Allocative Efficiency

NECG

Overview

- There are two models available to the Commission, which estimate the allocative efficiency impacts associated with the Alliance

- The results of the models vary substantially
  - The Gillen model estimates NZ$170m of losses for year 3 of the Alliance for domestic NZ and the Tasman
  - The NECG model estimates NZ$23m of losses for year 3 of the Alliance for all affected routes

- Both models have limitations, however:
  - The framework, assumptions and implementation problems associated with the Gillen model make it impossible to rely on for assessing the Alliance
  - The limitations of the NECG model have small effects or make our estimates conservative

- The NZCC should rely on NECG's estimates and place no weight on the results obtained by Gillen

Gillen Approach

- The Commission's draft determination relies on the approach of Professor Gillen
  - Gillen claims to implement a model of product differentiation based on work by Professor Hazledine

- Gillen finds much higher detriments than those estimated by the NECG model, but for the following reasons:
  - (A) Many aspects of the modelling approach are flawed
  - (B) The modelling approach relies on indefensible assumptions and leads to counterintuitive results
  - (C) Gillen makes many errors in implementation

(A) Gillen Approach: Flaws in modelling approach

1. Conjectural variations approach adopted by Gillen/Hazledine is widely discredited

2. Product differentiation model based on incorrect assumptions & assertions
   – The theoretical model is not properly solved

3. The revenue maximisation approach is flawed

4. Gillen erroneously assumes, and then incorrectly implements, Stackelberg leadership

(A1) Conjectural variations

Conjectural variations approach adopted by Gillen/Hazledine is widely discredited

- Theoretical problems:
    - Cournot conjectures are the only consistent conjectures. See work of Daughety and of Lindh.
- Empirical problems relate to the econometric concepts of:
    - Identification
    - Collinearity
- Conjectural variation parameter is not used appropriately
    - Hazledine assumes airlines can use it to achieve a load factor objective
    - Cannot be used for predicting the future state of competition

Independent of these problems with the CV approach, Gillen's modelling approach contains major flaws …

(A2) Product differentiation

Product differentiation model based on incorrect assumptions & assertions

- Assumptions regarding substitution between FSAs versus substitution between FSA and VBA are arbitrary, and inconsistent with empirical evidence
  - Use of "trigger points" inconsistent with demand system used
- Assumptions underlying Gillen's CV methodology are flawed
  - Assumption of an asymmetry between conjectural responses lacks supporting evidence
  - Whereas the CV methodology serves to estimate a conduct parameter based on market data, Gillen instead assumes an *ad hoc* relation between the conjectures.

The theoretical model is not properly solved

- Equations are rewritten but no equations are solved

(A3) Revenue maximisation

The revenue maximisation approach is flawed

- Confuses short run profit/revenue maximising and long run profit objectives
    - There is no "minimum profit constraint" imposed in the model
- Incorrectly presumes relationship between S-curve effect and revenue maximisation
- Confuses market and firm elasticity of demand
- No proof for the equivalence between revenue maximisation, a conjectural variation of –0.4 and a market elasticity of 1

(A4) Stackelberg leadership

Gillen erroneously assumes, and then incorrectly implements, Stackelberg leadership:

- The VBA is modelled as a competitive fringe
    - Inconsistent with empirical evidence
    - Unlikely to be a profit maximising strategy for a VBA
    - In implementation, Gillen does not set MR=MC for VBA

(B) Gillen Approach: Indefensible assumptions and results

- Almost perfect competition without Alliance, compared to a monopoly with Alliance

- VBA *more* likely to enter where its profitability would be lower ($36 million without Alliance), rather than higher ($118 with Alliance):
  - This is despite Virgin Blue's confirmation they will enter and competitively constrain the Alliance

- Fifth freedom operators impose *no* competitive constraint on the Tasman

- Air NZ would remain viable without Alliance despite estimated *$83m decline in profits per year* compared with today

(B) Gillen Approach Indefensible assumptions and results

- Qantas and Air NZ have equal market shares and hence concentration under the Alliance is exaggerated

- Unsurprisingly, the combined impact of the above assumptions are implausible assumptions:

