

Treatment Of New Investment At Regulated Airports

31 May 2001



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TREATMENT OF NEW INVESTMENT AT REGULATED AIRPORTS

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1 Executive Summary

This paper considers the available options for reform of treatment of new investment under the airports regulatory regime.

The paper begins by setting out the issues that an airports regulator has to grapple with in order to achieve socially optimal outcomes. These are set out as follows:

- Addressing potential for the service provider to take advantage of market power in setting prices
- Providing the right signals for new investment
- Relying on negotiation between users and service providers to the greatest extent compatible with social welfare
- Simplifying regulatory involvement in investment approval

It then explains why some new investments might have to be treated differently from other airport expenditure under the current price caps of the airport regulatory regime. In essence, different treatment is required because in some cases the revenue incentives of price caps do not elicit the required investment in a timely fashion or at socially optimal levels. This different treatment has to take the form of either adjustments to the price cap parameters or passthrough charging and means that the financial consequences of the investment decision are shared between the airport and airlines. Thus, appropriate treatment of some new investments creates the need to vest some approval authority either in the airlines or in the regulator acting on their behalf.

The paper then goes on to discuss this ‘approval’ problem in depth. It is shown that bargaining prior to approval of new investment as between the airports and airlines and among the airlines themselves can lead to the following strategic behaviours:

- Proposals to bundle necessary and unnecessary investments;
- Hold-up threats;
- Cheap riding;
- Forced riding and raising rivals costs;
- Barriers to airline entry;
- Suboptimal provision of club goods.

Four options for providing additional investment incentives are then described and evaluated subject to the regulatory objectives outlined and their ability to deal with the strategic bargaining problems described. These options are as follows:

- Status quo: regulator approval of investment with cost passthrough funding;
- Price cap parameters set on basis of expected investment requirements;
- Project Control Group approval process with cost passthrough funding;
- Project Control Group approval process with adjustable price cap parameter funding.

It is concluded that the fourth option, namely Project Control Group approval process with adjustable price cap parameter funding may provide the best approach for treatment of new investments under the airport regulatory regime. However, how well this option works in practice depends upon the design features of the approval process, in particular striking the right balance between an agreement rule that tends towards unanimity and one that tends towards simple majority approval. This is because each type of rule increases the likelihood of particular strategic behaviours occurring but decreases the likelihood of other strategic behaviours.

2 Introduction

2.1 *Background to this paper*

In 1997 and 1998 the Commonwealth Government privatised nearly all of the airports owned by the former Federal Airports Corporation (FAC) through long-term leases. These included the principal airports in all capital cities (except Sydney), several regional centres and a number of smaller general aviation airports.

As part of the privatisation process, the government either carried over or introduced new airport-specific economic regulation.

The Australian Competition and Consumer Commission (ACCC) was charged with the administration of the regulatory framework which in essence consisted of the following:

- A prices surveillance and monitoring regime covering aeronautical and aeronautical-related services, including a price cap for some services;
- The monitoring of airport service quality;
- An access regime covering services provided by essential facilities at the major airports; and
- The publication of annual reports of airports' financial and other performances.

The relevant legislation underlying this framework are the *Airports Act 1996*, the *Prices Surveillance Act 1983 (PSA)* and the *Trade Practices Act 1974 (TPA)*.

The price caps regime which is set out by the PSA and its associated cost pass-through arrangements comes under review by the end of 2001 and is the subject of this report. The price caps presently apply to 'declared aeronautical services' in 'core regulated airports' as designated by the *Airports Act 1996*. Section 21 of the PSA defines the declared services as follows:

- 'Aircraft movement facilities and activities';
- 'Passenger processing facilities and activities'.

Price caps are set for each core regulated airport specifying that rises in aeronautical charges are not to exceed the Consumer Price Index (CPI) minus an X-factor. The X value reflects expected general productivity improvements which can be made in service delivery at each airport. Compliance with the price cap is assessed by monitoring average changes in aeronautical charges at each core regulated airport and comparing them with the relevant CPI-X statistic. The changes are averaged by taking the percentage change in the charge for each service from one period to the next, weighting this change by that service's revenue share in the previous period and then summing over all components.

The most pertinent exception to this price cap regime for the purposes of this report and which shall be subject of some scrutiny in later sections is the provision for new investment costs pass through. Direction 13 of the PSA 1983 allows an airport operator to increase charges at a rate in excess of CPI-X where it seeks to recover the cost of 'necessary new investment.'

It is worth noting that the 'Guidelines for assessing proposals to increase charges to recover the costs of necessary new investment' under Direction 13 include the following among its criteria

(6)(c) support from airport users with a significant interest in the investment for the operator's proposals, including in relation to charging changes

2.2 Layout of this paper

In order to meet its obligations under the relevant pieces of legislation, which include the *Prices Surveillance Act 1983*, the *Airports Act 1996*, and the *Trade Practices Act 1974*, the regulator must often balance a need to curb an airport owner's use of market power with a need to maintain a suitable investment climate. The remainder of **Section 2** sets out the regulator's objectives with respect to airport investments. **Section 3** identifies the nature of the challenges the regulator faces in meeting these objectives, given the types of information asymmetries which regulators generally face, and the opportunities for strategic behaviour which are more specific to the 'club good' nature of airport services. **Section 4** identifies a range of alternative approaches to these challenges, and **Section 5** evaluates each in terms of its potential efficacy in assisting the regulator to meet the objectives set out earlier.

