"PRICE CONTROL STUDY OF AIRFIELD ACTIVITIES": A CRITIQUE

A Report for Auckland International Airport Limited

Prepared by NERA

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Sydney

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EXECUTIVE SUMMARY

Auckland International Airport Limited (AIAL) commissioned NERA to evaluate the Commerce Commission's (the Commission's) preliminary recommendation that airfield services at AIAL should be subject to price regulation, and to assess the analysis upon which this recommendation was based.

The Commission based its preliminary recommendation upon analysis suggesting price regulation would lead to net efficiency gains. The four "cornerstones" of the analysis presented in the *Draft Report* are:

- modelling showing AIAL has earned excessive profits over the period 1989 to 2000;
- further modelling indicating the degree of excess profitability would increase significantly over the period 2001 to 2003;
- estimates of dynamic inefficiency showing substantial potential gains available from improved investment incentives; and
- estimates of the cost of price regulation which were lower than these potential gains.

We believe the assumptions and level of rigour in the analysis underlying these cornerstones to be mediocre. The *Draft Report* does not make a reasonable case to support the preliminary recommendation for price control at AIAL.

Modelling of Historic Excess Profits

The *Draft Report* presents quantitative analysis of AIAL's returns within a framework of Accounting Rate of Profit (ARP). It estimates the return AIAL has historically earned on its asset base and compares this with an estimated historic weighted average cost of capital.

This analysis provides a biased assessment of whether AIAL has abused its market power for two reasons. First, the estimated value of the asset base is lower than would be appropriate for assessing whether a company's prices constitute an abuse of market power, since:

- airfield specific assets are valued using historic cost rather than optimised depreciated replacement cost, which would have provided a better approximation to a competitive market outcome and therefore a better reference point in the context of the Commission's objective of assessing whether price control is warranted;
- the exclusion of second runway assets is inconsistent with the approach that would be taken by an efficient new entrant faced with providing the same service on a sustainable basis and is contrary to the principles of efficient pricing (that prices should be set according to marginal costs, which will either include the *short-run*

congestion costs or the *longer-run* costs associated with increasing capacity to meet demand); and

- the data adjustments used to optimise assets (especially the seabed and seawall) have resulted in asset values being removed from the asset base before they were included.

Second, several of the assumptions underlying the profitability estimate have biased the estimate. For example:

- the assumption that airfield activity costs were a constant proportion of total costs (at the year 2000 ratio), whereas we understand from AIAL a greater proportion of costs resulted from airfield activities historically; and
- the assumed tax rate of 33 per cent, AIAL's reported tax rate (as a percentage of accounting profit) was somewhat higher.

We also note there are numerous inaccuracies, inconsistencies and data errors in the model.

Modelling of Future Excess Profits

The modelling of future excess profits is of a poor standard and is insufficient to assess whether to implement price regulation. This conclusion is based on several observations. First, the model holds a number of variables constant over the forecast period (eg, total costs, demand and AIAL's asset base) that will almost certainly not remain so.

Second, marginal costs have been assumed to be zero, both in an accounting and an economic sense. This implies an over-estimation of allocative efficiency gains and an underestimation of the "competitive" price. In a situation of increasing congestion resulting in planned investment in capacity, as is the case for AIAL, marginal costs include the incremental costs associated with bringing this investment forward. It is incorrect to suggest today's users are in no way responsible for the anticipated costs of capacity expansion.

Third, there are internal inconsistencies in the model. For example, the estimated competitive price and quantity change annually, even though the underlying economic conditions are not assumed to change. Additionally, the competitive price/quantity combination does not result in the targeted WACC, even though this is supposedly the basis for calculating the competitive scenario.

We also note the analysis is based on AIAL's announced price increases and does not take account of the ability of the existing light-handed framework to reduce these prices (if it can be shown they are excessive).

Estimated Dynamic Inefficiencies and their Realisation

The result that price regulation would be economically efficient relies on an assumption that AIAL presently incurs $6.7 million per annum in dynamic inefficiencies and that this figure could be halved through price regulation. There are three factors that mean this assumption is wrong.

First, the estimate is based on a misapplication of economic theory. Dynamic efficiency is concerned with ensuring the incentives for efficient investment are in place. The approach of assessing dynamic inefficiency on the basis of assets that have already been optimised out of the asset base double-counts the effects of any so-called "inefficient" investment decisions.

Second, the *Draft Report* does not provide any analysis to show the investment in the assets optimised out of the asset base (and used to estimate dynamic inefficiency) is in fact inefficient. This investment is comprised of the second runway land, the seawall and the seabed. Although it may be feasible to query the value at which these assets should be included in the asset base, it is quite a different matter to argue the assets themselves should not be owned by AIAL or that investment in these assets represents poor management decisions. Close scrutiny of these three assets suggests that divestiture is either inefficient or implausible. In particular, substantial customer's support for the second runway development implies they see this as preferable to the alternative of increasing congestion, implying the investment is efficient.

Third, it is generally accepted that price regulation is unlikely to improve incentives on a firm to act efficiently. Thus, it is more likely price regulation would worsen rather than improve dynamic inefficiency.

The Estimated Costs of Regulation

In estimating the costs of price regulation, the *Draft Report* omits the costs associated with the initial set-up and implementation phase and the necessary training and acquiring of institutional knowledge.

The Commission stated it has already incurred over $1 million in preparing its *Draft Report*.[1] It has also provided independent assessments which suggest the costs of a "review" year are likely to be $2.5 to $5 million for each airport (including the costs to both the regulator and the airport). To establish the regulatory framework and bring the regulator "up to speed" is likely to be considerably more costly than either of these. It is difficult to make an assessment of the likely cost without an understanding of the depth of analysis and

[1] Commission's Draft Report, page 198

consultation that would most likely comprise the development of the regulatory framework. However, for illustrative purposes only, the $5 million may form a useful benchmark.

Conclusion

Given the issues raised above and the already modest nature of the estimated net benefits from regulation ($2.5 million per annum on average), we consider it would be imprudent to base a decision to regulate the prices of AIAL's airfield services on the analysis presented in the *Draft Report*.

Furthermore, the *Draft Report* does not present any thorough analysis of regulatory options. There is a wide range of alternatives, even if a convincing case can be made that the existing light-handed regime is insufficient to prevent airports abusing their market power, and price control may not be the most suitable.

1. INTRODUCTION

1.1. Purpose

Auckland International Airport Limited (AIAL) commissioned NERA to evaluate the Commerce Commission's (the Commission's) preliminary recommendation that AIAL's charges for airfield services should be subject to price regulation and to provide high-level comments on the Commission's analysis. This report provides our assessment of the Commission's analysis and the conclusions it has drawn as they are presented in the *Draft Report: Price Control Study of Airfield Activities at Auckland, Wellington, and Christchurch International Airport* (the *Draft Report*).

We have not attempted any substantive revisions of the quantitative elements of the Commission's analysis, limiting ourselves to illustrative examples as appropriate. We have also excluded any assessment of the WACC, as this was outside the scope of our brief from AIAL.

1.2. Background

Airports are currently subject to "light-handed" regulation under the *Airport Authorities Amendment Act 1997* and the *Airport Authorities (Airport Companies Information Disclosure) Regulations 1999*, as well as the *Commerce Act*.

The *Airport Authorities Amendment Act* requires specified airports (including AIAL) to consult with "substantial customers" over charges for identified airport activities. It also requires specified airports to consult substantial customers on airport activity related capital expenditure plans that are likely to exceed 20 per cent of the value of the company's identified assets within the next five years.

Under Section 9A of the *Airport Authorities (Airport Companies Information Disclosure) Regulation*, the Governor General is able to introduce regulations requiring airport companies to disclose information in relation to their airport activities. Among other things, airports are required to disclose passenger charges and charges for airports activities and the methodology used to determine them. Furthermore, although it has not been exercised, there is provision for the Secretary for Transport to issue guidelines for the methodologies used to value assets, calculate WACC, and allocate revenues, costs, assets etc.

The Minister of Commerce has requested that the Commerce Commission report to him by 1 August 2002 on whether price control should be introduced for airfield activities at Auckland, Wellington and Christchurch International Airports.

The legal test for when price control may be imposed on goods or services, as contained in Section 52 of the Commerce Act, is when:

(a) the goods or services are, or will be, supplied or acquired in a market in which competition is limited or is likely to be lessened; and

(b) it is necessary or desirable for those goods or services to be controlled either -

(i) in the interests of persons acquiring the goods or services (whether directly or indirectly), if the goods or services are acquired from a person who faces limited or lessened competition for the supply of those goods or services; or

(ii) in the interests of suppliers, if the goods or services are supplied to a person who faces limited or lessened competition for the acquisition of those goods or services.

The Commerce Act has been amended since the Commission received the Minister's notice. As a result, the Commission's power has been extended to include the control of prices, revenues and quality standards, whereas previously it was limited to control of prices.

The Commission released its *Draft Report* on 3 July 2001, in which it draws the preliminary conclusion that AIAL's airfield activities should be subject to price regulation.

1.3. Report structure

This report follows the same broad outline as provided in the Commission's *Draft Report* and is structured as follows:

- part 2 comments on the high-level framework for determining whether price regulation is desirable, concluding that the approach appears sensible;
- part 3 considers the competition analysis, raising issues around the degree of rigour and coverage and concluding that insufficient weight has been given to the numerous factors constraining AIAL's ability to earn excess profits;
- part 4 assesses the pricing principles, questioning their appropriateness for assessing whether AIAL's prices constitute an abuse of the company's market power;
- part 5 reviews the approach to estimating the value of the asset base, which we find to be inconsistent with both economic theory and standard practice;
- part 6 assesses the modelling analysis of AIAL's historic and expected future excess returns, raising concerns about the application of Accounting Rate of Profit, the nature of adjustments to the data and the conclusions drawn;
- part 7 considers the cost-benefit analysis, particularly commenting on the likely over-estimation of potential gains and under-estimation of the costs of regulation; and
- part 8 concludes by evaluating the draft recommendation that AIAL be subject to price regulation in light of the comments made throughout our report.

