NECG Analysis of the Proposed Alliance between Air New Zealand and Qantas

Presentation to the NZ Commerce Commission

21 January 2003

Components of the quantitative analysis

- Competitive detriments:
  - Price and output simulation with results converted to a welfare measure
- Public benefits
  - Cost savings
  - Tourism
  - Improved scheduling
  - Additional direct flights
  - Freight
  - Engineering and maintenance
- Summary of results
- Changes to the model

Competitive detriments

Competitive detriments: the Cournot approach

- The quantitative analysis of competitive detriments focuses on the air passengers services markets
- The analysis involves the modelling of an oligopoly under Cournot competition. This assumes that firms use output rather than price as their main strategic variable
- This approach involves a number of simplifying assumptions. However, it was chosen over alternatives because:
  - More sophisticated models are necessarily more complex to implement and interpret
  - Cournot competition has both empirical and theoretical support in the airline industry
  - In the circumstances, Cournot competition is conservative since
    - it assumes market concentration is the sole determinant of the intensity of competition; and
    - it over-estimates the fall in market demand, since it involves modelling an average yield rather than a marginal price

Competitive detriments: the Cournot approach

- As noted, one of the important limitations of the the model is that it produces a single average retail price
- This means that the Cournot model will overstate the solution price, perhaps especially when VBAs operate
- Consequently, the market outcomes that are predicted are likely biased in the direction of higher prices and lower output than would actually transpire
- Applied to Australian domestic market between 2000 and 2002, a period of VBA entry and FSA consolidation, the Cournot model predicted prices between 2% and 13% higher than those that actually eventuated

Competitive detriments: the scenarios

- The scenarios we model are the future with the Alliance (the factual) and the future without the Alliance (the counterfactual)
- The price and output associated with each of these scenarios with respect to a base case is estimated and the impact of the Alliance is calculated as the difference between the factual and counterfactual results
- Hence, our assessment involves a comparison of the likely future world with and without the Alliance, not a comparison with today

Competitive detriments: the scenarios

- The future with and without the Alliance are reflected in the model in terms of flight schedules:
  - The factual and counterfactual schedules are presented in terms of departures per week by city-pair by airline and aircraft type
  - From this information, seat capacity for each city-pair is calculated by multiplying the number of departures by the number of seats for each aircraft operated on each city-pair

The factual schedule is in the ‘F-sch’ tab of the model and the counterfactual schedule is in the ‘CF-sch’ tab

Competitive detriments: the scenarios

- All departure values are hard-coded in the model with the exception of the VBA schedules, which are read in from the 'VBA' tab depending on the VBA entry scenario selected in the 'Control' tab
  - No VBA entry, medium VBA entry and high VBA entry
  - NECG's analysis is based on the medium VBA entry scenario

VBA schedules are read into the 'F-sch' and 'CF-sch' tabs from the 'VBA' tab depending on which VBA entry scenario is selected in the 'Control' tab

Competitive detriments: the scenarios

- The model is run for 5 years from the commencement of the Alliance:
  - Years 1 and 2 reflect a phasing-in of the full schedule, which is assumed to be implemented by year 3
  - After year 3, the schedules for Air NZ and Qantas are assumed to remain fixed, while the departure numbers for other airlines are increased at the rate of natural demand growth
- The model is run at the level of individual city-pairs rather than the wider markets defined in our report and hence should be considered conservative

Competitive detriments: the scenarios

- In the schedules, Air Pacific is treated as a part of Qantas for the purposes of determining capacity shares
  - AKL-NAN and NAN-LAX and marked in the model as FJ departures
- Freedom appears in the schedules as a separate airline to Air NZ, but is combined with Air NZ in the Cournot analysis
- United appears in the schedules as a separate airline to Air NZ, however:
  - in the counterfactual is combined with Air NZ in the Cournot analysis for the relevant routes
  - in the first 2 years of the factual there is assumed to be no competitive detriment on city-pairs where the United/Air NZ agreement operates