2.3 Objectives of regulation

In an ideal world where an omniscient social planner made all investment decisions, the costs associated with uncertainty and with strategic behaviour could be avoided. In the real world, however, uncertainty regarding future demand levels and technology choices which will become available in future has a critical effect on investment decisions. These uncertainty costs can be reduced by placing those

parties with the best ability to manage demand and technology risks (i.e., the airlines and the airports) in charge of the investment decisions at issue.

While a hypothetical integrated firm which operated both airports and aircraft and which does not have or abuse any market power could be expected to make optimal use of the available demand and technology information, in the real economy those functions are vertically separated. Given this vertical separation, airports and airlines will each attempt to maximise their own profits in a way which, in the absence of regulatory intervention, may ignore, or pay insufficient attention to spillover effects. Certainly, if there were only one airline and one airport owner, they might arrive at mutually satisfactory agreements over the exploitation of positive externalities¹ and the sharing of the benefits. (As a practical matter, though, such an agreement bargain could face important problems of indeterminacy in bilateral bargaining). With many airlines, the feasibility of exploiting such opportunities diminishes, as the transaction costs mount and the opportunities for cheap riding become more abundant.

This situation creates a potentially useful role for the regulator, who can attempt to influence investment outcomes toward what the omniscient social planner would have chosen. Through some process of consultation with airports and airport users, the regulator can gain some insights into the interplay between demand and technology factors. The remaining stumbling block is one faced almost universally by providers of public goods –designing a mechanism which will elicit a truthful revelation of preferences. As this paper shall discuss, though airports are not public goods, the preference revelation problem arises here nonetheless because of the ‘club good’ characteristics of airport facilities

A regulator has several well defined responsibilities in influencing outcomes toward the omniscient social planner’s ideal. Firstly, the regulator must prevent a monopoly service provider taking advantage of market power; to some degree, this can be done through price cap regulation. Secondly, the regulator must ensure that the price controls are not so tight that necessary new investment is choked off. This balance could be better achieved when an environment is created in which voluntary negotiations between facility owners and users are encouraged and facilitated, as these directly involved parties have superior knowledge of demand, cost, and technology factors. Finally the regulator must recognise that regulation itself imposes costs (both administrative costs and the costs associated with the possibility of erroneous judgements), and that these costs increase with the complexity of regulatory involvement in decision-making processes. Therefore, simplicity should be a goal as well.

These regulatory objectives as applied to airports price caps regime and associated cost pass through arrangements can be summarised as follows:

- Addressing potential for the service provider to take advantage of market power in setting prices;
- Providing the right signals for new investment;

¹ In particular, from optimal provision of club goods – this is discussed in greater detail at **Section 3.2.6.**

-
- Relying on negotiation between users and service providers to the greatest extent compatible with social welfare;
 - Simplifying regulatory involvement in investment approval.

It is worth briefly setting out why these objectives are important in the specific airport context.

2.3.1 Addressing market power

Airports are an essential infrastructure for the Australian economy. However, airports can be monopoly facilities in their geographic markets. If unregulated, airport owners or operators could exercise their market power and charge prices above those expected in a competitive market. This would adversely affect the Australian economy through increased business and tourism costs and reduced economic growth. In theory, these costs would not be so great if airport owners could act as efficient price discriminators; in practice, there are many reasons why such price discrimination is not feasible. Thus, the most important role of the current price caps regime under review is to inhibit the exercise of market power by the airports.

2.3.2 Investment incentives

Airports are infrastructure which require substantial amounts of investment. If investment incentives are distorted, airports may not bring forward valuable additional capacity at the best timing and scale, even where social benefits would outweigh social costs. Thus, an appropriate incentive framework must coexist with the limitation of the airport's market power.

2.3.3 Negotiation between users and service providers

It is desirable that, to the greatest extent possible, airlines and airports be encouraged to negotiate mutually satisfactory commercial arrangements. Regulation creates least distortion when it acts as a safety net for parties which are unable to negotiate satisfactory arrangements due to the market power of the counterparty or to the existence of a significant gap between private and social costs and benefits. On a range of other matters, the negotiation process can and should work without extensive regulatory involvement.

2.3.4 Regulatory simplification

All other things being equal, the lower the costs of regulatory compliance, the lower the costs of engaging in the activity which is the subject of the regulation. This is because the steps which the airport owner has to go through to obtain approval for supplementary funding to support a new investment also constitute a cost to the owner, in the form of opportunity costs of time and money. This cost further lowers the rate of return on the planned investment. The uncertainty of approval constitutes a further cost. Thus, streamlining the regulatory process can help reduce these costs and ensure that the firm makes investment decisions on their merits and to the public benefit.

3 The investment incentive challenge for airports

The purpose of this section is to elucidate the challenges the regulator faces in balancing its monopoly power-curbing objectives with its investment-incentivising objectives. It is not uncommon to perceive this trade-off as a purely financial one: by tightening price controls the regulator limits the airport's ability to earn monopoly profits, and by relaxing price controls the regulator makes investment more financially attractive to the airport.

However this one-dimensional view is incomplete. While excessively tight price controls may arrest desirable investments, excessively loose price controls are not guaranteed to bring investment forth. Two approaches are typically used to ensure that necessary investment takes place:

- the "stick" of minimum service standards compels investment in cases where failure to invest would result in a failure to meet the standard; or
- the "carrot" of additional revenue is offered, contingent on the investment being made.