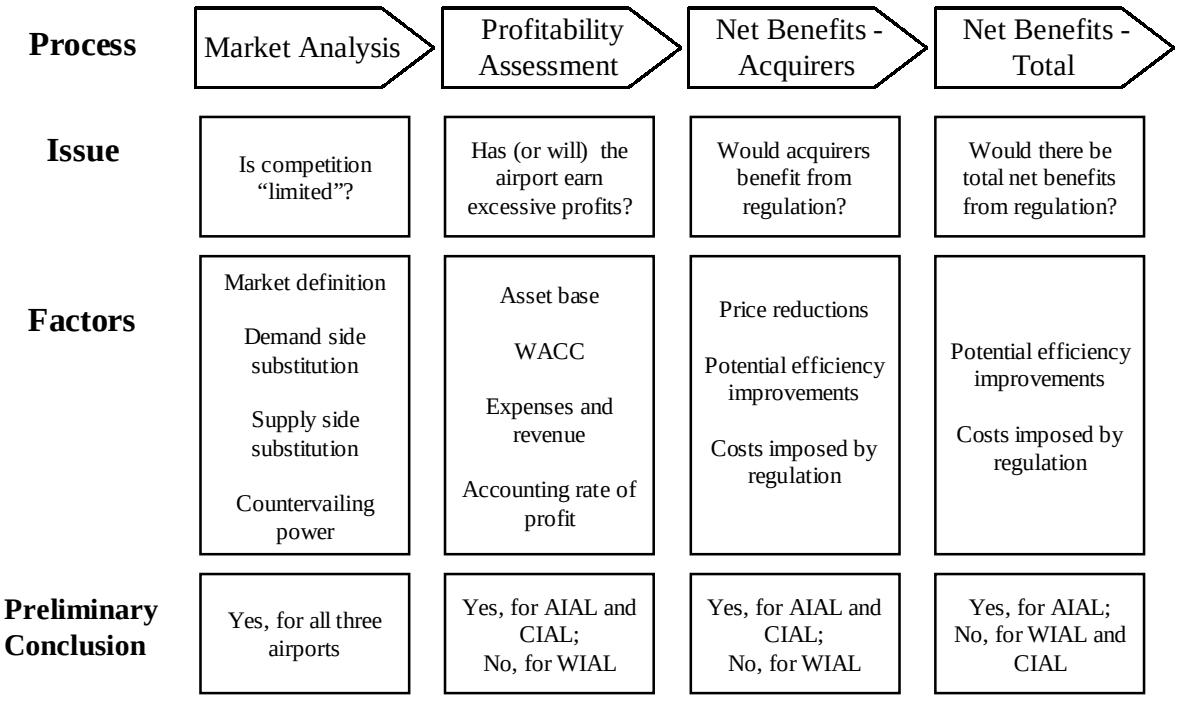
2. THE FRAMEWORK

2.1. Overview of the Framework

The Commission has approached the question of whether airfield activities should be regulated from the perspective of a social-planner, considering whether there would be net benefits from regulation, firstly to acquirers and, secondly, in total.

Chart 2.1 provides a very high-level depiction of the analytical process that has been undertaken.

Chart 2.1
High-level Overview of the Approach



2.2. Comment

Throughout its analysis the *Draft Report* uses a competitive market paradigm to assess whether AIAL's prices constitute an abuse of market power and the extent to which price regulation has the potential to increase efficiency.

While we endorse the use of the competitive market as the appropriate comparator for a review of whether or not there is abuse of market power, we note it is necessary to be cautious in interpreting this. The relevant comparator for abuse of market power by a provider of infrastructure services, such as an airport, is *the price an efficient new entrant would require to provide those same services*.

The Commission has chosen to base its preliminary recommendations (as to whether to implement price regulation) on overall economic efficiency:[2]

> *The focus is on the interests of the economy as a whole. The aim is to maximise economic efficiency regardless of which particular individuals receive the benefits. Wealth transfers between different groups within the economy (due to, for example, the elimination of excess returns) do not form part of this analysis.*

The *Draft Report* notes that the alternative would have been to consider only the interests of acquirers, the decision depending on the stated objective(s) of regulation. The *Draft Report* states that, in this case, the objective is to maximise total welfare, ignoring the distribution effects of particular pricing strategies. This approach has been taken on the basis that it is more consistent with the intent of the *Commerce Act*. We believe this interpretation of the test is valid.

[2] Draft Report, Executive Summary, page 27

3. THE MARKET ANALYSIS

3.1. Overview of the Commission's Approach and Findings

Under Section 52 of the Commerce Act, price control can only be implemented where goods or services are supplied or acquired in a market in which competition is limited or is likely to be lessened. The *Draft Report* reaches the following preliminary conclusions:

- *market definition* - for the purpose of the price control inquiry, the following markets are relevant:
  - the aircraft movement market;
  - the passenger aircraft access market;
  - the freight aircraft access market;
  - the airport access and utilities market; and
  - the commercial activities market;
- *potential competition* – barriers to entry are such that potential competition is weak;
- *existing competition* – although there may be competition for general aviation aircraft, this does not seem to be the case for domestic commuter and international traffic;
- *price elasticity of demand* – the price elasticity is likely to be around –0.105, with little scope for substitution between airports or for other transport modes; and
- *countervailing power* – airlines' countervailing power is unlikely to constrain airports.

The preliminary conclusion is that competition is limited in the aircraft movement market.

3.2. Comment

The market analysis presented in the *Draft Report* is high-level and cursory, raising questions about several aspects, specifically:

- market definition;
- elasticity estimate;
- evaluation of countervailing market power;
- assessment of the effectiveness of existing light-handed regulatory framework; and
- failure to assess whether there is evidence of abuse of market power at this point.

3.2.1. Defining the market

Although several markets are mentioned, and in some places different demand and supply side features of some sub-markets are noted (for example general aviation compared to international flights), throughout most of the analysis in the *Draft Report* the market for airport services, for different airports and flight types, is treated as a single market.

This approach is consistent with the view that New Zealand's international airports operate in a highly integrated environment, implying separate analysis would be unsuitable. While this may well be the situation, the *Draft Report* does not provide any discussion or analysis suggesting joint consideration is appropriate.

By contrast, King's recent analysis of airports' market power in Australia was undertaken at the level of individual airports for four different classes of aeronautical service (international and domestic passenger transport and international and domestic freight transport).[3] Following this approach, King found that the degree of market power is likely to vary significantly between airports.

We believe it would have been useful for a similar approach to have been taken in the *Draft Report*. A different definition of the market may well have changed the Commission's conclusions, eg, to the extent that airports may be subject to relatively greater pressures to price in a competitive manner in the international rather than the domestic market.[4] Given AIAL's much higher ratio of international passengers, it may well have a more price-sensitive customer base than other New Zealand airports.

3.2.2. The elasticity estimate

The elasticity of demand for a product (with respect to price) contains information on the degree of both demand side and supply side substitutability. That is, it provides information on both alternative products that are available to consumers and also alternative sources of product supply. The elasticity of demand can be used to assess market power, with an elasticity close to zero implying a higher degree of market power.

The *Draft Report* accepts Air New Zealand's estimated elasticity of demand for passenger services of –1.5, which is based on international estimates. This has been used to estimate the price elasticity of demand for airfield services by multiplying it by the proportion of airport charges to the average ticket price. There are several fundamental (and questionable) assumptions underlying such an adjustment.

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3 King (2001)

4 In a review of elasticity estimates, Hooper (1993) found that elasticity is generally higher the higher the proportion of vacation traffic and the longer the route. It is also generally the case that international travellers are more likely to be leisure travellers than their domestic counterparts.

For instance, it assumes airlines act as though they are perfectly competitive and pass on to consumers any increase in airfield prices. Whether this is the case is an issue for empirical analysis. If airlines do *not* pass through 100 per cent of any increase, airport demand would tend to be *less* elastic (elasticity closer to zero).

The Commission's adjustment also implicitly assumes a one-to-one relationship between passenger variability and airline activity (ie, a 10 per cent reduction in passengers would result in a 10 per cent reduction in the use of airfield services). While this is an issue for empirical analysis, given the "lumpy" nature of aircraft, airlines are unlikely to be able to adjust their aircraft usage smoothly to ensure this is the case.

Similarly, the adjustment relies on an assumption airlines have no other recourse for reducing airport fees. However, experience suggests airlines can reduce airport charges by changing the mix of aircraft used, which would tend to suggest demand is more price-sensitive. The *Draft Report* cites the example of Dunedin Airport where, in 1995, Air New Zealand and Ansett both announced a switch from jets to mainly turboprop aircraft. These aircraft fell in a lower charging weight group resulting in a significant reduction in the airport's revenue.

The analysis also implicitly assumes there is no substitutability between airports by using an elasticity relating to total air travel rather than specific routes, and therefore specific airports. Adjusting for potential substitutability would tend to make demand more elastic.

We also note that a single elasticity estimate has been provided for all airports. It may be the case that the different customer base at various airports implies distinctions in the elasticities. As mentioned above, AIAL's customer base may be more price sensitive than that of other airports.

It was not possible for us to estimate an alternative elasticity within the timeframe of this report. As the discussion above suggests, it is also difficult to assess whether the provided estimate is likely to over- or under-estimate the actual figure. However, it is our expectation that there would be a wide band of confidence around this estimate, providing little confidence in drawing conclusions about market power from it.

As mentioned by King:[5]

> *Often it will be impossible to calculate a single figure for a particular elasticity.*

[5] King (2001), page 6. On this basis it would have been appropriate for the Commission to consider a range of elasticity estimates and undertake sensitivity analysis in its modelling rather than use a point estimate.

3.2.3. Airlines' countervailing power

The airport industry is substantially different from many other utility and infrastructure businesses in that airports have a small number of highly informed customers, some of whom may hold significant potential market power in their own final market. In other words, airlines may have countervailing or negotiating power that limits airports' ability to abuse any market power they may have.

According to King:[6]

> *Countervailing power will arise in an otherwise uncompetitive market when buyers have a credible option to cease buying or other "outside alternatives" that are not captured by conventional market analysis. It is enhanced when sellers have little alternative other than to sell their product….*
>
> *…To determine if countervailing power is relevant, the analyst needs to consider the bargaining position of buyers and sellers. In particular, it is important to consider which parties will lose the most from any failure to reach an agreement to trade the relevant product. For countervailing power to exist in a market that otherwise is deficient in competition, any losses from a break-down in bargaining need to be predominantly bourn [sic] by the seller.*

The *Draft Report* reached the preliminary conclusion that neither AIAL, WIAL or CIAL are likely to be significantly constrained by airlines' countervailing power. However, this conclusion is not supported by analysis presented in the *Draft Report*, for example:

- paragraph 5.99 outlines a range of features that potentially lead to airlines' countervailing power, including the *requirements for consultation*;
- paragraphs 5.102 and 5.107 discusses the constraining impacts airlines' *willingness to litigate* imposes on airports; and
- paragraph 5.103 cites an example whereby *consultation* with the airlines *resulted in a reduction* in proposed landing charge increases from 35.5 per cent in a single year to 18.5 per cent over three years; furthermore it is noted that Air New Zealand has now begun *legal proceedings* in relation to this increase.

Furthermore, we believe the Commission's analysis underestimates the relative bargaining power of airlines. The *Draft Report* assumes that because airfield charges are small in relation to airlines' total costs they will be relatively unconcerned about them. However, airport charges can have a significant impact on airlines' profitability. As narrow margin businesses, small changes in costs can have large impacts on airlines' net profit. Airlines' willingness to undertake lengthy and expensive legal proceedings is testimony to their concern over airport fees.

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[6] King (2001), pages 12 and 13

Insufficient account also seems to have been taken of airline's flexibility to alter flight schedules and routings without significantly impacting service levels, or the additional bargaining power resulting from airlines' jointly negotiating prices. The One-World and Star-Alliance arrangements have increased airlines' ability to influence airport fees and respond flexibly to price changes.

While the *Draft Report* considered the question of whether airlines can make a credible commitment not to use an airport, it did not consider whether airports could make a credible commitment not to let airlines land. The *Draft Report* also omitted to consider airports' limited ability to enforce payment of landing charges. We understand airports are legally required to allow airlines to land, even if they fail to pay landing fees. Air New Zealand is currently refusing to pay an increase in charges at Auckland Airport while awaiting the outcome of litigation, and in the interim AIAL is obliged to allow the airline to continue using its services.

The *Draft Report* also notes that because airlines are larger than airports, they stand to lose more as a result of boycotting airports and therefore are in a weaker negotiating position. However, as a proportion of total revenue and therefore in terms of the viability of the firm, the risk to airports from losing revenue related to a particular airline is much more significant than the risk to airlines from losing the revenue related to a particular route.