  - an increase in average fares of 48% on the Tasman and 56% in domestic NZ
  - Qantas and Air NZ would operate half full aircraft under the Alliance, suggesting ineffective yield mgt

- ***These results are not only implausibly high, but inconsistent with findings in other jurisdictions and with the extensive undertakings offered by the Applicants***

(C) Gillen Approach: Implementation errors

Gillen has provided three versions of spreadsheets

- The seriousness of the implementation errors are reflected in the extent to which allocative efficiency gains/losses differ in the aggregate results table across versions

	Domestic NZ	Tasman	Combined
Gillen 1	91 Loss	41 Loss	132 Loss
Gillen 2	19 Gain	74 Gain	93 Gain
Gillen 3	19 Gain	136 Gain	155 Gain

NECG Model – Cournot framework

- The essence of the Cournot approach is that firms use output rather than price as main strategic variable

- We chose this framework for the following reasons:
  - More sophisticated models are more complex to implement and interpret
  - Cournot competition has both empirical and theoretical support in the airline industry
  - Our model, based on the Cournot approach is conservative in important respects

NECG Model

- There are a number of issues that we have explored:
  1. Framework for calibration
  2. No product differentiation
  3. Estimates changes in average yields and hence does not capture the airlines' practice of price discrimination
  4. Does not capture the higher intensity of VBA-FSA competition
  5. Do not pass through cost savings into price solution
  6. Does not incorporate the impact of the extensive undertakings offered by the Applicants

  – *We have worked through each of these issues and they either have a small impact on our results or make our model results conservative*

(1) Framework for calibration

- Standard merger analysis (Farrell & Shapiro) involves a comparison of two states of the world: one with the merger and one without

- Marginal cost is estimated for the world without the merger

- Prices and outputs are calculated assuming that the only thing that differentiates the two states of the world is the merger itself (the move from N to N-1 firms)
    – No new entry or exit occurs
    – No exogenous expansion or contraction of capacity

(1) Framework for calibration
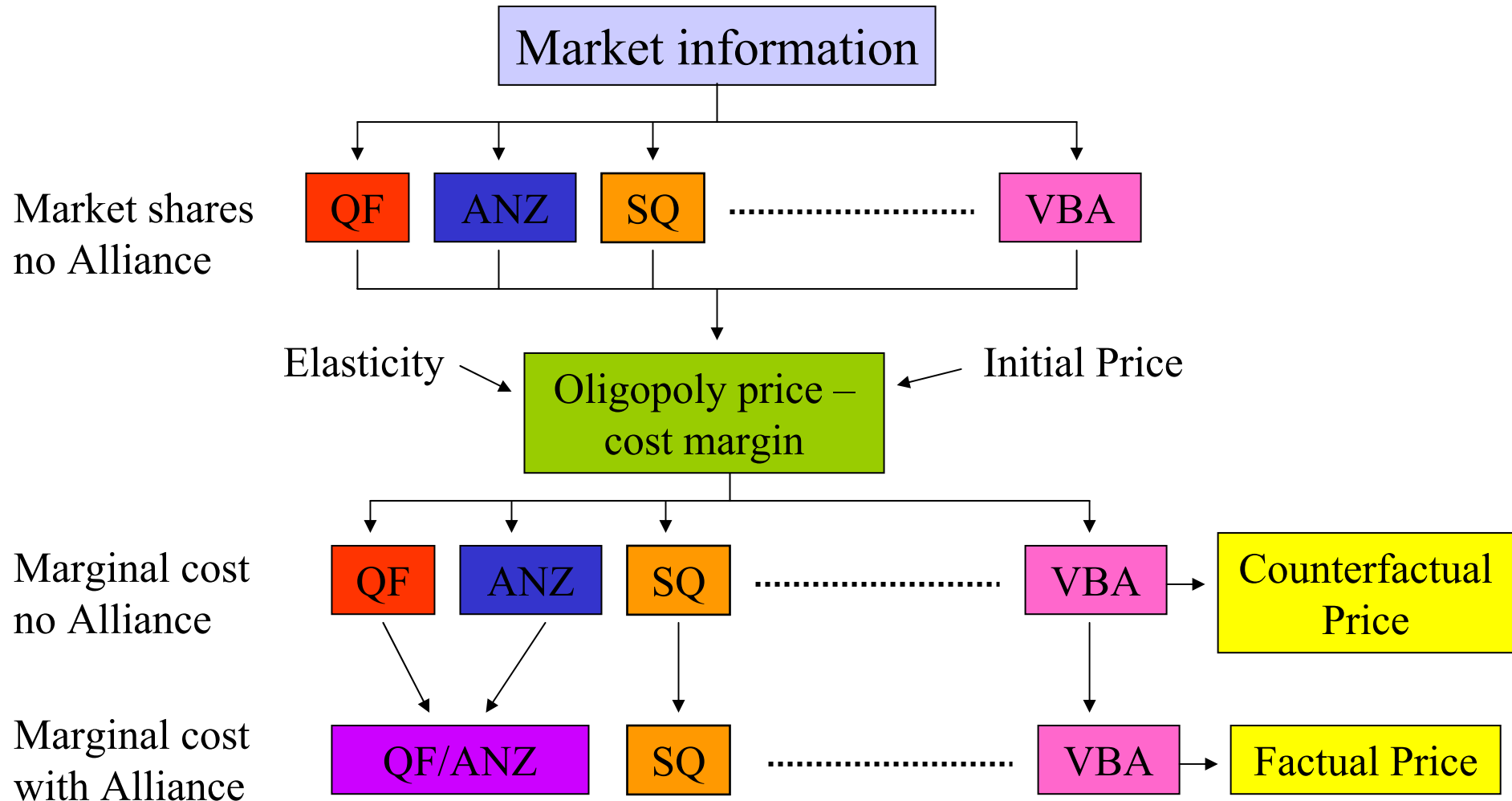
(1) Framework for calibration