Competitive detriments: the inputs

- Base case average fares
- Base case passenger volumes and capacity
- Market shares for base case, factual and counterfactual
- Price elasticity of demand
- Capacity elasticity of demand
- Cost differential between a VBA and FSA

Competitive detriments: the inputs

- Base case average fares
  - Calculated as the weighted (by volumes) average fare for Qantas and Air New Zealand based on passenger revenue and volumes for 2001/02
  - For this calculation gross passenger revenue was reduced by non-cash adjustments, standard commissions and foreign exchange gains/losses
  - A factor was also included in the model to reduce the average fares for domestic New Zealand to reflect the impact of NZ Express
    - This factor was set to 20% in our scenarios, although can be adjusted in the 'Control' tab

Base case average fares are in the 'Input' tab of the model and the factor for reducing base case fares in domestic NZ is in the 'Control' tab

Competitive detriments: the inputs

- Base case passenger volumes
  - for each city-pair these volumes are calculated using 2001/02 average load factors for Qantas and Air New Zealand multiplied by total base case capacity for each city-pair
  - Base case passenger volumes are increased in each year of the model based on the rate of natural demand growth
- Base case capacity
  - Base case capacity for all airlines operating on a city-pair is calculated using Northern Summer 2002 schedules, which operate between April and October

Base case passenger volumes and base case capacity are in the 'Input' tab of the model. The natural demand growth assumptions are in the 'Control' tab.

Competitive detriments: the inputs

- Market shares were approximated using capacity shares
  - Capacity shares were calculated by multiplying number of departures in the schedules by number of seats on each aircraft type
  - Base case capacity shares were calculated using Northern Summer 2002 schedules for all airlines
  - Factual capacity shares for Qantas and Air New Zealand determined on the basis of the schedule agreed between the parties
  - Counterfactual capacity shares for Qantas and Air New Zealand determined on the basis of schedules provided to NECG by each airline
  - Factual and counterfactual capacity shares for other airlines determined on the basis of base case schedules plus natural demand growth

Capacity shares are calculated in the ‘F-sch’ and ‘CF-sch’ tabs and are read into the ‘Cournot’ tab

Competitive detriments: the inputs

- Price elasticity of demand of –0.70 for business passengers and –1.65 for leisure passengers
- Weighted average calculated for each city pair using business/leisure passenger split as weights
  - Business/leisure split provided by Air NZ

Price elasticity of demand is in ‘Control’ tab, business passengers shares are in ‘Input’ tab and weighted average elasticities are calculated in the ‘Input’ tab

Competitive detriments: the inputs

- Capacity elasticity of demand of 0.12 to reflect the impact of more frequent flights (ie better service quality) on demand
  - This is likely to overstate the level of demand under the counterfactual given that many of these flights would be wing-tip and hence do not represent an improvement in service quality over the factual
- Cost differential assumed to be 20% between an FSA and VBA and 7.5% between an FSA and VBA+

Capacity elasticity is in the 'Control' tab and cost differentials by major route for FSA/VBA and FSA/VBA+ are in the 'Control' tab

Competitive detriments: solution price

- The solution price is a function of:
  - Initial price
    - As the solution price is calculated as a change from the initial price, the higher the initial price the higher the solution price
    - The initial price does not impact the solution in terms of percentage change in price, but does impact the size of the DWL and net transfers
  - Price elasticity of demand
    - The more price elastic is demand the smaller the price increase resulting from a lessening of competition
    - This is because, when the demand is price elastic, the mark-up on competitive price is smaller

Competitive detriments: solution price

- Market shares
  - The market shares of each individual market participant determines endogenously its marginal costs
- Number of market participants
  - The higher the number of airlines operating on a city-pair, the lower the change in the price.

The solution price is calculated in the ‘Cournot’ tab for the factual and counterfactual. The price difference between the factual and counterfactual is calculated in the ‘Analysis’ tab’.

