the profit of the dominant firm and for the corresponding deadweight losses.

Even if there is a significant difference in the ratios of biggest firm/group to the second firm/group between the factual and counterfactual (as there indeed is in some cases in the model), it would not be appropriate to assess the Alliance using to the "dominant firm facing a competitive fringe" rather than the Cournot model. There are a number of reasons for this.

First, the "dominant firm facing a competitive fringe" model is based on the dominant firm being a price setter, optimising for the output of the fringe. The fringe on the other hand plays only a passive role in price setting. The theoretical problem associated with such strategic interactions is that there is no justification for that assumption. It is consequently difficult, if not impossible, to characterise the outcome as a Nash Equilibrium, if there is no exogenous explanation for, or constraints on, the behaviour of the non-dominant firm.

Second, a practical difficulty with the "dominant firm facing a competitive fringe" is that the outcomes are extremely sensitive to the choice of the elasticity of supply of the competitive fringe – that is, the form of their supply curve. This is because the constraint imposed on the dominant firm depends on the reaction of the fringe to the price behaviour of the dominant firm. In other words, the extent to which the fringe's supply increases with price affects the trade-off of the dominant firm, as explained above. Under such circumstances, any outcome of this alternative modelling would be highly hypothetical – especially because no data is available, which in turn is due to the inapplicability of the model to the relevant markets.

Third, the model is indeed not consistent with the structure of the relevant markets. This is because the "dominant firm facing a competitive fringe" by definition is characterised by a competitive fringe. This is not the case on the route at issue. Even if the largest firm/group is

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214 That is, the market demand curve net of the supply of the competitive fringe.

significantly larger than the second firm/group, the latter is not a competitive fringe – there is only one other market player in most case. This is crucial since the passivity of the competitive fringe is eventually explained by its atomistic size. This is obviously not the case for firms serving around 20% of the market.

Finally, it is worth noting that the asymmetry in the market shares is taken into account in the Cournot model used for the assessing the Alliance, which is why this model is widely used in the aviation industry and has found empirical support in the literature.

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