Given the above discussion, the *Draft Report* appears to have underestimated airlines' ability to counteract airports market power.

3.2.4. The existing regulatory framework

The *Draft Report* considers the impact of the existing light-handed regulatory arrangements in terms of the countervailing power this lends airlines. This focus on the impact on airlines' negotiating power may underestimate the scope for the light-handed regulation to act as a constraint on airports' behaviour. In particular, the light-handed approach includes a threat of regulation should there be evidence of the abuse of market power. Although it is impossible to say how strong an impact this is likely to have on airports' behaviour, in combination with the current disclosure requirements it may be significant. We also note that there is a provision for the Secretary for Transport to issue guidelines for the methodologies used to value assets, calculate WACC, and allocate revenues, costs, assets and liabilities, to identified airport activities.

3.2.5. Returns analysis

It is generally the abuse of market power, rather than the presence of it, that leads to action by consumer watchdogs or regulators. The *Draft Report* notes Richardson J's statement in *Telecom Corporation of New Zealand Limited v Commerce Commission:*[7]

[7] Draft Report, pages 10-11.

> *…structures only function through people and at the end of the day it is how participants in the market behave that counts.*

Evidence of abuse of market power is generally equated with a company earning "excessive" profits. The analysis of whether AIAL is earning unjustifiably high returns would have better fitted at this stage of its process rather than as part of a consideration of the potential allocative efficiency gains and wealth transfers from introducing price control. Such analysis effectively takes account of the structural and behavioural aspects of the market, including the implications of the existing light-handed regulatory framework, rather than relying on the judgments and assumptions associated with the analysis of the potential costs and benefits of price control.

We believe the *Draft Report's* analysis should have included the investigation of whether the airports have been taking advantage of the potentially limited competition in the market at this stage. It is possible the inclusion of an assessment of airports' historic returns at this point may have changed the *Draft Report's* conclusion as to whether the conditions of Section 52(a) were met. It is also worth noting the *Draft Report's* assessments that the demand for airport services is inelastic, that airlines do not have significant countervailing market power, and that existing regulatory arrangements are insufficient, are each inconsistent with the finding that WIAL has not earned excessive profits. We note that AIAL has also developed revised (and corrected) analysis showing it did not earn excessive profits.

3.2.6. Conclusion

The analysis in the *Draft Report* of the level of competition in the airport market is rudimentary and lacks empirical analysis that would lend it greater weight. Whilst competition may well be limited, the *Draft Report* places insufficient weight on the numerous constraining competitive market pressures on airports. Furthermore, the only way to test whether behaviour is consistent with market power abuse would be through returns analysis.

4. THE PRICING PRINCIPLES

4.1. The Pricing Principles

The *Draft Report* formulates a set of pricing principles as follows:[8]

- *Prices should be as close as possible to their allocatively efficient level over the medium term. Prices should be commensurate with the desired level of service quality and based on appropriate costs (productively, and dynamically, efficient costs). Prices should encourage efficient use of a supplier's facilities and avoid cross subsidisation. Today's consumers should only bear today's costs.*
- *Prices should allow for a "normal" rate of return to be earned by suppliers over the medium term. Normal returns should be based on an appropriately determined asset base and rate of return. Returns which are greater, or lesser, than this normal rate should reflect superior, or inferior, performance respectively.*
- *Prices should on average, over the medium term, cover efficient operating costs (including any temporary deviations resulting from unexpected changes in external factors), and no more.*
- *Prices should send appropriate signals for determining whether new investment (or divestment) would be efficient.*

4.2. Comment

The question the Commission should be focusing on at this point is whether AIAL is abusing its market power and therefore whether price regulation is warranted. With this in mind, there are two aspects of the principles we disagree with – the focus on issues other than normal returns and the implied interpretation of what constitutes "normal" returns.

4.2.1. Focus on return

It is questionable whether, for the purpose of a test for abuse of market power, the Commission should be concerned about anything other than the *total revenue* these prices generate. Addressing the question of whether prices represent an abuse of monopoly power should focus on whether the prices set by the company generate revenues *in excess of those an efficient firm would require to enter the market*.

There will inevitably be a range of price structures that are consistent with earning a normal return. The *Draft Report* appears to have been sidetracked by the issue of what an "optimal" price structure might be. Furthermore, the *Draft Report's* discussion of allocative efficiency,

[8] Draft Report page 86

marginal cost pricing and Ramsey pricing is somewhat naive in the context of the airports industry or any other infrastructure business involving significant, long-lived capital assets.

In practice Ramsey pricing requires a considerable amount of information and is difficult to implement. Such pricing would also be contrary to international agreements on discrimination between different carriers. Some studies have suggested airports are likely already to be encouraged to set prices as closely to Ramsey prices as possible, given various other constraints. Yet other studies have shown that, in the context of the transportation industry, the costs associated with Ramsey pricing may mean that it is not a welfare-maximising strategy. The "optimal" price structure will depend not only on such issues as marginal costs and elasticities, but also on transaction costs, information constraints, customer acceptability, etc.[9] Determining an optimal price structure would require extensive empirical analysis at a minimum, and may in fact need to be developed in a process of iterative market testing.

Additionally, there appears to be no appreciation in the *Draft Report* of the distinctions between accounting costs and economic marginal cost. Marginal costs are forward-looking and complex to estimate in situations where investment profiles are lumpy. (The practical estimation of long run and short run marginal costs is discussed in the Appendix: Marginal Costs.) For example, in the assessment of the match between the existing price structure and Ramsey pricing, the analysis assumes marginal costs are equal to operating costs. Such an assumption is quite misleading and, in fact, plain wrong in the case of AIAL, which is already planning a second runway due to capacity limitations.

Nevertheless, while the *Draft Report* discusses the structure of prices, the basis for assessing whether or not regulation is warranted should rely on the excess profitability analysis rather than on analysis of pricing structure.

4.2.2. "Normal" returns

While the test for abuse of market power should focus on whether a company has earned in excess of a normal rate of return, it must be recognised that in trying to determine what is a "normal return" a number of judgments and assumptions will need to be made. The pricing principles will have implications for defining normal returns when considering asset revaluations, etc. On this basis, there are several aspects of the *Draft Report's* pricing principles that are inappropriate in relation to a test for abuse of market power.

For instance, not only does the principle that "today's consumers should only bear today's costs" lack meaning in the context of an infrastructure industry with large periodic and sunk investments, it also goes against the notion of allocative efficiency, which would see prices reflecting *forward-looking* marginal costs.

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[9] see Allen (1986)

The *Draft Report* also states that prices should be based on efficient costs. While fine in principle, such assessments are difficult to make in practice. It is important to bear in mind that the average firm will only be averagely efficient. Tests for productive inefficiency should be carefully undertaken, giving due reference to the factors relevant to the individual firm, rather than being based on high-level assertions or ad hoc comparisons.

It is also important that the issue of dynamic efficiency be considered in a balanced manner. The traditional (textbook) problem with monopolies is that they restrict capacity and raise prices. In contrast, the discussion presented in the *Draft Report* suggests regulation is needed to ensure that airports don't over-invest. The inefficiencies associated with under-investment could well be greater than those associated with over-investment, depending on the extent of under- or over-investment and the implications of capacity limitations versus the costs associated with excess capacity. It is important that prices adequately encourage and reward companies for efficient investment rather than delay or reduce investment.

5. THE ASSET BASE

5.1. Overview

The *Draft Report* sets out the principles considered appropriate to value assets:[10]

- *Specialised airfield assets should be valued at historic cost.*
- *Airfield land should be valued at opportunity cost.*
- *Historic costs should be depreciated to reflect any remaining useful life (reduction in utility) of the assets. Assets that have infinite lives such as land are not depreciated. Other properly maintained assets may not reduce in utility, and may not need to be depreciated.*
- *Airfield assets that are not "used or useful" should be optimised out.*
- *The costs of investments in new capacity should only be included in the asset base when the airfield assets become "used or useful". The cost of new investment in land that is eventually included in the asset base should include the capitalised costs of financing construction and any holding costs of land (less any revenue that may have been derived from former use of the land) up to a cap of opportunity cost.*

There are three problems with these principles:

- rejecting optimised depreciated replacement cost (ODRC) and instead using *historic cost* to value specialised assets and *the opportunity cost associated with maintaining the assets in their current use* to value land assets is inconsistent with the competitive market paradigm and the central question as to whether regulation is required;
- the approach to optimisation confuses the issue of optimising for poor or outdated investment choices and deciding when a new investment should be included in the asset base, leading to inappropriate conclusions in relation to dynamic inefficiencies; and
- the approach to *when* an asset should be included in an asset base is inconsistent with the principles of allocatively efficient pricing, given the particular circumstances of Auckland Airport.

5.2. The Use of ODRC

Most debates concerning the appropriate basis for valuing long-lived infrastructure assets can be resolved relatively easily by careful attention to the purpose for which the valuation

[10] Commission's Draft Report, page 105

is required. In addressing the valuation of the asset base appropriate for AIAL, the Commission's purpose is to assess whether or not price control is warranted for airfield activities at Auckland airport. Two critical reference points in that assessment are a test for abuse of market power and the outcomes that could be expected from a competitive market. For both these purposes, the appropriate basis for valuing all existing airfield assets is ODRC, which mimics the value placed on assets in a competitive situation. ODRC attempts to measure:[11]

- the valuation that would be consistent with the price charged by an efficient new entrant into an industry, and is therefore consistent with the price that would prevail in the industry in the long run; or
- the maximum price a firm with a certain service requirement would pay for existing assets in preference to replicating them.

ODRC is widely used to value assets within infrastructure industries. It forms part of the required approach to asset valuation for New Zealand electricity line businesses, under the Optimised Deprival Value (ODV) methodology. ODRC is also widely recognised as being appropriate for valuing infrastructure assets within Australia (where it is sometimes referred to as DORC). The Australian Consumer and Competition Commission (ACCC) has adopted an ODRC basis for asset valuation for the regulation of electricity transmission revenues on the following grounds:[12]

> *First, regulators often look to competitive or contestable markets for guidance on efficient decision rules for regulating natural monopoly markets. Such comparisons can provide a number of guiding principles for a range of complex regulatory problems.*
>
> *Second, the maintenance of revenue streams over time at a level that is consistent with a DORC asset valuation will minimise the likelihood of significant shocks to tariffs as the replacement of assets becomes necessary…*
>
> *Thirdly, any value that is in excess of DORC is likely to imply pricing of services that will expose the service provider to being by-passed.*

Australian state-based regulators also rely on ODRC. The Office of the Regulator General in Victoria has stated, in relation to the gas industry, that:[13]

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[11] see ACCC (1999) page 39

[12] ACCC (1999) *Draft Statement of Principles for the Regulation of Transmission Revenues – Overview,* page 5. Note that the ACCC has adopted ODRC to set the cap on the valuation of the asset base. The ACCC stated that it may write down part of the transmission system below ODRC if there was evidence suggesting the regulatory asset base valuation exceeded the ODV of the system.

[13] Office of the Regulator General (1998), pages 60 and 62 respectively.