- There are a number of options available for calculating the marginal costs to use in the analysis:
  - (A) Disaggregated Factual market shares
  - (B) Counterfactual market shares
  - (C) Base case market shares

- Each approach involves some limitations compared with the commercial reality of the future with and without the Alliance
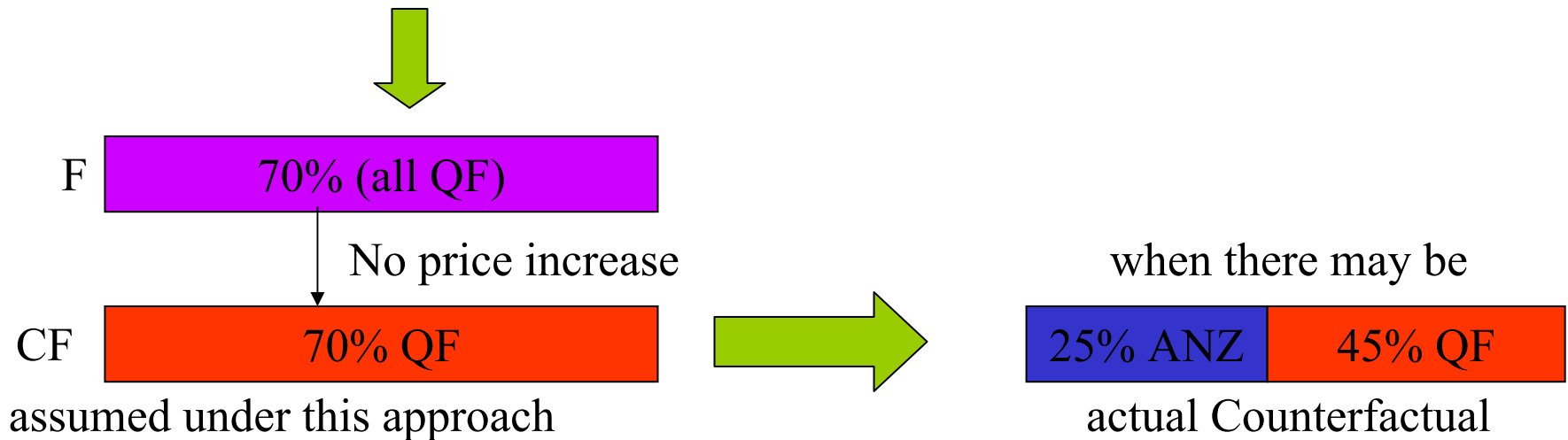
(1A) Disaggregated factual market shares