Competitive detriments: solution output

- The solution output (passengers) is a function of:
  - initial output
  - the solution price
  - the initial price
  - the price elasticity of demand
  - initial capacity
  - factual/counterfactual capacity
  - Capacity elasticity of demand
- The solution output is calculated as the initial output plus the change in output resulting from the change in price and change in capacity

Competitive detriments: solution output

- Solution output:

  Initial output

  +

  % change in price * price elasticity * initial output

  +

  % change in capacity * capacity elasticity * initial output

The solution output is calculated in the 'Cournot' tab for the factual and counterfactual. The output difference between the factual and counterfactual is calculated in the 'Analysis' tab'.

Competitive detriment: welfare

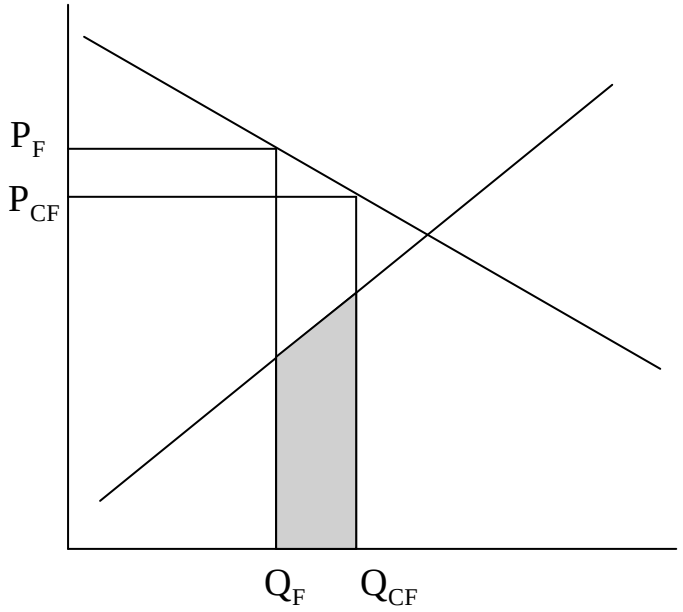
- The price and output changes are converted into measures of welfare changes between the factual and counterfactual
- There are 2 components to welfare changes relevant to our analysis:
  - Deadweight loss
  - Net transfers

The deadweight loss and total transfers are calculated in the ‘Analysis’ tab.

Competitive detriment: welfare

- The deadweight loss is calculated as the difference between:
  - the value that consumers put on the units of consumption that are foregone as a result of the price increases;

  and
  - the cost to producers of providing those extra units of consumption
- To avoid double-counting of cost-savings, we deduct the cost-savings that result from higher prices



This calculation is done in 'PAX burn' tab of the model

Competitive detriment: net transfers

- When considering a transaction within a country, transfers of wealth between consumers and producers are usually ignored, as they do not represent a loss in economic efficiency, only a redistribution of wealth
- However, when considering a transaction that involves inter-country transfers, some of the transfers associated with the proposed Alliance become relevant:
  - Where transfers are made from NZ (Australian) consumers to foreign producers then this represents a net loss to NZ (Australia) and hence is included as a relevant transfer
  - Similarly, where transfers are made from foreign consumers to NZ (Australian) producers then this represents a net gain to NZ (Australia) and hence is included as a relevant transfer
  - These transfers are referred to as “net transfers” as they are net of intra-country transfers

Competitive detriments: allocation of welfare

- The potential loss in welfare associated with the Alliance is allocated between New Zealand, Australia and foreigners
- The deadweight loss is allocated on the basis of the proportion of New Zealand, Australian and foreign passengers carried on each of the major routes
  - These proportions were provided to NECG by the airlines and represent a weighted average between the values provided by Qantas and Air New Zealand

The passenger shares used for the allocation of welfare are in the 'Control' tab of the model.