> *DORC is the valuation methodology that would be consistent with the price charged by an efficient new entrant into an industry, and so is consistent with the price that would prevail in the industry in the long run.*
>
> *The Office considers the DORC has some significant advantages as a methodology from the viewpoint of economic efficiency.*

ODRC has also been used by the ACCC for valuing airport non-land assets. For example, in its 2001 decision on Sydney Airport Corporation Ltd's pricing proposal, the ACCC stated that:[14]

> *The DRP [Draft Statement of Principles for the Regulation of Transmission Revenues (as referred to above)] outlines the advantages of the ODRC approach from the viewpoint of economic efficiency…The DRP also comments on the use of valuations based on historic cost for regulatory purposes…*
>
> ***SACL's proposals for asset valuation are consistent with the DRP in that they are based on the ODRC methodology. This decision does not revisit SACL's use of the ODRC methodology.***

In its submission to the ACCC, Sydney Airport Corporation Ltd noted the following:[15]

> *In economic terms, an ODRC valuation is equivalent to the opportunity cost of providing the relevant service on a green-field or new entrant basis.[16] Although ODRC asset valuations generally take the cost and condition of existing assets as their main information source, the concept draws its origins from the question that would be asked by a prospective new entrant, ie:*
>
> > *"What is the maximum amount a prospective new entrant, providing exactly the same service, would be willing to pay to acquire existing, second-hand assets (which will require higher maintenance and earlier replacement relative to new ones), rather than rebuild the entire facility from scratch?"*

The *Draft Report* rejects the use of ODRC for both the two main asset types applicable to airfield services, ie, land and specialised assets. In doing so, the Commission is forced to take divergent, and inconsistent, approaches to valuing land and specialised assets.

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[14] ACCC (2001c), pages 102 and 103

[15] Sydney Airport Corporations Ltd (1999), page 4-2 to 4-3

[16] note that the definition of "greenfield" adopted by SACL differed slightly to that used by AIAL in its submission and is closer to AIAL's "brownfield" definition.

The *Draft Report* rejects the use of ODRC for land on the basis that it is the opportunity cost forgone by the airports as a result of not using the land for an alternate purpose that is the most appropriate valuation:[17]

> *The Commission's preliminary view is that airfield land should be valued based on opportunity cost. The airports' approach of measuring land value as the realistic cost of getting the land to airport usage – the costs and benefits of moving, and of building the new airport is not appropriate.*

The opportunity cost approach advocated in the *Draft Report* amounts to the realisable or "exit" value of assets. While this may be appropriate in circumstances where the purpose is to ensure assets continue to be used to provide airfield services, it is completely inappropriate as a basis for a test for abuse of market power in the context of an inquiry into whether price control should be imposed.

The use of exit value denies airports the ability to obtain a return on all the costs arising from prudent investment decisions. A return on exit value is therefore inconsistent with what an efficient entrant would require to provide the service, or with anything other than an extremely short-term perspective of a competitive market (because it ignores the on-going incentives on firms to invest). If assets are valued on a scrap or exit value basis, incumbent firms will not invest in additional capacity and no new firms will enter the relevant market. These outcomes are completely inconsistent with what can be expected from a competitive market.

The *Draft Report* rejects the use of ODRC for specialised assets on the basis that analysis suggests ODRC does not have any clear advantages over historic cost and:[18]

> *While the use of ODRC smoothes prices (to some extent), it explicitly involves an element of pre-financing. In accepting ODRC, today's consumers will pay for some of tomorrow's costs.*

The *Draft Report's* reference to "pre-financing" in this context reflects a fundamental misunderstanding of the principle and objectives of ODRC. The suggestion that the purpose of ODRC is to guarantee the company amasses sufficient funds to replace the asset when required is flatly wrong. In fact, ODRC has nothing to do with pre-financing future investment, it is about ensuring investors receive a return of and on *existing* capital by reference to an existing value that would prevail in a competitive market.

Other than this point, the *Draft Report* argues the historic cost approach is suitable largely on the basis that there are no discernable advantages of ODRC. In making this judgement the *Draft Report* becomes detached from the purpose of the Commission's inquiry. Historic values provide no information about the cost today of entering the market and are therefore

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[17] Draft Report, page 96

[18] Draft Report, page 99

completely inappropriate in a test for excess returns to determine whether regulation is necessary.[19]

Furthermore, most of the advantages cited in the *Draft Report* as being in favour of historic cost asset valuations are irrelevant in a test for excess profits when the question being asked is whether prices are higher than those that would prevail in a competitive market. The *Draft Report* also places more weight on these advantages than warranted.

For instance, the *Draft Report* argues that historic costs are robust and easily ascertained with relatively low compliance costs. This is not relevant in a test for whether or not excess profits exist. In any case, historic costs may not be a robust measure of the company's original cash-outlay. Today's book values reflect various accounting practices, including revaluations, and potentially different approaches to asset unitisation, capitalisation, etc. They are also based on vesting values, which may or may not be comparable to what the airport would have paid for these assets in a competitive market scenario.

The *Draft Report* also suggests historic costs will ensure investors are fully compensated. Again, this is not the appropriate comparator for assessing how an airport's revenues compare with those that would be earned in a competitive market today. Moreover, historic cost based pricing will only guarantee a fair return (and no more) on original investment if prices in the past have been set on this basis and have been consistent with accounting practices, including depreciation, revaluations, capitalising and expensing policies.

Overall, the *Draft Report*'s appears fixated with the question of *how* the Commission would regulate prices rather than focusing on the issue of *whether prices are such that regulation is required*. These are two fundamentally different questions. At this point of its analysis the Commission should be concerned with whether airports are earning revenue in excess of that which would be required to encourage an efficient new entrant to provide the same level of services (the "new entrant" test). This is the appropriate comparator when considering whether airports' prices are higher than those that would prevail in a competitive market.

5.3. Optimisation

The *Draft Report's* approach to optimisation is to consider whether the investment in the asset was appropriate at the time it was made:[20]

> *So as to not discourage innovation, decisions to optimise assets should consider whether the decision to invest was poor at the time it was made, and not rely on the benefit of hindsight.*

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19 Furthermore, there is a risk of "gaming" under a historic cost valuation approach, whereby the airport sells assets in order to repurchase them at a higher price that can then be included in the asset base.

Again, this seems to be an example of the *Draft Report* focusing on "how" to regulate rather than "whether" to regulate. In a competitive environment, firms earn a return on the current value of their assets, whether or not investment in these assets was appropriate at the time of investing. In a competitive market businesses bear the risk of technological or market changes that may make their assets more or less valuable. Optimisation, on the basis of existing market conditions and technology, is therefore appropriate in a test for abuse of market power.

The issue of *optimisation* is distinct from the question of *when* an asset should be included in the asset base, and must be treated as such. The timing of including ongoing investments in the asset base is discussed in section 5.4.

With this in mind, we disagree with the approach taken in the *Draft Report* in relation to assets held for future development. It is inappropriate to "optimise" these assets, unless it is shown that airports should not (in the year under consideration) have held the land. The *Draft Report* does not present any analysis of when AIAL should have purchased the land but, nevertheless has optimised these assets out of the asset base from 1989 until 2003 when assessing excess profits in each year. In so doing, the *Draft Report* is suggesting that this land should not have been held in the past and should not be held now.

The *Draft Report* comments that:[21]

> *It is noted that section 5 of the Airport Authorities Act 1966 (as amended in 1986) states that any development or reconstruction of an airport deemed by the Minister of Finance to be of both "national and local importance" is covered by section 224 of the Public Works Act 1981, which allows land to be taken or acquired.*

On this basis, the *Draft Report* concludes that airports do not necessarily need to hold land, but may choose to do so if this is beneficial. However, no attempt has been made to estimate when it would be beneficial to have purchased these assets or to consider the costs that may be associated with delaying land purchases if there is a risk land will be developed for other uses in the meantime. Given AIAL is anticipating the need for the second runway by 2007 and the consenting process and preliminary earthworks are already underway, it seems likely AIAL's ownership of the second runway assets is efficient now and may have also been efficient in the past.

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[20] Draft Report, page 100

[21] Draft Report, page 103

5.4. When Should Assets be Included in the Asset Base?

The *Draft Report's* assessment as to when an asset should be included in the asset base is made by reference to the principle that "today's customers should only bear today's costs" and the need for investment to be "used and useful".

By contrast, in addressing its task, the Commission should be asking "what is appropriate in a test for abuse of market power and when would it be reasonable to expect a competitive firm to expect to receive a return on investment?". In deciding whether "normal" returns in this context should include returns on assets under development, several factors should be considered, ie:

- the incentives on the firm to invest appropriately, including the implications on the firm's cash flows;
- the requirement to compensate firms for the risks of investment and whether it may be appropriate for airlines partially to bear such risks; and
- the implications for the price path, its adherence to the principles of allocative efficiency and the desire to avoid significant price shocks.

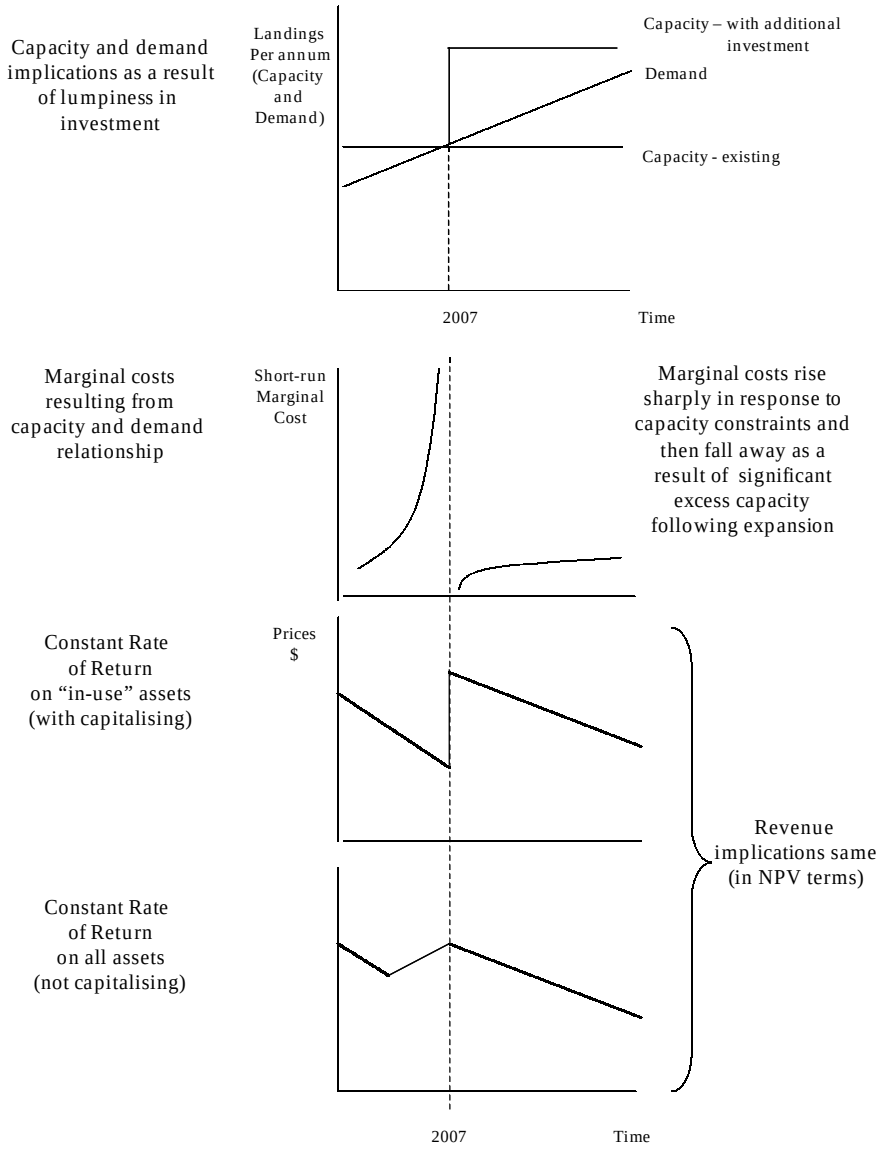
It is important to recognise that AIAL's investment in the second runway has the support of its substantial customers. Presumably, they see its development as preferable to the alternative scenario of increasing congestion and decreased flexibility with flight scheduling. By virtue of the airlines current use of the existing capacity, in combination with projected increases in that demand over time, today's users are contributing to the requirement for the second runway. If today's demand were to decrease significantly, then the need for future capacity increases would diminish immediately. In that sense, it is simply wrong to suggest that today's users are not causally responsible for the costs incurred now to expand capacity for the future.