Provided that service standards are measurable, the "stick" approach may be preferable because, at least potentially, it:

- involves less intrusion by the regulator into the airport's business,
- does not require the regulator to make investment decisions itself,
- permits the regulator to focus on outcomes and the airport to focus on means of achieving them, and
- maintains a strong degree of cost protection for the airport's customers.

Section 3.1 below identifies the circumstances in which the price cap with service standards approach is most likely to succeed.

In some cases, however, the price cap with service standards approach will not elicit the required investment in a timely fashion. If price controls would prevent the airport recouping the new capital expenditure, then standards and compulsion may be of little benefit. Here some form of "carrot" is needed, but the issues raised by the more intimate involvement of the regulator in investment choices must be addressed.

When the airport must obtain additional revenue to fund a requested new investment, an approval problem is created. As long as investments can be funded from within existing price cap arrangements, it is desirable that the airport itself is the approving authority (subject to Ministerial approvals required under the *Airports Act 1996*) since it alone bears the financial risk of the investment decision.² However when these financial consequences are shared between airport and airlines it is intuitively sensible to vest some approval authority either in the airlines or in the regulator acting on their behalf.

² Airport charges will be determined by the price cap, and hence are not affected by the investment decision.

This type of situation is common in utility regulation. Where rate of return regulation is applied there is often a requirement for a regulator to approve the addition of a new investment to the rate base. This reflects the fact that the regulatory framework to a greater or lesser extent insures the regulated firm from the adverse consequences of its investment decisions. A “moral hazard” problem then arises, with the extent of the problem depending on the degree of insurance the regulatory scheme offers. “Prudency” reviews, in which the regulator tests investment proposals, are one option for dealing with the risk of poorly-chosen investments being made.

In price cap regulation, the firm is (at least in principle) not insured against the consequences of poor investment decisions. As a result, there is no need, again in principle, for the regulator to become involved in investment decision-making. However, precisely because the cap does not provide insurance (or at least does not do so to the same extent as a formal rate of return scheme), there is a greater risk of socially desirable investments not being made. Where price cap regulation is applied it is therefore not uncommon to adjust the price cap parameters to reflect the additional revenue required to fund specified investments—this adjustment usually being contingent on tests of the investments’ justifiability.

In airports the issue is complicated by the fact that its primary aeronautical customers—the airlines—are relatively few in number and form a diverse club in which some definitely possess some degree of market power while others do not. As the airlines are few in number it is feasible to involve them directly in the approval of new investments. As the airlines are more knowledgeable than the regulator about the impacts of new airport investments on their businesses they are, in many ways, ideally placed to veto or approve investment proposals from the airport for which they are asked to contribute financially. This situation contrasts strongly with that of the customers of an electricity distributor, for instance, who are extremely numerous and arguably less well placed than the regulator to evaluate investment proposals. However, a problem may be that – given that airlines are quite diverse in their cost structures and business models – airlines with market or bargaining power may favour airport charges and investment which effectively raise rivals’ cost and distort the competitive process in the airline industry.

The airlines’ information advantage over the regulator provides opportunities for various types of strategic behaviour when they are given, collectively, veto power over investments which require additional funding. These strategic behaviour opportunities are catalogued and explained in **Section 3.2**. These opportunities arise because the facilities provided by airports are to some extent ‘club’ goods: a class of goods for which consumption is potentially non-rivalrous (like public goods) but for which non-payers can be excluded (like private goods).³

³ An example of a club good would be membership in a golf club which does not suffer from congestion. As long as there is no congestion, the enjoyment of the golf course and club facilities by one member does not prevent or detract from the enjoyment by other members. As with a public good, the club members do not ‘consume’ the benefit. Unlike a pure public good, however, the benefits of golf course membership can be denied to non-members by fencing off the golf course and employing an officious front desk person.

3.1 *When do price caps provide sufficient incentives?*

Price cap regulation has a number of desirable features, some of which have been noted above. In addition to the noted benefits, price caps can provide “high powered” incentives for efficient delivery of service.⁴ In this respect they can differ from rate of return regulation which creates “low powered” efficiency incentives. Thus, at least in theory, price caps place the cost risk with the firm, and therefore make the firm’s profitability dependent on its cost management. In contrast, and again in theory, rate of return regulation aims to deliver a programmed level of profitability—in most cases almost independently of the firm’s cost management.

Under a “high powered” incentive structure, firms will be highly motivated to pursue investments which reduce costs overall, which permit more effective cost control, or which increase demand for the firm’s services at the capped prices. A firm subjected to rate of return regulation (at least in its pure forms⁵) will be significantly less motivated to pursue such investments, as its profitability will be adjusted ex post to prevent it keeping the benefits such investments would create.