Competitive detriments: allocation of welfare

- Transfers from consumers to producers are also allocated on the basis of passenger shares
- Transfers to producers from consumers are first allocated to QF/ANZ on the basis of these airlines share of capacity and then these transfers are allocated between New Zealand and Australia on the basis agreed by the airlines for the purposes of the Alliance

The allocation of the deadweight loss and net transfers is in tab ‘Allocation’ of the model.

Public benefits

Cost savings: the approach

- The cost savings are simply the difference between the operational costs and capital costs associated with the factual schedule and passenger volumes and the counterfactual schedule and passenger volumes
- The costs associated with the factual and counterfactual scenarios are calculated by multiplying unit costs by cost drivers
- The JOA is likely to yield other savings – eg in marketing costs, lounges and (eventually) IT. These have not been quantified and hence are not included

Cost savings: unit costs

- Unit costs were calculated for 3 cost drivers:
  - Passengers
  - Block hours
  - Departures
- Using the airlines' historical accounts for 2001/02 each cost item in the account was allocated to a cost driver
  - Each cost item was allocated as closely as possible to the way in which the airlines allocate costs
  - This was done by major route and by aircraft type

Cost savings: unit costs

[CONFIDENTIAL TABLE]

Cost savings: unit costs

- Two adjustments were made to the unit costs following PWC's audit:
  - Qantas fuel costs for 747s on the Tasman, which altered the unit cost per blockhour for 747s on the Tasman
  - Air NZ airport dues for 744s on the Tasman, which altered the unit cost per departure for 744s on the Tasman
- In addition, Qantas does not currently operate A330 aircraft and hence no historical information was available
  - Qantas studies indicate that A330 overall costs are **[CONFIDENTIAL]** than 767 costs
  - Hence, A330 costs were estimated based on historical 767 units costs for departures and blockhours

Cost savings: unit costs

- Also, Air NZ does not currently operate A320 aircraft and hence historic cost information was not available
- Air NZ estimated that the unit costs (blockhour and departures) was **[CONFIDENTIAL]** than the costs for 737 aircraft
- Hence unit costs for Air NZ's A320 aircraft is estimated based on historical 737 aircraft costs **[CONFIDENTIAL]**

Unit costs are in the 'Unit cost' tab of the model

Cost savings: capital costs

- Capital costs are calculated on the basis of:
  - The fleet composition of each airline dedicated to the affected routes
  - The useful life of each aircraft type
  - The average age of each aircraft type
  - The AVITAS written down value for each aircraft type
- Depreciation is calculated as the AVITAS written down value divided by the remaining useful life
- The cost of capital is calculated as the AVITAS written down value multiplied by a WACC of 8%
- The total capital costs are divided by total blockhours per aircraft type to arrive at a capital cost per blockhour for each aircraft type

The capital cost calculations are in the ‘CapCost’ tab of the model

Cost savings: cost drivers

- The cost drivers required to calculate the total variable and capital costs associated with the factual and counterfactual are:
  - Passenger volumes
    - These are the solution passenger volumes from the ‘Cournot’ tab
  - Departures
    - These are taken from the relevant schedule
  - Blockhours
    - These are calculated by multiplying the blockhours on a city-pair by the number of departures on that city-pair

Cost drivers are in the ‘FCD’ tab for factual and ‘CFCD’ for counterfactual. Blockhours by city-pair are in the ‘BHrs’ tab.

Cost savings: total variable and capital costs

- The total variable and capital costs associated with the factual and counterfactual are calculated by multiplying the relevant unit cost by the relevant cost driver
- The total costs per cost driver are then summed to arrive at the total variable and capital costs for the factual and counterfactual

The total variable and capital costs associated with the factual and counterfactual are in tab ‘FC’ for the factual and ‘CFC’ for the counterfactual

Cost savings: total variable and capital costs

- Total cost savings are then calculated as:
  - Total variable and capital costs for the counterfactual

  Less
  - Total variable and capital costs for the factual

  Less
  - Cost savings resulting from price increases
- Cost savings are then allocated between Australia and New Zealand on the basis agreed between the parties for the purposes of the Alliance