It is also important to realise that if AIAL were to take on all the risk of developing additional capacity, the company will require a return commensurate with this risk – a "developer's WACC". The extent to which AIAL was unable to earn a return on the second runway assets during the development phase would reduce its short-term revenues, increase the riskiness of the investment and so raise its cost of capital.

In addressing the timing of when an asset should be included in any assessment of the outcomes that could be expected from a competitive market, it is also important to consider the implications for the price path. As much as possible, principles underlying the definition of "normal returns" should be consistent with the objectives of economic efficiency. The following chart depicts the (stylised) implications for the price path of different approaches to including assets in the asset base. This chart demonstrates that prices that allow for a return on assets during the development phase are more consistent with marginal cost pricing, which is forward looking and takes account of capacity

utilisation (refer to the appendix).[22] In a "pure" marginal cost pricing world, prices would rise prior to investment taking place, reflecting either scarcity costs (SRMC) or the incremental cost of impending investment (LRMC).

Chart 5.1
Price Implications of Timing for Inclusion in Asset Base



[22] Note that this analysis implicitly assumes there is a one-to-one relationship between airport tariffs and revenues, and so implicitly rules out two part tariffs, which would generally be held to be more consistent with allocative efficiency. However, two part tariffs have rarely (if ever) been applied in an airport context.

For firms in other infrastructure businesses that are already subject to price control, new investment is often included in the asset base only when it becomes operational. However, this is by no means universal and is uncommon in the airports sector. In other jurisdictions firms have been allowed to include assets in the asset base for pricing purposes during the construction phase.

In the UK, the CAA allows "assets in the course of construction" (AICC) to be included in the asset base for all airport investments. This allows airports to earn their cost of capital on AICC, however assets are not depreciated until facilities become operational. The main reason for structuring charges in this way is that it brings prices into line with short-run marginal costs when investment is lumpy as at airports.

For instance, Heathrow airport was able to include investment costs for its "Terminal 5" in the price determination several years prior to even receiving planning approval. The costs that were included in the asset base reflected anticipated costs. It was expected that BAA plc would incur some 230 million pounds of capital expenditure prior to planning approval. There was a provision for a mid-term price review should planning permission not be granted.[23]

The ACCC also allows airports to include land held for future development in their asset bases. In a meeting between the Commission and the ACCC, we understand the ACCC advised that Brisbane and Melbourne Airports own land for development and that this is included in asset base due to the risk other users will use the land and the airport will not be able to acquire it when needed.[24]

[23] MMC, BAA plc A review on the economic regulation of the London airports companies

[24] File note of the meeting between the Commerce Commission and the ACCC Airport's team, ACCC offices, Melbourne, 18 July 2001

6. PERFORMANCE ANALYSIS

6.1. The Approach

In its *Draft Report*, the Commission estimates *AIAL's* historic and expected future accounting rates of profit (ARP) and compares these with its estimated WACC to assess whether the airport has made, or will make, "excess" profits.

6.2. Comment

In our opinion, the quantitative analysis underpinning the *Draft Report* is of a disappointingly low standard – to the extent that the results and conclusions the drawn from it should be given very little, if any, weight. Although we have not formally audited the model, we do have five specific criticisms of the methodology and analysis.

First, the overall framework relies on a single estimate of performance, ARP, the calculation of which appears to be inconsistent with that set out in Taylor (2001) and in the *Electricity (Information Disclosure) Regulations 1994*. These regulations set out three financial performance measures:[25]

- accounting return on total assets, being earnings before interest and tax, divided by average total funds employed;
- accounting return on equity, being net profit after tax, divided by average total shareholders funds; and
- accounting rate of profit, which is defined as:

$$\frac{\textit{earnings before interest and tax} - \textit{cash tax} - \textit{interest tax shield} + \text{revaluations}}{\textit{average total funds employed} - \tfrac{1}{2}\textit{revaluations}}$$

The formula used in the *Draft Report* to estimate ARP excluded the tax shield and used average fixed assets rather than average total funds employed. Both of these adjustments would result in higher estimates of excess returns than warranted.

Second, the level of detail in the information used as a basis for the analysis in the *Draft Report* meant the data required considerable manipulation to fit into an ARP framework while excluding non-airfield activities. The data has required further manipulation to take account of the Commission's view on the appropriate way to value assets, for example in relation to optimisation and the reversion to historic cost. Although we recognise the difficulties of this type of analysis, there are several aspects of the data manipulation that are likely to have biased the results:

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[25] *Electricity (Information Disclosure) Regulations 1994, First Schedule, Part II, Section 1, page 33*

- the simplistic approach of estimating the airfield related costs as a constant proportion of total costs on the basis of that ratio in 2000 may underestimate historic airfield cost – according to AIAL airfield activities accounted for a higher share of total activity in the past suggesting it may be more sensible to allocate costs on the basis of airfield activity revenue to total revenue;

- second runway land has been "optimised" out by removing a constant proportion of land each year according to the ratio of second runway to total land in 1999, essentially assuming AIAL held the second runway assets since corporatisation. We understand from AIAL that this is inconsistent with the airport's progressive purchase of these assets over time and so the approach in the *Draft Report* may have removed assets from the asset base before they were included;

- the seawall and seabed were optimised out by removing the assets from the base in all years from 1989 to 1998 and 1989 to 2000 respectively. However, AIAL only included a value for these assets from 1999, implying a value has been subtracted for these assets before they were included in the asset base; and

- the modelling assumes AIAL paid tax at a rate of 33 per cent, which is lower than the figures reported in AIAL's financial statements which, on average, is around 36 per cent.

Third, the modelling of future excess returns is overly simplistic. For example, AIAL's demand, costs and capital base have been held constant over the next three years. It has also been assumed AIAL will fully achieve the announced price increases (and for the entire year of introduction), ignoring the ability of the existing regulatory framework to contain excess returns (if it can be shown they exist or are likely to arise).

Fourth, the model for estimating allocative inefficiency contains a number of inconsistencies and calculation errors, which call into question its credibility. For example, the estimated "competitive" price and quantity change each year despite no change in the assumed asset base or level of costs and the estimated "competitive" price and quantity do not yield the targeted WACC.

Fifth, in interpreting the model results, too much reliance has been placed on point estimates rather than attempting to determine the statistical significance and sensitivity of its results to changes in key assumptions. This is particularly inappropriate when the analysis relies in such large part on assumptions and judgments. Similarly, when interpreting whether its estimates implied excess returns, the *Draft Report* compares the estimated ARP with the midpoint of the WACC range. The purpose of presenting a range of WACC values is to reflect uncertainty about the "right" number. It would therefore seem to have been more sensible to compare the ARP estimates with this band of potentially consistent WACCs. Table 6.1 illustrates the sensitivity of the estimated "excess returns" over the period 2000 to 2003 to several of the assumptions.

Table 6.1
Sensitivity of Excess Profits Estimate[26]

(The top numbers are based on AIAL's revised version of the Commission's model (with an adjustment to WACC to 8.4% for comparability), as prepared by AIAL which we understand have been audited by Deloitte Touche Tomatsu. The figures in brackets are from the Commission's model. Table 6.2 provides an explanation of the key differences between these figures.)

	Average Annual Excess Profit (2000-2003)	**Impact**	**% change**
AIAL's estimate Commission's estimate	-$2.2 million ($4.4 million)		
WACC of 8.8% rather than 8.4% (8.8% is Commission's upper bound)	-$3.6 million ($3.6 million)	-$1.4 million (-$0.8 million)	-64% (-17%)
WACC of 8.0% rather than 8.4% (8.0% is Commission's lower bound)	-$0.8 million ($5.1 million)	$1.4 million ($0.7 million)	64% (17%)
Tax rate of 36% rather than 33% (36% is AIAL's actual historic tax rate)	-$3.4 million ($3.5 million)	-$1.2 million (-$0.9 million)	-56% (-20%)
Reversion to ODRC for airfield specific assets (AIAL asset base $236,094 up from $219,307;[27] Commission base of $236,589 from $186,816)	-$4.0 million ($0.2 million)	-$1.8 million (-$4.2 million)	-86% (-95%)
Inclusion of second runway land (AIAL asset base $256,064 up from $219,307; Commission base of $223,573 from $186,816)	-$6.3 million ($1.3 million)	-$4.1 million (-$3.1 million)	-189% (-70%)
ODRC and inclusion of second runway (AIAL asset base $273,851 up from $219,307; Commission base of $273,346 from $186,816)	-$8.2 million (-$2.7 million)	-$6.0 million (-$7.1 million)	-275% (-165%)

Note: these sensitivity analysis results are based on stand-alone adjustments and are not cumulative.

[26] Note that we have not adjusted the Commission's model calculations for determining the competitive price and quantity. This had been incorrectly calculated such that the competitive price depended on "monopoly" quantities, leading to the result that the competitive price and quantity change in the Commission's model without any change in underlying variables. This also explains why the Commission's competitive scenario does not result in the targeted WACC, upon which it purports to be based. Adjusting for this error makes a substantial difference to the figures estimated, however, we have undertaken our modelling to illustrate sensitivity rather than try to audit the Commission's model.

[27] These figures refer to the value in 2000; it should be noted that AIAL has included a growth rate from this figure in its model.

Table 6.2
AIAL Adjustments to the Commission's Model

	2001	2002	2003
MCTOW growth	3.5%	3.5%	3.5%
Expense growth	12%	5%	5%
Capital expenditure	31,330	43,539	40,000
Additional depreciation charges	958	2,387	3,387

AIAL also adjusted the annual price increase effects to account for price increases occurring part way through the year rather than at the beginning.

7. COSTS AND BENEFITS OF REGULATION

7.1. Overview

The *Draft Report* assesses whether price control will benefit acquirers by:[28]

> *…measuring at each of the three airports the likely benefits of price control that would accrue to acquirers of airfield activities, balancing against those the likely costs of such control that would be borne by those same acquirers.*

The counterfactual for comparison was the continuation of the status quo, and the implications for allocative, productive and dynamic efficiency.

After assessing the net benefit to acquirers, the *Draft Report* estimates the net benefits in total by ignoring the transfer between airports and airlines that would result from a price decline. The preliminary conclusion and recommendations are based on this total net benefits estimate.