Price capped firms will be far less motivated to pursue investments which do not directly improve their profitability. This is generally, but not invariably, socially desirable. For example, investments in quality of service will have incremental costs, but are unlikely to yield incremental revenue benefits under a static price cap, even where there are tangible benefits for customers. Rate of return regulated firms would be less reluctant to invest in quality of service. If the regulator’s estimate of such a firm’s Weighted Average Cost of Capital (WACC) is accurate, then the firm will be equally indifferent about quality investments as it was about cost-reducing or demand-increasing investments. On the other hand, if the regulator’s estimate of such a firm’s WACC is higher than its actual WACC, then the firm will be motivated to invest.⁶

In order to prepare the ground for the detailed discussion, we undertake the preliminary step of developing an algebraic method of adjusting a price cap for new investment when the regulated WACC is equal to the firm’s actual WACC. This exposition of the relationship between the financial results of investment and the price cap parameters p_0 and X will be useful in understanding what types of investment necessarily require adjustments to the permitted revenue and which do not.

Then we present a rough categorisation of the various investment objectives applicable to airports and demonstrate that the nature of the objective (if it can be clearly established) provides a good indication of whether price caps will provide adequate incentive. We conclude **Section 3.1** by noting that a precise categorisation of investments by purpose is not entirely feasible, nor is it always desirable.

⁴ Whether they do so as a practical matter obviously depends on the features of the cap, including the extent to which it is set according to information that depends on the regulated firm’s behaviour. Moreover, it needs to be noted that the “purer” a price cap (in the sense of the weaker the link between the cap and the firm’s costs), the greater the risk the cap imposes on the firm. The ultimate consequence of this risk may be to prevent the firm from exploiting socially desirable opportunities – for example, through investment.

⁵ In the sense of regulation that effectively insures the firm’s income.

⁶ Averch-Johnson effects will then be associated with “gold-plating”.

3.1.1 How price cap parameters would change after new investment

To explore the relationship between price caps and investment incentives it is useful first to understand the financial relationship between price-cap parameters (p_0 and X , primarily) and returns required on incremental investments. From this algebraic analysis it will be possible to explore the most appropriate regulatory treatment of investments which serve various objectives.

When a capital investment of K dollars is made in a new asset⁷ with a life of L years, the resulting capital charge in any year of the asset's life will be the sum of the required return on assets and a depreciation charge. For simplicity let us assume that depreciation is linear. If the asset's age is a function of time: $A = t_0 + t$ (t_0 is the year in which the asset was bought), then the combined capital charge is:

$$\text{Annual capital charge (ACC)} = WACC * K * (L - A)/L + K/L,$$

where WACC is the regulated Weighted Average Cost of Capital, and this is assumed to accurately reflect the firm's actual WACC. This new asset may have any of a number of possible effects on the airport owner's business. For example:

- it may result in a net savings in operations and maintenance costs of S per annum for the life of the asset, leading to a net increase in annual costs of $ACC - S$;
- it might expand the airport's capacity, making it possible to serve an additional ID units of incremental demand, leading to an increase in actual demand from Q_0 to Q_1 , where $Q_1 - Q_0 \leq ID$; or
- it might contribute to the quality of the service provided to the airport's customers, but do so in a way for which the airport is unable to earn additional revenue without increasing prices.

Prices are assumed to be subject to a $CPI - X$ cap. Thus:

$$p(t) = p_0 * (1 + t * (CPI - X))$$

Here the consumer price index in year 0 is 1.0, and if inflation in year 1 was 2%, then the CPI variable for that year would be 1.02, and if X were set at 1.5%, then $CPI - X$ would be 1.005 in that year.

Further, let us assume that the $CPI - X$ price cap before the new investment was set in such a way as to yield zero economic profit for the airport owner at any point in time:

$$\text{Economic profit} = \text{revenue} - \text{cost} = Q_0 * p_0 * (1 + t * (CPI - X)) - C_0(t) = 0$$

Here t represents time, expressed in years. $C_0(t)$ is the firm's total cost function over time before the investment is made. CPI and X are here both expressed as fractions

⁷ By "new" we mean no more than "new to the business". The discussion generalises immediately to assets that have already been used, but are now being purchased by the business at issue.

of one, rather than as percentages. This equation can be rewritten as an expression for total costs as a function of time:

$$C0(t) = Q0 * p0 * (1 + t * (CPI - X))$$

The CPI - X price regulation parameters $p0$ and X can be derived from the cost function as follows:

$$p0 = C0(t=0)/Q0$$

$$CPI - X = d/dt(C0(t)) / (Q0 * p0)$$

The effect on $p0$ and X of capital investment K can be demonstrated by applying the same transforms to a cost function modified to take account of the investment. The new cost function is:

$$C1(t) = C0(t) + ACC - S$$

To calculate $p0'$, we know that $p0' \cdot Q1 = C1(t=0)$. Let $A0$ be the asset's age at time $t=0$. Therefore,

$$\begin{aligned} p0' &= C1(t=0)/Q1 = (1/Q1) * (C0(0) + WACC * K * (L - A0)/L + K/L - S) \\ &= p0 * (Q0/Q1) + (1/Q1) (K/L) * (WACC * (L - A0) + 1) - S/Q1 \end{aligned}$$

$$\begin{aligned} CPI - X' &= d/dt(C1(t)) / (Q1 * p0') \\ &= (C0(0)/C1(0)) * (CPI - X) - K * WACC / (L * C1(0)) \end{aligned}$$

From these formulae, the following conclusions can be drawn:

- The new starting price level, $p0'$, differs from the pre-existing starting price, $p0$, in three respects:
 - A capacity effect is evident in the first term, in which the larger demand which is served because of the investment leads to a reduction in the average cost equal to: $p0 * (1 - (Q0/Q1))$;
 - A cost-saving effect is evident in the third term: $- S/Q1$; and
 - A capital cost effect is evident in the middle term:

$$(1/Q1) (K/L) * (WACC * (L - A0) + 1).$$
- The new CPI - X' price trajectory differs from the pre-existing trajectory, CPI - X, in two respects:
 - The change in initial ($t=0$) cost levels as a result of the investment leads to an adjustment factor of $C0(0)/C1(0)$ applied to CPI - X; and
 - X' includes a capital cost term equal to $K * WACC / (L * C1(0))$.