- NECG model calculates marginal cost on the basis of the disaggregated Factual market shares
  - This approach assumes that the Counterfactual shares are equal to the disaggregated Factual shares
- Counterfactual price equal to base case price except where VBA entry is assumed

Factual schedules

25% ANZ	45% QF

25% ANZ	45% QF
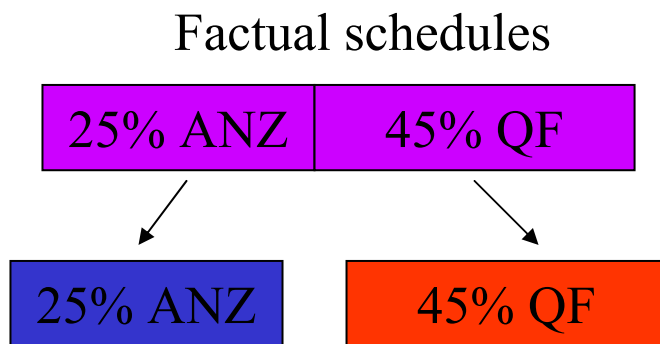
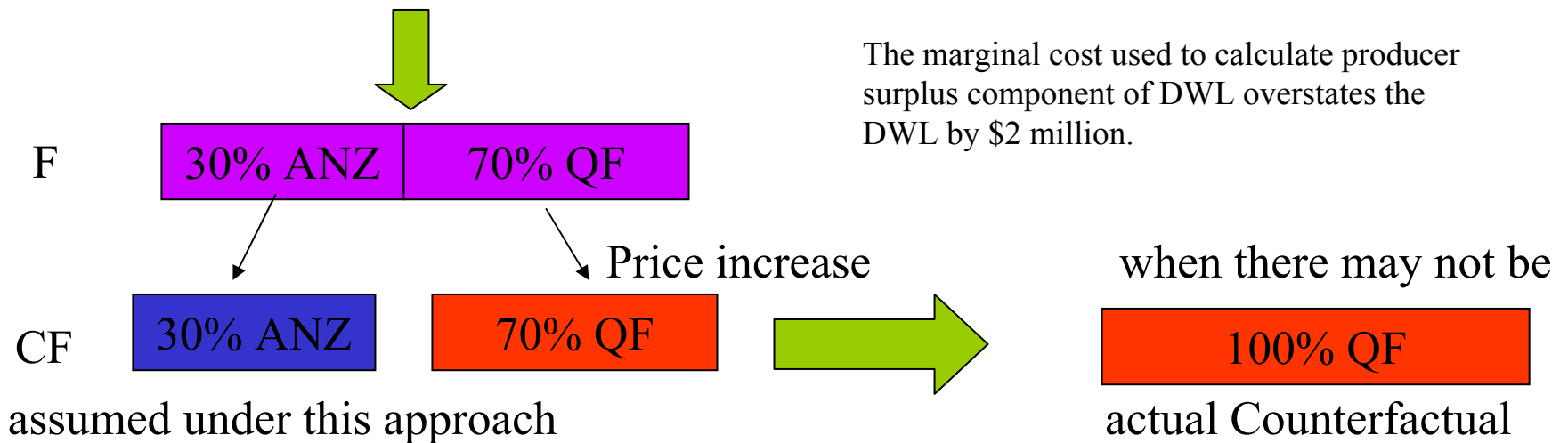Counterfactual assumed under this approach

(1A) Disaggregated factual market shares

- On a limited number of city-pairs this approach underestimates the allocative efficiency loss of the Alliance
  – For example, where only one of the airlines operates a city-pair with the Alliance, but both operate that city-pair without the Alliance, this approach will not estimate a price increase for that city-pair

F **70% (all QF)**

No price increase

CF **70% QF**

assumed under this approach

when there may be

25% ANZ **45% QF**

actual Counterfactual

(1A) Disaggregated factual market shares

- On some city-pairs this approach overstates the allocative efficiency loss of the Alliance
  - For example, where both airlines operate a city-pair with the Alliance, but only one operates that city-pair without the Alliance, this approach will estimate a price increase for that city-pair

The marginal cost used to calculate producer surplus component of DWL overstates the DWL by $2 million.