In section 6 of this report we raised a number of factors that, in concert, imply very little weight should be given to the quantitative analysis in the *Draft Report*. Although this view remains, for the purpose of this section we have used the reported numbers, limiting our comments to methodology and reasoning rather than revisiting the quantitative issues. However, it must be recognised that comments in this section should not be interpreted as providing support for the underlying analysis.

7.2. The Benefits of Regulation to Acquirers

The *Draft Report* starts from the point of considering the *sources* of potential gains to acquirers, with these being:

- the excess returns otherwise expected to be earned by airports;
- allocative efficiencies resulting from reduced prices (the gain in consumer surplus);
- productive inefficiency; and
- dynamic inefficiency.

The *Draft Report* then assumes half these benefits could be realised for acquirers as a result of price control, noting the following:[29]

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[28] Draft Report, page 191

[29] Draft Report, page 203

The 50% deduction is considered to be a conservatively high figure to form the lower bound of the net benefit range; the upper bound is formed by assuming that the deduction is zero.

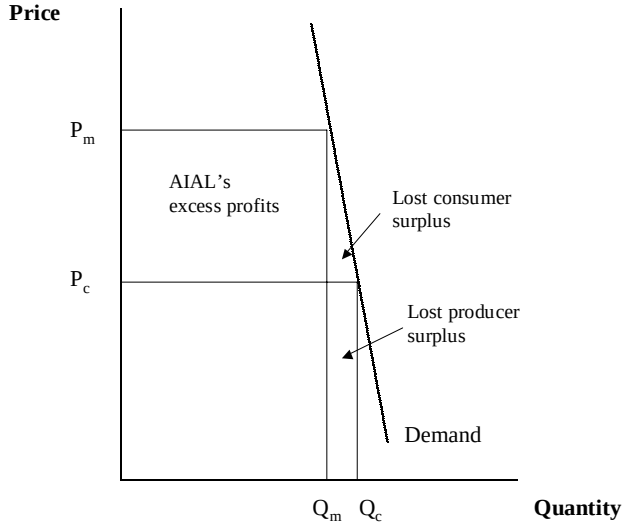
7.2.1. Excess profits

The analysis assumes 50 per cent of any excess profits should be passed on to acquirers via price control. Although necessarily a rough estimate, this is consistent with the practicalities of implementing price control, which recognises that price control can never be a perfect substitute for competition.

7.2.2. Allocative efficiency

The *Draft Report's* analysis of the allocative inefficiency present as a result of AIAL's prices being higher than "competitive" prices, is based on the following diagram. The allocative inefficiencies are comprised of the regions marked "lost consumer surplus" and "lost producer surplus". These would accrue to consumers and AIAL respectively as a result of a reduction in prices from P_m to P_c.

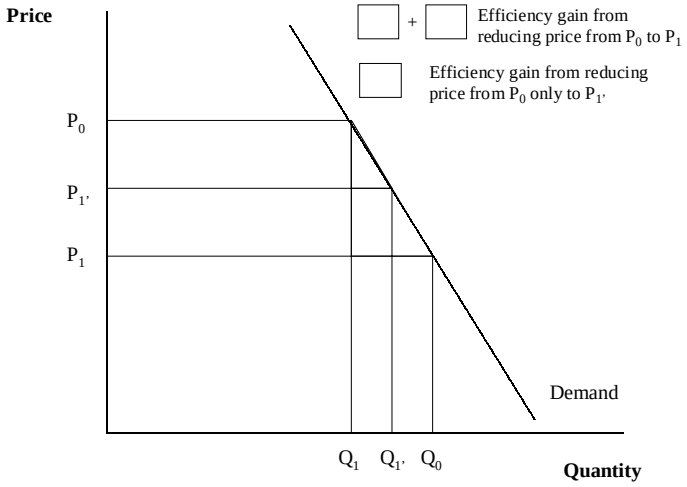
Chart 7.1
Basis for the Allocative Inefficiency Analysis



A fundamental flaw in the analysis presented in the *Draft Report* is its assumption that marginal cost is zero. This appears to reflect a misunderstanding of *economic* marginal costs. As illustrated in the appendix, marginal costs are by definition forward looking and, for a company with significant capacity-related investment on the planning horizon, marginal cost will be considerably higher than zero. Prices can only be said to be allocatively inefficient to the extent they deviate from marginal costs. Because the *Draft Report* does not attempt to estimate marginal costs, its assessment of allocative inefficiency is meaningless.

Furthermore, the analysis of the potential improvement in allocative efficiency as a result of price control is inconsistent with the assumed price reduction. The Commission has estimated the increase in "consumer surplus" (in addition to the transfer of profits) as the triangle referred to as "Lost consumer surplus" is figure 7.1 above. However, a reduction in excess profits of 50 percent will not ensure consumers realise half this triangle. In fact, a 50 per cent reduction in over-pricing leads to only a quarter of this triangle area being realised by consumers, as illustrated in the following chart.

Chart 7.2
Relationship Between Excess Profitability and Allocative Efficiency



It is also important to be aware of the risk that price reductions may lead to incentives on airports to reduce service quality. The *Draft Report* assumes price reductions will not affect service quality. However, in practice, this may not be the case and any reduction in service quality would reduce allocative efficiency compared to the analysis presented (assuming that service quality is presently at the optimal level).

7.2.3. Productive efficiency

The *Draft Report* states:[30]

> *[it] has not attempted to incorporate productive inefficiency in the analysis either of historical returns, or in the model above.*

This is inconsistent with the quantitative analysis presented, in which it is assumed there are potential productive inefficiencies of 1 per cent of operating costs, excluding depreciation. We do not consider the assumption of 1 per cent productive inefficiencies has sufficient

[30] Draft Report, page 147

credibility to warrant being built into the modelling work. The Commission itself has recognised it has no basis for this assumption:[31]

> *There is likely to be some room for improvement in the productive efficiency of the airfield activities at each of the three airports, although on present information that is impossible to quantify. For the purposes of illustration only, if 1% of airfield expenses (excluding depreciation) were to be an appropriate measure of productive inefficiency, then the losses…*

Such an assumption is probably much stronger than realised. Although 1 per cent may appear relatively modest, we understand from AIAL that a significant proportion of operating costs are essentially fixed, for example, costs associated with the fire fighting service. Excluding these costs, the 1 per cent adjustment implies a much stronger assumption of inefficiencies in areas of cost that are genuinely variable.

Although there is a body of literature on incentives for efficiency that concludes monopolists generally have a tendency towards inefficiency, it does not necessarily follow this will be the case for AIAL. AIAL has a number of factors motivating it to operate efficiently:

- the countervailing power of airlines;
- the disciplinary effects of market scrutiny and analyst reports;
- the scrutiny and risk of public takeover resulting from AIAL's public listing; and
- strong profitability incentives from directors and shareholders.

Without proper analysis, it is therefore not possible to conclude by how much, if any, AIAL may be inefficient.

Furthermore, even if AIAL does have inefficiencies, price control alone is unlikely to institute better incentives. Under any system of price regulation, there is inevitably a trade-off between establishing incentives to encourage companies to undertake actions to ensure productive efficiency (which imply arrangements that allow prices to deviate from cost) and the objective of allocative efficiency (which implies that prices track costs closely). Under the existing arrangements, AIAL is able to retain 100 per cent of any cost savings. Under price regulation the airport is likely to be able to retain considerably less than this amount, reducing its incentive to seek productive efficiency gains.

There are three ways reducing the share of efficiency gains can reduce the incentives for companies to improve performance:

- reduced rewards will dampen efforts to cut costs and improve service;

[31] Draft Report, page 150

- reduced rewards will prevent some socially worthwhile, but uncertain, innovation and investment; and
- reduced rewards alter the best timing of cost reductions, encouraging the deferral of gains to the detriment of customers.

Price regulation is generally understood to involve *reduced incentives* for short term operating efficiency. When price caps are reset to costs, the incentives for efficiency may be reduced. This is illustrated in the following quotes:

> *Sometimes rent extraction is performed more explicitly when earning-sharing schemes are appended to the price cap to redistribute excessive profits to consumers. A consequence of such profit sharing, of course, is a weakening of the incentives for cost minimization…*[32]

> *…management may willingly sacrifice performance gains if they believe that the company's unit cost at the conclusion of one plan period will be used to set more demanding PCI parameters in the next.*[33]

> *Specifically, companies may believe that the short-term advantages of increased efficiency and lower costs will be more than offset by a tougher X and therefore lower prices in the next period and may even induce an adverse change of X within the current period. In this view, RPI-X is merely a special form of rate-of-return control, embodying no significant net advantage over the US approach on grounds of economic efficiency*.[34]

We believe it unlikely that price control would lead to the improvement in productive efficiency suggested in the *Draft Report*.

7.2.4. Dynamic efficiency

The *Draft Report* defines dynamic efficiency as[35] *maintaining allocative and productive efficiency over time.* Accordingly, it would not seem necessary to separately identify dynamic inefficiency, as at any point it should be represented by productive and allocative inefficiency. Nevertheless, the *Draft Report* estimates the extent of dynamic inefficiency at present by determining the value of AIAL's optimised assets on the basis of the cash flows they generate and comparing this figure with AIAL's estimated value of these assets. The difference between these is used to estimate an annual equivalent value (perpetuity equivalent), which was defined as the dynamic inefficiency.

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[32] Laffont and Tirole (2000) page 86

[33] Kaufmann and Lowry (1998) pages 25 to 26

[34] Beesley and Littlechild (1989) page 456

[35] Draft Report, page 86

It has been assumed the dynamic inefficiencies result from $102.7 million of optimised land, as outlined in the following table (this figure differs from that used in other parts of the Commission's *Draft Report*, as also illustrated – the reason for the distinction is unclear).[36]

Table 7.1
Optimised Assets

	"Optimised" Assets for Dynamic Inefficiency Estimate ($000s)	**Amount "Optimised" According to "Asset Base" Chapter ($000s)**
Optimisation of Seabed	30,113	9,800
Optimisation of Seawall	9,787	2,101
Optimisation of Second Runway Land	62,870	36,757
Total	**102.7**	**48,658**

We consider the assessment of the potential improvement in dynamic inefficiencies that could possibly result from regulation to be grossly misstated for four reasons.

First, it is not clear that the interpretation and approach to estimating dynamic inefficiencies for a particular company is appropriate. Generally, dynamic efficiency is interpreted as a forward-looking, optimal development of supply and demand. At any point in time, dynamic inefficiencies may be evident, for instance, in capacity levels lower than demand, sub-optimal technology, etc. We therefore believe it inappropriate to estimate the dynamic inefficiencies for any particular year over and above the estimated productive and allocative inefficiencies.

Second, no attempt has been made to evaluate AIAL's investment choice when assessing dynamic inefficiencies; rather the *Draft Report* has relied on its own categorisation of optimised assets. Although the Commission may see a need to query the value at which these assets enter the asset base, it is quite a different matter to argue the assets themselves should not be owned by AIAL. It is an even greater stretch to suggest they can be used as an indicator of AIAL's likely tendency towards "poor" investment choices, especially since the seabed and seawall were inherited from the Crown rather than being the result of management decisions.