This analysis demonstrates that the financial impact of new investments can be understood within the CPI – X price-capping framework. The specific characteristics of an investment, notably the balance between the effects on capacity, cost-saving, and capital cost, will determine whether, by how much, and in what direction the p_0 and X parameters would need to be adjusted to compensate for a new investment (to ensure that zero economic profit continued to be earned). These comments apply equally well for divestments, in which case K and S would have opposite signs than for investments, and Q_1 would not be greater than Q_0 .

3.1.2 Classification of investments by objective

Circumstances in which price caps provide sufficient incentives for new investment depend to a large extent on the purpose of the investment, and the degree to which the investment was foreseen in setting the current price cap parameters.

The current framework for evaluating necessary new investment already distinguishes between investments serving different objectives. For example, the ACCC, in its guidelines⁸, notes at page 6:

“Although this definition can be applied to any investment proposal, one type of new investment that should be excluded, however, is that aimed solely at cost saving innovations. Where innovation has no effect on quality or capacity, the price cap already provides sufficient incentive for firms to undertake investment of this sort. That is to say, the airport owner retains increased earnings resulting from lower costs under the price cap arrangements.”

The following discussion will consider a range of generic types of investment, classified by the nature of the expected financial outcomes.

3.1.3 Maintenance of existing service potential (in both quality and capacity terms)

The first category of investment, also called “major periodic maintenance” in some industries, is investment aimed at simply preserving the current service potential of an asset. In its most usual form this involves like-for-like replacement of a life-expired asset. In many cases the service potential is maintained with an investment in a slightly different type of new asset. To the extent that this investment represents the most efficient means of maintaining without enhancement existing service potential, it is most appropriate to treat such investments as though they were a form of maintenance expenditure.

Given the neutral impact on both costs and revenues over time from planned like-for-like cyclic renewal of assets, investments with a maintenance purpose should be included within the price cap. These would provide no basis for modifying the price cap parameters.

3.1.4 Cost savings

If a strict zero economic profit rule were observed, cost-saving investments would lead to a tightening of the price cap. However given the practical issues (administrative costs of modifying the price cap) and the adverse incentive effects (perfect and instantaneous expropriation of cost savings by the regulator will

⁸ “New Investment Cost Pass-through”, ACCC Position Paper, April 2000.

disincentivise the airport owner from making such investments and makes the cap no different from pure rate of return regulation) the argument for retaining the price cap parameters unchanged after such a cost-reducing investment is very compelling. We note that this is the ACCC's current practice.

3.1.5 Capacity enhancement

The simple model set out above provides a framework in which capacity-enhancing effects of investment can be evaluated. There is clearly at least a possibility that a capacity-enhancing investment might be able to be self-funding without making any changes to existing price cap arrangements. Assuming, for simplicity, that the cost-saving effect is sufficiently small to be ignored, it is certainly possible that the additional revenue obtained by removing a capacity constraint would be sufficient to fund the additional capital charges. Whether the two effects will actually balance in practice depends on the specifics of the investment.

Note that the equations above refer not to the additional capacity but the additional volume of traffic Q1 to which the prices apply. It is important to be precise about the nature of the capacity effect. If additional airport capacity does not translate into additional revenue at current prices, then it may be more appropriate to think of the investment as being primarily directed at quality improvements.

For example, a capacity-related investment which increased the maximum throughput of passenger luggage from check-in to the aircraft's baggage hold would not necessarily result in more revenue for the airport. It would simply mean that aircraft could be loaded more quickly and passengers would find the check-in and boarding process less time-consuming and more convenient. In other words it would have the characteristics of a quality investment rather than a capacity investment. The distinction between a quality investment and a capacity investment, is, like many things, admittedly a blurry line. For instance, if aircraft were loaded more quickly, more aircraft could be handled in a given time period so that more terminal slots could be sold, if there was not some other constraint (as there is in Sydney, for example) on the number of slots available. However the impact of this capacity effect may be too slight to translate into measurable incentives for the airport to change its investment behaviour.

In addition to this, even a more direct capacity investment such as a new runway may not necessarily increase the number of aircraft takeoffs and landings in a day. It may just reduce congestion at peak times, improve safety margins, or permit airlines to schedule more frequent flights at high demand times of day. In these situations, even a runway investment might be more aptly characterised as an investment in quality rather than quantity of service, and the airport's ability to earn additional revenue at constant prices might be small.

The foregoing discussion provides some justification for handling capacity-related investments either outside the price cap framework, or by modifying the price cap parameters, unless the connection between the investment and new revenues at current prices is direct and strong.