F | 30% ANZ | 70% QF

Price increase | when there may not be

CF | 30% ANZ | 70% QF | 100% QF

assumed under this approach | actual Counterfactual

(1B) Counterfactual market shares

- Another approach is to calculate marginal cost on the basis of the counterfactual market shares

- However, on a number of city-pairs this overstates the price increase associated with the Alliance

  – where the level of VBA entry is higher in the Factual than the Counterfactual, this approach may underestimate the level of VBA entry under the Alliance and hence overstate the price increase

  – where there is no VBA entry in the Counterfactual, but entry in the Factual, an assumption is required to calculate marginal cost for the Factual

(1C) Base case market shares

- Another approach is to calculate marginal cost using base case market shares
  - this approach is usually adopted in standard merger analysis because it allows a "before and after" comparison and is based on actual market share information
  - we allow the output of the VBA to be determined endogenously
  - however, it does not capture information about what would happen in the future with and without the Alliance
    - where the VBA operates in the factual and counterfactual, but not in the base case scenario, this will not be picked up in the analysis
    - to include VBA entry requires some assumptions regarding marginal cost
   - Qantas' increase in capacity under the Counterfactual will not be reflected in the analysis

(1) Framework for calibration: year 3 results

	DWL	Transfers	Total
Disaggregated Factual market shares (NECG model)	$41 million	-$18 million	$23 million
Counterfactual market shares	$48 million	-$15 million	$33 million
Base case market shares	$26 million	-$12 million	$13 million

(2) No product differentiation

- We have examined the impact of adding product differentiation

- This was done in the simplified Gillen/Hazledine framework

- Involves the following assumptions
    - QF and ANZ are not differentiated and have equal market shares;
    - VBA is differentiated (including lower quality) from the the FSA's;
    - There is no fifth freedom airline;
    - Aggregate market for domestic NZ and Tasman