Third, assuming price control could reduce this inefficiency is akin to assuming such regulation could alter the pattern of AIAL's investment and divestiture program to eliminate the lost returns. Specifically, the approach adopted suggests price regulation would

[36] Draft Report, page 151

encourage AIAL to divest itself of at least half these optimised assets in order to realise the potential increases in efficiency. This assumption appears problematic:

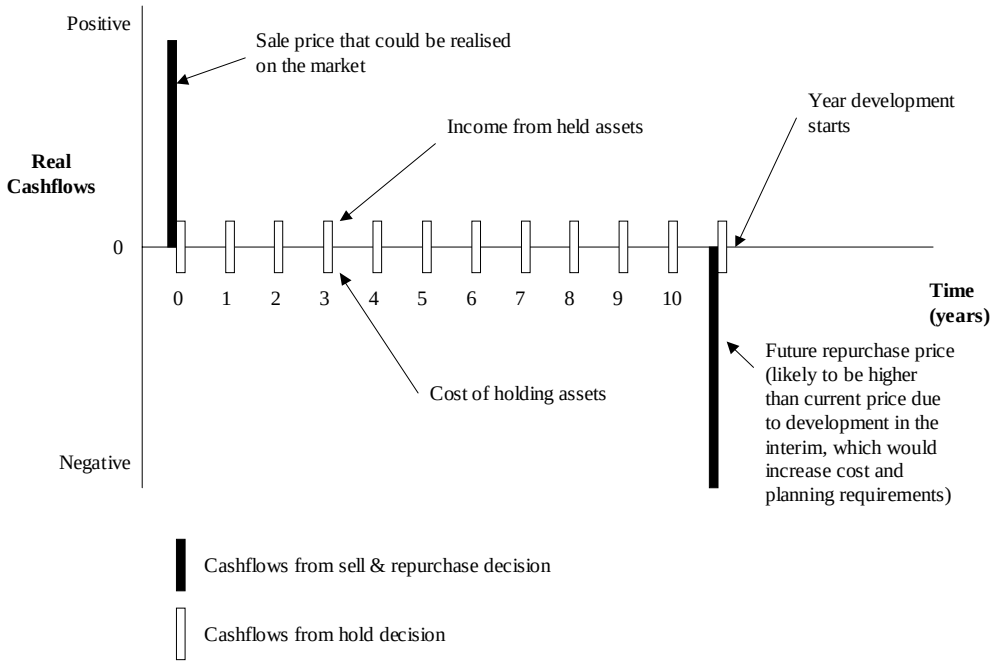
- the ownership of the second runway land is likely to be efficient compared to the option of selling the land and repurchasing it within the next few years in order to develop the second runway for commissioning by 2007 (which has the support of customers) – refer to the stylised analysis presented below;
- it is difficult to imagine AIAL selling the seabed at a price close to $10 million (the implications of the valuation being higher or lower than warranted were already dealt with as part of assessing the asset base); and
- suggesting AIAL should divest itself of the seawall seems nonsensical.

In other words, even if the postulated efficiency gains were to exist (which itself there is reason to doubt) they cannot be realised by imposing price control.

In particular, no attempt has been made to determine whether it is efficient for AIAL to continue holding the land earmarked for a second runway and therefore whether it would continue to do so under perfect investment incentives. An assessment of whether it is optimal to continue holding land for future development would need to consider the net benefits of doing so, taking into account immediate, ongoing and future cash flow implications of each option.[37] This is illustrated in the following diagram.

[37] An alternative way to consider the issue is whether it would be optimal to purchase land now for future development. This is a corollary to the example provided and would have the same "net cost" results. The alternative of continuing to hold land has been provided in this report, as it is considered the more relevant question for AIAL.

Chart 7.3
Stylised Cash Flows from Holding or Selling and Repurchasing Assets



The central question is which stream of cash flows, in net present value terms, is the lowest. This will depend on:

- the company's cost of capital;
- the income that can be earned from the asset during the holding period;
- the likelihood that land would be developed for residential or industrial purposes between now and the development point;
- the transaction costs of buying and selling land; and
- the time until development.

The expected period before development will be critical. Given AIAL is already undertaking planning consent processes and preliminary soil testing, it seems highly unlikely that the introduction of price control could result in the second runway land being sold for later repurchase.

Our fourth reason for considering the dynamic inefficiencies to be overestimated is that it is quitepossible regulation will worsen rather than improve the incentives on airports for efficient investment. For instance, if airports anticipate a regulator taking an opportunistic approach and failing to allow a return on sunk investments that fairly compensates for the risks involved, they will be less likely to make investments, even though they may be socially optimal. Thus it is difficult to preserve incentives for efficient investment, and

therefore long-term efficiency, under price regulation unless the regulator can establish some credibility. Even if this problem can be overcome it is difficult to preserve appropriate investment incentives. This is illustrated by the following quote by Lewis and Sappington:

> *A further dynamic issue arises when the regulator conducts periodic reviews of the firm's performance under PC [price cap] regulation. If superior performance by the firm is used to justify a more stringent policy under future PC regimes, the firm's incentive for such performance may be dampened.*[38]

In addition, a *change* in the regulatory framework may also impose costs on airports in the form of a higher cost of capital. It may also lead to reductions or delays in investment while uncertainties regarding the new framework are resolved.

In short, the *Draft Report* does not provide any robust evidence to support its assessment that there are significant dynamic efficiency gains to be made from price control. If anything, it is more likely for price control to compromise rather than encourage dynamic efficiency. While the problems associated with monopolies are essentially static (prices above costs) the problems of regulation are dynamic, relating to long-term investment. In the long run, the costs of airports will be largely determined by the efficiency of investment and its cumulative effect on the capital stock of the industry.

7.3. The Direct Costs of Regulation

The *Draft Report's* estimate of the additional direct costs of regulation has been based on the following analysis and information:

- an independent estimate that the costs of administering price control for a single airport could be around $500,000 per review;
- the Commission's expenditure of $1,000,000 on the *Draft Report*; and
- the estimation that airports and airlines could be expected to spend roughly similar amounts in relation to the review.

On this basis, the *Draft Report* arrives at the following preliminary conclusion:[39]

> *…a very rough estimate is that the direct costs of price controlling a single airport might be $2.5 - $5.0 million in a review year, and $1.0 - $2.0 in other years.*

[38] Lewis and Sappington (1989) page 413

[39] Draft Report, page 199

This estimate has been combined with analysis from Air New Zealand suggesting the regulation of airports over the period 1990-1994 may have cost around $10 million ($2.5 million per annum).

The calculation of the net impact of regulation on costs was therefore arrived at as follows:

> *The direct costs are estimated on the basis of the following assumptions:*
>
> - *That the annual cost of the present regime per airport in the counterfactual is one-third of the estimate of $2.5 million given by the Australian PSA quoted above, or about $800,000 each.*
> - *That the costs of price control per airport are $3.75 million in price review years, and $1.5 million in intervening years (with price being reviewed every five years), giving a five year total of $9.75 million, and an annual average of about $2 million.*
>
> *On this basis, the annual additional cost per airport of airfield activities being subject to price control would be $2 million less $800,000, or $1.2 million. Assuming, conservatively, that acquirers ultimately bear all of the costs, then the additional costs to acquirers would be $1.2 million.*

Without extensive analysis of the type of regulatory framework likely to be instituted, it is difficult to arrive at an accurate estimate of the direct costs likely to be incurred. However, the *Draft Report's* estimate of $500,000 per review for *administrative costs* seems surprisingly low when compared to the costs of regulation in other jurisdictions. Table 7.2 provides a comparison of the budgets of a selection of UK regulators (it must be noted that these regulators' responsibilities are greater than those envisaged by the Commission). It can be seen that most of these budgets are well in excess of the figure suggested by the Commission, even allowing for difficulties in making comparisons given the range of responsibilities and cost implications of different countries.

Table 7.2
Regulator's Budgets 2000-2001[40]

	Staff	Cost
Ofgem	555	£62.8 million
Oftel	212	£13.9 million
Ofwat	227	£10.9 million
ORR[41]	165	£13.8 million
UK CAA[42] (Economic Regulation Group)	52	£5.1 million

Furthermore, the *Draft Report* omits to estimate the costs of *establishing* a regulatory framework or a regulatory body. The *Draft Report* notes the Commission has already spent in excess of $1 million on the review process to date. The costs of establishing a regulatory framework would likely be well in excess of this figure and more likely to be in line with the estimate for *managing* a regulatory framework in a review year ($2.5 to $5 million). In addition to the development phase, there will likely also be a lengthy learning phase for any regulator. This is likely to involve considerable expenditure on training and consultants in order to avoid the costs associated with poor regulation.

Given this, we believe the *Draft Report's* analysis under-estimates the costs associated with changing frameworks. Nevertheless, it would be virtually impossible to arrive at a robust estimate of the cost of establishing a regulatory framework without any specification of the degree of analysis or consultation this would entail. In other words, there would be a very wide band within which price regulation could be established, depending on the quality required and budgetary constraints. However, for illustrative purposes only we have incorporated a $5 million estimate in the following tables.

7.4. Summary of the Net Benefits to Acquirers

On the basis of the comments made above, the calculation of the potential benefits of price control to acquirers appears to be overstated. The following table considers the adjustments to the estimates in the *Draft Report* that would need to be made to reflect these comments. We have presented these adjustments against the estimates in the *Draft Report* and against

[40] Ofgem, Oftel, Ofwat and ORR figures from WS Atkins Management Consultants and Oxera (2001) page 4-2, CAA figure from CAA website.

[41] Oftel and Ofgem have more difficult roles, however, ORR has a focused role since it regulates only one company (albeit a massive monopoly) with well-understood and slow moving technology.

[42] CAA ERG regulates 5 major UK airports and has a range of responsibilities relating to air traffic systems and regional airports.

AIAL's adjusted figures. (AIAL's adjustments were outlined in table 6.2 and reflect an alternate set of assumptions, which AIAL and its auditors consider to be more realistic. AIAL's revision focused solely on the numeric sense of model and did not just adjust for the underlying economic assumptions, even though AIAL also took issue with several of these.)

We also consider the approach of averaging the net benefits over time disguises some useful information. It is not clear why analysis for the years 2000 and 2001 have been included, instead we have assumed regulation could only be implemented from 2002 onwards.