More generally, the connection between investment and revenues under a given cap is most likely to be strong when the investment lifts or eases a capacity constraint on output. In these circumstances, the investment has a shadow price to the airport that

reflects the capacity constraint, and it is the change in that shadow price over time that determines the timing of the airport's investment decision. However, when the cap is binding, in the sense that the airport owner could profitably charge more for existing quantities than the cap allows, and given vertical separation between airport owners and airlines, investment that increases capacity in some dimension but merely increases willingness to pay for current output (say, by improving service quality) will yield no net gain to the airport owner. Even if that investment also permits an increase in output,⁹ its attractiveness to the airport owner will depend solely on the balance between the marginal revenue from the output expansion and the overall cost of the investment project. The infra-marginal increases in willingness to pay will not – under vertical separation and a binding price cap – be weighted in the airport owner's investment evaluation. In the absence of any corrective mechanism, this will distort the timing and level even of investments in capacity expansion.

3.1.6 Quality enhancement

Many necessary investments at an airport may result in no savings in operating and maintenance costs, and no change to revenues at current prices if the principal effect of these investments is an improvement to the quality of service. Many of these investments may provide the airport's customers with an ability to provide a greater quantity of service or a more highly valued type of service to their customers. The lack of incentive for an airport owner to make such quality investments arises essentially through the vertical separation of airport and airline services, because a hypothetical vertically integrated airport and airline company would maximise profits by voluntarily making such investments.

The relationship between a vertically separated industry structure and incentives to invest for quality has been explored in a recent paper on railway investments.¹⁰ The framework used by the authors is sufficiently general to be applicable to the airport case at issue here. Their findings are that under reasonable assumptions regarding the responsiveness of (demand for air travel) to quality, and how that quality effect varies with retail price (which would presumably map to airline ticket prices in this case), (quality) investment incentives are smaller (but still positive) under vertical separation than under vertical integration. Suitable non-linear access prices (equivalent to aeronautical charges in this case) are then required for investment incentives under separation to become identical to those under integration. In turn, it is well-known that such non-linear charges may create distortions of their own (mainly by affecting entry decisions into the dependent market) and are in any event more difficult to monitor for anti-competitive conduct. Even if such charges were efficient and commercially feasible, they might still be constrained by rules against airport price discrimination (which apply especially to international airports) and hence might not be practically open to airports. As a result, it is not likely that the problems could be addressed simply by altering the airport pricing structure.

⁹ This can occur either by removing a capacity constraint or by the effect of improved quality on downstream output and through that on intermediate input demand. (In this case, the downstream output is sales of air transport services, and the intermediate input is usage of airport services).

¹⁰ Buehler, Schmutzler, and Benz, "Quality Provision in Deregulated Industries: The Railtrack Problem." Working Paper No. 0002 of the Socioeconomic Institute, University of Zurich, 2 October 2000.

To the extent that the investment-dampening incentives of vertical separation must then be compensated, it would be important that the airport owner receive some financial inducement to make such investments. Practically speaking, such inducements are most likely to be realised through price increases to regulated aeronautical services.

Given the airlines' involvement in the value capture process, it is appropriate in these circumstances to make approval of such 'quality-based' investments contingent on the airlines' agreement to fund the capital cost. The process of obtaining approval from an airline 'club' whose members have somewhat divergent interests gives rise to a number of strategic behaviour issues which are considered in **Section 3.2** below. Generally speaking, the challenge for the regulator in this situation is to devise a mechanism through which the preferences of the airlines for various investment options can be truthfully revealed.

It is important to note that there are circumstances in which the airlines, taken as a group, are unable to fully capture the benefits of a quality-related investment in the airport. Airport users, such as passengers, meeters and greeters, may derive benefit from some quality-related investments, but there may be no mechanism through which the investor can obtain a revenue stream. The most efficient means of inducing these investments may be to impose a 'tax' on the airlines which would ultimately be paid by their passengers. In these circumstances the regulator may find itself the most appropriate approval authority for these investments, acting as the agent for these beneficiaries.

After the approval question has been resolved there remains the question of whether quality investments should be funded through an adjustment to the price cap parameters, or through a separate passthrough arrangement.

3.1.7 Meeting Government-imposed standards

A special case of quality-related investment is investment required to meet government-imposed standards for such issues as safety, public convenience, environmental protection, disabled access, noise mitigation, erosion control, etc. For standards-related investment the critical question is whether and to what degree the new standard existed or was anticipated at the time that the current price cap parameters were established.

Investments to meet Government standards already in place or reasonably anticipated at the time of establishment of the current price cap should be met from within the price capped revenue, with no changes to the price cap parameters. The necessity of this rule should be readily apparent.

Investments to meet new Government standards which could not have been reasonably anticipated at the time the current price cap was put in place, should be met from outside the price capped revenue. This case is identical to the earlier treatment of quality-related investments. As in that case it remains an open question at this point in the discussion as to whether it is preferable to permit the airport to fund approved standards-related investments through modified price cap parameters, or through a separate passthrough arrangement.

Whether a modified price cap is used or a pass-through arrangement used may well depend on the extent to which there is a public interest in incenting the airport to meet these requirements at least cost. Where (1) the risks associated with cost-shading by the airport owner are substantial (as might be the case with investments needed to meet safety standards) and (2) it is not easy to detect such shading before its harmful consequences appear, then it seems generally preferable to use a passthrough arrangement, as this minimises the likelihood of any “cutting of corners”. Conversely, where any net risks of excess cost reduction are slight (say because monitoring for compliance is relatively easy), and the scope for reducing costs is of more than marginal significance and socially valued, then a modified price cap may provide a suitable framework for carrying out the investments required.