This calculation is done in the tab ‘Analysis’

Valuation of flight timing benefits

Existing Schedules

Number of Flights * $\frac{\text{Total Passengers}}{\text{Total Flights}}$ * Average Wait Time per Passenger * Opportunity Cost of Time = Existing Cost of Waiting

MINUS

Factual Schedules

Number of Flights * $\frac{\text{Total Passengers}}{\text{Total Flights}}$ * Average Wait Time per Passenger FACTUAL ⇓ Closest flight at a point in time * Opportunity Cost of Time ⇓ $1.67/m (bus) $0.33/m (leis) = Estimated Cost of Waiting FACTUAL = Benefit

Benefits from direct flights

Formula

Time Saving per Flight (Minutes) * Number of Flights (No/Week) * Passenger per Flight (No) * { Proportion Business Passenger * Opportunity Cost of Time $1.67/minute ; Proportion Leisure Passenger * Opportunity Cost of Time $0.33/minute }

Example Auckland / Adelaide

191 * 6 * 116 * { .27 * 1.67 = 59,941 ; .73 * 0.33 = 32,024 }

⇓

= $91,965/week

Existing

AKL MBL MBL ADL = 420 Minutes

DIRECT = 229 SAVING 191 MINUTES

Calculations in ‘Direct’ tab

Tourism benefits

Formula

Arrivals * Spending per trip

For example:

Qantas Holidays

				$M NZ
Australians	14,000	*	1,770/Trip	24.8
Other Foreigners	36,000	*	3,950/Trip	142.2
Total	50,000			167.0

Promotion Effectiveness

				$M NZ
Other Foreigners	13,277	*	3,950/Trip	52.4
GRAND Total	63,277			219.4

Calculations in ‘Tourism sum’ tab

New fares and products

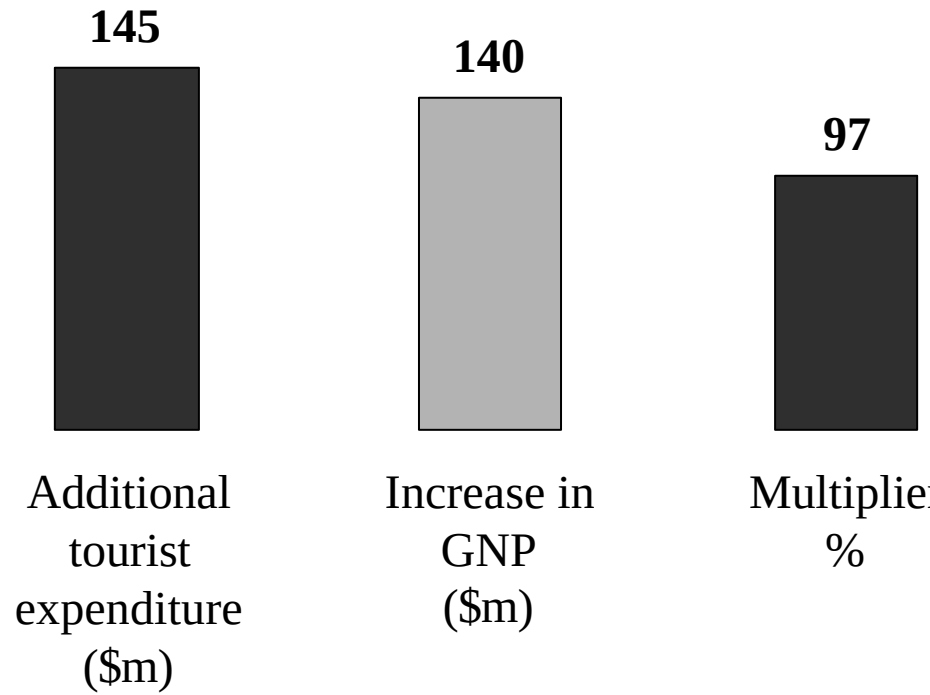
New Zealand Net Tourist Impact Year 3				
Route	New Zealand	Australia	Foreigners	Net NZ Impact
Tasman	-67,491	-53,140		14,351
Other NZ International	-17,315	-20,757	-55,639	-17,567
			Net Impact	–3,216