Table 7.3
Adjusted Estimated Gain to Acquirers

	2000		2001		2002		2003	
	AIAL ***Commission***	**Revised**	**AIAL** ***Commission***	**Revised**	**AIAL** ***Commission***	**Revised**	**AIAL** ***Commission***	**Revised**
Excess profitability transfer	-$719,649 *$641,327*	$0 *$0*	-$1,032,169 *$ 1,898,697*	$0 *$0*	-$845,736 *$ 2,701,196*	-$845,736 *$ 2,701,196*	-$674,307 *$ 3,543,819*	-$674,307 *$ 3,543,819*
Allocative efficiency	- $1,231 *$978*	$0 *$0*	-$2,335 *$ 7,901*	$0 *$0*	-$1,405 *$ 15,229*	-$702 *$ 7,615*	-$822 *$ 24,965*	-$411 *$ 12,482*
Productive efficiency	$65,955 *$65,955*	$0 *$0*	$65,955 *$65,955*	$0 *$0*	$65,955 *$65,955*	$0 *$0*	$65,955 *$65,955*	$0 *$0*
Dynamic efficiency	$1,071,792 *$3,355,842*	$0 *$0*	$1,071,792 *$3,355,842*	$0 *$0*	$1,071,792 *$3,355,842*	$0 *$0*	$1,071,792 *$3,355,842*	$0 *$0*
Direct costs (on-going) (net increase)	$ 2,950,000 *$ 2,950,000*	$0 *$0*	$700,000 *$700,000*	$0 *$0*	$700,000 *$700,000*	$2,950,000 *$2,950,000*	$700,000 *$700,000*	$700,000 *$700,000*
Direct costs (initial)	$0 *$0*	$0 *$0*	$0 *$0*	$0 *$0*	$0 *$0*	$5,000,000 *$5,000,000*	$0 *$0*	$0 *$0*
Total	**-$2,533,133** ***$1,114,102***	**$0** ***$0***	**-$596,757** ***$4,628,395***	**$0** ***$0***	**-$409,394** ***$5,438,222***	**-$8,796,439** ***-$2,991,190***	**-$237,382** ***$6,290,580***	**-$1,374,718** ***$2,856,301***

7.5. The Net Benefits of Regulation

7.5.1. The approach

In assessing the total net benefits of regulation, the *Draft Report* starts from the point of the gains to acquirers, subtracts profit transfers and adds the incremental gain in producer surplus resulting from the increase in sales at the regulated price. Similar to its analysis outlined above, the *Draft Report* assumes regulation could result in the realisation of 50 per cent of estimated inefficiencies.

7.5.2. Comment

The same comments as above (section 7.2 through 7.4) apply in this case. Applying the same logic as above, the estimated net efficiency gain of price control at AIAL reduces to that set out in the following table.

Table 7.4
Adjusted Estimated Net Gain

	2000		2001		2002		2003	
	AIAL ***Commission***	**Revised**	**AIAL** ***Commission***	**Revised**	**AIAL** ***Commission***	**Revised**	**AIAL** ***Commission***	**Revised**
Allocative efficiency (acquirers)	- $1,231 *$978*	$0 *$0*	-$2,335 *$ 7,901*	$0 *$0*	-$1,405 *$ 15,229*	-$702 *$ 7,615*	-$822 *$ 24,965*	-$411 *$ 12,482*
Allocative efficiency (airports)	-$78,026 *$65,383*	$0 *$0*	-$113,047 *$ 183,562*	$0 *$0*	-$91,612 *$253,167*	-$91,612 *$ 253,167*	-$72,446 *$ 322,172*	-$72,446 *$ 322,172*
Productive efficiency	$65,955 *$65,955*	$0 *$0*	$65,955 *$65,955*	$0 *$0*	$65,955 *$65,955*	$0 *$0*	$65,955 *$65,955*	$0 *$0*
Dynamic efficiency	$1,071,792 *$3,355,842*	$0 *$0*	$1,071,792 *$3,355,842*	$0 *$0*	$1,071,792 *$3,355,842*	$0 *$0*	$1,071,792 *$3,355,842*	$0 *$0*
Direct costs (on-going) (net increase)	$ 2,950,000 *$ 2,950,000*	$0 *$0*	$700,000 *$700,000*	$0 *$0*	$700,000 *$700,000*	$2,950,000 *$2,950,000*	$700,000 *$700,000*	$700,000 *$700,000*
Direct costs (initial)	$0 *$0*	$0 *$0*	$0 *$0*	$0 *$0*	$0 *$0*	$5,000,000 *$5,000,000*	$0 *$0*	$0 *$0*
Total	**-$1,891,510** ***$ 538,158***	**$0** ***$0***	**$322,365** ***$ 2,913,259***	**$0** ***$0***	**$344,730** ***$ 2,990,193***	**-$8,042,314** ***-$5,439,219***	**$364,480** ***$ 3,068,933***	**-$772,856** ***-$365,346***

8. CONCLUSION

The Commission's *Draft Report* draws the preliminary conclusion that it is necessary and desirable to implement price control at AIAL (but not at WIAL or CIAL, because there are insufficient net gains expected from regulation at these airports). We believe the Commission's preliminary recommendation is not supported by sound analysis. As it stands, the *Draft Report* is inadequate for the purposes of determining whether price regulation is either required or would be beneficial.

The conclusion that AIAL has been making excessive profits historically and will continue to do so, thereby necessitating price control, is based on very weak analysis. The Commission's modelling misspecifies the accounting rate of profit formula and is dependent on many dubious assumptions or assertions. Furthermore, the model supporting the *Draft Report* involves several data entry errors that have significant impacts on the results. The impact of most of the flaws in the modelling is to increase the estimated Accounting Rate of Profit, leading us to the conclusion that the analysis involves a significant bias.

Several of the major elements of the Commission's cost/benefit analysis are fundamentally flawed. The estimated reduction in prices (and benefit to acquirers) is based on an overly simplistic model of future events – to the extent these results are virtually meaningless. The estimated improvement in dynamic inefficiencies is based on an unsound numerical calculation of the impact of past "poor investment" decisions and fails to consider whether price regulation would result in improved asset holdings. Additionally, the *Draft Report* fails to consider the costs of developing and implementing a regulatory framework.

Even on the basis of the *Draft Report's* own analysis, the net benefits from price control are only $2.4 million per annum (on average over four years). This is a point estimate, the confidence bounds of which are likely to be very wide. This suggests that $2.4 million may not be significantly different from zero given the potential fluctuations around this number. Thus, the Commission's own numbers do not appear to provide strong enough evidence that price control is worthwhile.

On the basis of these short-comings, we believe it highly likely that price control of airfield services could result in a worsening in economic efficiency (and on the basis of the conclusions drawn in the *Draft Report* for WIAL and CIAL, the case for regulating AIAL collapses). Furthermore, the recommendation of price control seems premature given the litigation airlines are currently initiating under the existing "light-handed" framework. Even if the Commission considered AIAL's announced price increases likely to lead to excess profits, it would seem more sensible to await the outcome of this process prior to determining the existing framework was not providing sufficient protection to acquirers.

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APPENDIX A. MARGINAL COSTS

Economic theory suggests efficient price setting equates prices with marginal costs. The rationale for this is that marginal cost based prices send signals to consumers and producers encouraging them to balance the benefits obtained by consuming a good or service with the costs of providing it.

Departures from marginal cost can make sense for any number of reasons. For example, marginal cost pricing cannot guarantee firms will earn a reasonable return on their previously invested capital as well as recover operating costs. In industries with significant fixed costs (including the cost of capital on and of sunk assets) and spare capacity, marginal cost pricing could lead to under-recovery. Conversely, for firms with capacity constraints, marginal cost pricing may lead to over-recovery. This is because marginal costs are forward-looking and include either: the cost to customers who are potentially unable to consume services due to capacity limitations; or the anticipated costs associated with providing additional capacity.

That said, estimates of marginal cost, or at least an understanding of how marginal cost might change over time, can prove useful when formulating a pricing policy.

Marginal cost can be estimated in either a long-run (LRMC) or a short-run (SRMC) sense. The fundamental difference between SRMC and LRMC is the time frame under consideration and the implications for a firm's ability to adjust its production process to minimise costs. For instance, an important distinguishing feature of SRMC is that, in the event supply cannot expand to match demand, SRMC rises to whatever price level is necessary to curtail demand to match available supply.

A.1. Estimating Marginal Costs

LRMC is typically disaggregated into two main types of marginal costs: marginal operating costs; and marginal capital costs, associated with bringing forward investment projects.

Marginal operating costs are generally simpler to estimate, as they usually have a more easily defined relationship with incremental increases in demand. Estimating marginal capital costs is more difficult. These are the costs associated with bringing investment forward as a result of an incremental increase in demand. They are not the total investment costs, since an incremental increase in demand does not generally result in investment that would otherwise never be required; rather it speeds up expansion.

The capital cost component of LRMC (LRMCC) can be estimated by taking the difference in the present values of the investment programs with and without an incremental increase in demand. This suggests that the LRMCC will be relatively low when capacity utilisation is low and the next investment project is some distance in the future, but will rise as capacity utilisation increases and the timing of the next project is nearer.

One way to estimate LRMCC, developed by Turvey43, involves:

1. forecasting the relevant expected demand characteristics into the foreseeable future;

2. estimating the system requirements and augmentations that would be required over time to meet expected these demand levels;

3. estimating the likely cost of these requirements;

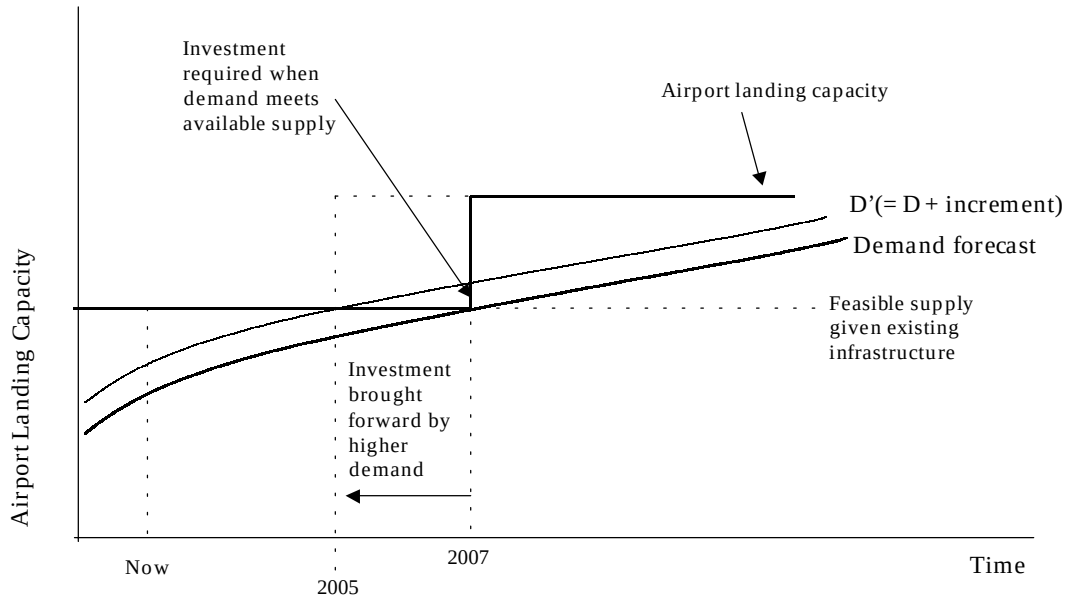
4. adjusting the demand curve upwards by an incremental level of demand;

5. reconsidering the system requirements and augmentations that would be required to meet this new demand pattern and their associated costs;

6. calculating the LRMCC as the difference between the net present values of the investment programs, divided by the total increase in demand.

This (highly simplified) framework for estimating LRMCC is illustrated diagrammatically in figure 2.1 below.

Figure A.1
Estimating the LRMCC



43 Turvey (2000) , Turvey (1976), Hanke (1981) and Hanke and Wentworth (1981)

SRMC is often erroneously estimated as the operating and maintenance costs associated with providing the product. As noted earlier, in times where demand is greater than supply, the SRMC includes the costs associated with customers not being able to land. Furthermore, marginal cost is a forward-looking concept and its estimation essentially involves a probabilistic assessment of possible future outcomes and the costs they entail. In situations where there is an increased risk of slot unavailability, the cost of this demand side component can cause SRMC to rise well above marginal variable costs such as operating and maintenance expenditure.