(2) No product differentiation
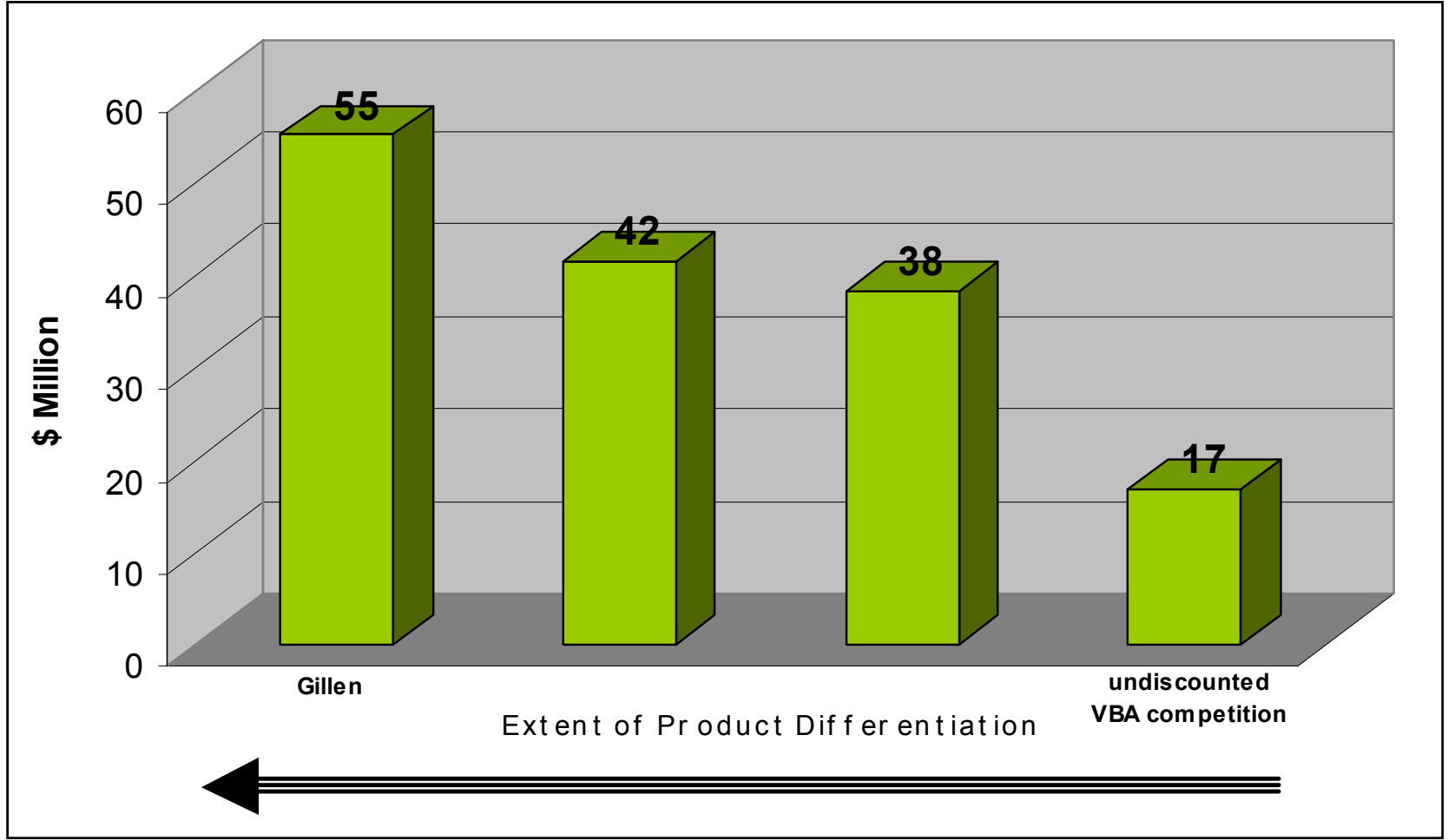
(3) No price discrimination

- Empirical and anti-trust literature generally ignores yield management

- Price discrimination in oligopoly settings is "state of the art"
    - Some theoretical results have begun to emerge, but they are largely untested
    - It is unlikely that economics will ever be able to accurately reflect the complexity of yield management

- The Commission's price discrimination work seems to be consistent with expectations
    - With 5 price bands the allocative efficiency loss is substantially lower than with 3 price bands ($32 million compared with $85 million)
    - This is consistent with NECG's conclusion that ignoring price discrimination in the modelling is conservative

(4) Intensity of VBA-FSA competition

– Model understates impact of VBA entry on fares

– Using historical data for domestic Australia we estimated the price change associated with VBA entry in the NECG model and compared this with actual outcomes

Route	Price prior to VBA entry January-June 2000	Modelled price after VBA entry	Actual price after VBA entry January-June 2002	Difference between modelled and actual
SYD-MEL	$160	$153	$150	2%
SYD-BNE	$146	$140	$130	7%
MEL-BNE	$198	$190	$166	13%

(5) Undertakings ignored

Detriments will be lower than those estimated by the NECG model due to undertakings relating to price and capacity

Relevant routes	Undertaking
Tasman routes where only the Applicant(s) operate	**Price cap:** Applicants will not increase prices beyond airline cost base increases
Domestic NZ and Tasman routes where only the Applicant(s) operate	**Capacity floor:** Applicants will increase capacity at the same average rate as all other Tasman Routes or Domestic New Zealand Routes (as applicable)

NECG Model – Summary of findings

Over 5 years the total allocative efficiency loss associated with the Alliance is NZ$160 million

Year	Deadweight loss	Net Transfer
1	57	14
2	22	7
3	36	-16
4	35	-15
5	34	-15
Five year total	185	-25

Summary

- The Gillen model is based on a flawed framework and the assumptions and results obtained from the analysis are implausible

- We have tested a number of variations to the NECG model which address issues that might be raised and the impact of these is either small or makes our approach conservative

NETWORK ECONOMICS CONSULTING GROUP