3.1.8 Treatment of investments serving multiple objectives

So far this discussion of investment objectives has somewhat abstractly presumed that investments are purely categorisable into one or another type of objective. Even a cursory examination of investment proposals which the ACCC has been asked to consider under the necessary new investment framework¹¹ illustrates that real investments are seldom so easily categorised.

One approach would be to create a formal requirement that Necessary New Investment proposals contain a statement of purpose, which would be used in the evaluation. The difficulty with such a requirement is that it would make it harder to gain approval for investments which serve more than one purpose (i.e., cost reduction and quality improvement). In some cases the most efficient means of satisfying the various objectives of the airport may be through investments which serve multiple financial objectives, so a rule which discriminated against them would be counterproductive.

In light of this observation, the algebraic approach developed above is likely to prove useful. As long as the separate effects of an investment: O&M cost reduction, volume increase, and capital charges can be quantified with a reasonable degree of confidence, the precise categorisation of the investment purpose is not necessary. The following simple decision rules should be maintained, however:

- Where an investment can be funded without alteration to the price cap parameters or approved supplementary passthrough charging, then customer approval should not be required.¹²
- Where an investment requires either alterations to the price cap parameters or passthrough charging, then customer approval should be obtained.
- Where there is a strong prospect that airline approval may be unreasonably withheld, the approval authority should be the regulator.
- Where an investment is required in order to comply with government-imposed standards or obligations arising from them, it should be funded from within the existing price cap with unchanged parameters, unless it can

¹¹ See, for example, the ACCC’s April 2000 Decision on Proposal to increase aeronautical charges to recover the costs of necessary new investment at Brisbane Airport, and the ACCC’s October 2000 New Investment Decision on a Range of Projects for Australia Pacific Airports (Melbourne) Pty Ltd.

¹² Note that under the Airports Act, Ministerial approval may still be required for significant investments.

be shown that the requirement to meet the standard is new and could not reasonably have been anticipated by the airport owner before the current price cap parameters were established.

3.2 The approval problem

The table below summarises a range of likely circumstances surrounding any particular investment proposal and identifies in each case the party or parties who are best placed to take the approval decision.

	Approval of new investment rests with:		
	Airport	Airlines	Regulator (as agent of third parties)
No extra revenue required to fund investment	Airport should be sole approval authority (subject to Ministerial agreement)		
Extra revenue required to fund investment:			
<ul style="list-style-type: none"> single airline benefits 		Private negotiation between airline and airport should be encouraged, but threat of regulatory involvement needed.	Regulator may need to protect airline against airport taking advantage of market power.
<ul style="list-style-type: none"> Benefits distributed among airlines 	Strategic behaviour by airport may take the form of: <ul style="list-style-type: none"> bundling proposals, holdup, barriers to airline entry, suboptimal provision of club goods. 	Strategic behaviour within heterogeneous airline club may cause: <ul style="list-style-type: none"> holdup, free-riding, forced-riding and raising rivals costs , barriers to entry, or suboptimal provision of club goods. 	This situation places the heaviest burden on the regulator.
<ul style="list-style-type: none"> Benefits not able to be captured by airlines 			Argument for regulator approving investment, then funding through equitable tax on all airlines.

As the table illustrates, the situation giving rise to the greatest potential range of strategic behaviour is that in which additional revenue is required to fund an investment which provides benefits to a number of airlines. This situation creates the greatest challenges for the regulator. Unfortunately this situation may be relatively common in practice. We briefly note the main strategic issues and how they might arise below.

The discussion below will consider the case in which new investment is to be funded by either a cost pass-through or price cap adjustment. This means that the airport owner obtains greater returns from its investment if facilities are funded through this channel and more use is made of these facilities.

In the majority of the cases where strategic behaviour of the airport against airlines is being considered, the ultimate objective is to divert inappropriate levels of investment through the incentive scheme.

The other most frequently occurring type of strategic behaviour is among the airlines themselves. Essentially it is motivated by the ability of some airlines to expropriate other airlines.

In both these types of strategic behaviour, the outcome may depend on the bargaining power of the respective parties. Before discussing their specific manifestations below, it is worth outlining the factors which are determinative of their bargaining powers.

The balance of bargaining power between the airport and airlines depends on:

- the terms and conditions for access to existing facilities offered to all users through the normal price cap;
- the level of existing airport congestion (it is unlikely that at a congested airport any single user will have effective bargaining power in a negotiation process, though at uncongested airports the situation is less clear);
- the airline's share of total traffic at that airport; and
- the airline's passenger mix.