Formula

Tourist Impact * Spend

Calculations in ‘Tourism sum’ tab

CGE modelling supports putting benefit equal to spend



- $145 million approximate expenditure by 50,000 tourists in New Zealand
- Simulated in GTEM model

Freight benefits

Formula

Additional capacity * Yield

Tonne Kilometres / Year — $ Tonne / Per Kilometre

Calculation

127,424 * $36.01 = $4.6

Engineering & maintenance

Formula

Qantas Heavy Maintenance Awarded Air New Zealand (FACTUAL)	—	Qantas Heavy Maintenance Awarded Air New Zealand (COUNTERFACTUAL)

Calculation

$45m	-	$6m	=	$39m/year

- With alliance Qantas directs 80% of heavy maintenance to Air New Zealand
- Absent the alliance, Qantas may award only 10% of heavy maintenance to Air New Zealand. Additionally, the Qantas' outlays with Air New Zealand are likely to be more uncertain

Summary results

- The competitive detriments and public benefits (with the exception of freight and E&M) are summarised in each year of the model in the ‘TO-rep’ tab
- The results for all 5 years are then summarised in a separate workbook ‘Output summary.xls’
  - This workbook brings together the results of all 5 years, including freight and E&M, and discounts the results using a discount rate of 6%

Changes to the model

Changes to the model

- Since submitting the NECG report and the models, a number of errors have been identified and corrected:
  - Qantas fleet composition error: an A333 aircraft was included instead of a 763 in the year 3 counterfactual schedule
  - Scheduling benefits incorrectly included some flights that the airlines do not propose to operate, **[CONFIDENTIAL]**
  - **[CONFIDENTIAL]**

Changes to the model

- Average base case fares were set at Air NZ average fares rather than weighted average of Air NZ and Qantas
- Revised passenger shares for the Tasman based on Statistics New Zealand passenger arrival data
- Updated tourism expenditure information
- Deduction of promotional expenditure of NZ$ **[CONFIDENTIAL]** per year

Changes to the model: impact on results

Results reported in report of 8 December 2002

	Benefits						Detriments		Net benefit		
	Cost Savings	*Scheduling*	*New direct*	*Tourism*	*E&M*	*Freight*	*Dead-weight loss*	*Net Transfer*	*Total*	*NZ*	*Australia*
1	-$21	$14	$26	$120	$39	$1	$71	-$14	$123	$67	$56
2	$172	$13	$24	$237	$37	$0	$25	-$1	$457	$285	$172
3	$323	$11	$23	$276	$34	$5	$46	-$29	$656	$379	$277
4	$314	$11	$22	$260	$33	$5	$44	-$28	$628	$361	$266
5	$297	$10	$21	$244	$31	$5	$43	-$26	$590	$340	$251
Total	$1,086	$60	$116	$1,134	$175	$15	$230	-$98	$2,454	$1,433	$1,022

Revised results

	Benefits						Detriments		Net benefit		
	Cost Savings	*Scheduling*	*New direct*	*Tourism*	*E&M*	*Freight*	*Dead-weight loss*	*Net Transfer*	*Total*	*NZ*	*Australia*
1	$6	$22	$0	$100	$39	$2	$78	-$14	$105	$58	$47
2	$154	$9	$14	$221	$37	$0	$28	$1	$406	$274	$132
3	$289	$4	$16	$217	$35	$5	$49	-$19	$536	$337	$199
4	$272	$4	$15	$203	$33	$5	$48	-$27	$510	$310	$200
5	$257	$3	$15	$189	$31	$5	$47	-$26	$478	$290	$188
Total	$978	$41	$60	$931	$174	$15	$250	-$84	$2,035	$1,270	$765