3.2.1 Bundling proposals

The airport has incentives to engage in bundling of inefficient investments together with efficient investments where approval of the investment is to be sought from the airlines. This bundling of inefficient with efficient investments might be motivated by the airport owner's wish to maximise its returns from investment by diverting more investments through the incentive scheme. Alternatively, the bundling may be a result of rent-extracting behaviour by the airport, particularly on the part of the airport's managerial employees. While price caps may foreclose some opportunities for rent extraction, managerial employees may obtain economic rents in the form of the enjoyment of perquisites associated with management of large expenditure projects.¹³

The bundling strategem is only likely to succeed if the transaction cost of unbundling exceeds the benefit of refusing some but not all of the investments. Then it becomes too costly for the airlines to unbundle the investments which they do not want if the "unwanted" investment is relatively inexpensive compared to the costs of

¹³ Clearly, for the bundling to be profitable for the airport owner, the cap (or other price limiting mechanism) must allow the airport to earn a rate of return on the additional investment that is in excess of the WACC. Failing this, the airport owner has no interest in inflating the airport's asset base. Even in these circumstances though, agency problems between the airport owner and the airport's managers may result in the promotion of projects that do not enhance the net value of the owner's assets.

unbundling. Thus, at the investment approval stage, it may be too costly for the airlines not to accept the whole investment plan. On the other hand, when the unwanted investment is discrete and costly, airlines should have no difficulty in separating it out and vetoing it. For example, this might be the case with any proposal for an entire new runway.

While bundling may in some instances impose welfare costs, it will not always do so. In a second-best world where transaction costs are above zero and not all the bargaining parties' preferences can be met through intricate bargains and side-payments, the bundling may have some efficient properties. These efficient properties arise from the fact that none of the proposals taken separately may be acceptable to a majority of the airlines. If each proposal then had to be voted on one by one, they would be rejected each time. The bargaining would have to go back to square one and new investment proposals may have to be designed. This may lead to a very long and frustrating approval process, as coalitions are formed and side-deals arranged. The longer the approval process, the more opportunities in terms of resources and time are foregone. It is true that the resulting investment is more likely to be efficient if it can garner the approval of all parties, at least to the extent that a decision-making process that has the input of both airports and their users is more efficient than a decision-making process made only by the airports; however, this benefit is, of course, not infinite, and must be traded off against the costs just described.

The implication of all this for a bundling strategem is that – much as in political log-rolling – there is an additional efficiency gain: namely the parties can take into account the tradeoffs between different proposals and engage in a form of indirect bargaining whereby airlines which gain from proposal A but not B can compromise with airlines which gain from proposal B but not A. This can reduce the transaction costs of reaching agreement among the parties. Consequently, the mere fact of project bundling ought not to be taken as problematic.

3.2.2 Hold-up

Where approval of the new investment ultimately rests with the airport, the airport may refuse to make (i.e. “hold-up”) necessary investments unless they are funded by a cost pass-through or upward adjustment to the price cap.

The airport may be able to engage in this regulatory arbitrage subtly and thus minimise the risk of regulatory intervention, making its hold-up threat more credible. Even faced with a quality of service guarantee of some sort, there may be sufficient scope for the airport to under-provide quality related to those facilities which are under the price cap. This scope for underprovision despite minimum quality standards can arise from the intrinsic difficulties of measuring and specifying quality levels in great detail. The costs to airlines of enforcing standards may be high, making them more or less vulnerable to conduct of this type.

The possibility of airlines holding up investments can also arise where approvals for new investment are subject to private negotiation between the airport and a group of airlines. If approval of investment is subject to agreement among the airlines, then an individual airline may refuse to approve an investment unless the airport (or the group of other airlines) makes some pricing or other concession to it. An airline's ability to extract such concessions will depend on its bargaining power relative to

that of the airport, and other airlines. Unanimity requirements for airline approval are conducive to this type of holdup, even by small airlines.

While incumbent airlines may try to block entry-facilitating investments, the smaller entrant airlines may, notwithstanding their relative lack of market power, paradoxically have stronger bargaining power to the extent that the larger airlines actually have more to lose from the hold-up of investment. The larger airlines have more to lose if the group does not come to an agreement on what investments to pursue because they have a larger business to run and therefore face higher losses to their business and/or costs the longer the delay to necessary investments and the more inadequate these investments are to the needs of their business. This means that the smaller airlines can band together to 'hold up' investments unless they get concessions from the larger airlines. The ability of the smaller airlines to expropriate the larger airlines is greater the 'tighter' the agreement rule i.e. the closer it is to unanimity. This is the familiar problem of the "exploitation of the large by the small" classically analysed in the context of alliances that supply quasi-public goods.¹⁴

However, a worst case scenario is where the airport 'calls the bluff' of the airlines by deciding not to go ahead with the investment at all, even though the investment might in the long run prove beneficial to the airline club as a whole.

These particular manifestations of opportunistic behaviour leading to a hold-up are simply part of a more general likelihood of a hold-up problem occurring where the bargaining process is not structured properly. This possibility was already alluded to in the previous discussion of bundling, in particular, of the benefits of bundling stratagems in facilitating some forms of indirect trades which minimise the transaction costs involved in getting parties to agree. This suggests also that a bargaining process that allows multiple issues to be treated simultaneously is likely to reduce hold up problems.

Even in the case where all parties bargain in good faith, frequent hold-ups may occur if the rule for coming to agreement is set too 'tightly' e.g. where the rule is that a particular proposal may only be approved where approval is unanimous. If the agreement has to be unanimous, then each party is given a veto right over the investment. That right has a value, and the expectation is that each party will want to obtain that value. It may be that each party's attempt to secure that value reduces (arguably to zero) the worth of the veto that has been provided; but it is by no means clear that the equilibrium that will emerge from this situation is such that all efficient projects will proceed.

The issue is a familiar one in public finance, where it has been most closely examined in the context of decentralised mechanisms for the supply of public goods.¹⁵ In essence, a tight approval requirement (such as a unanimity rule) internalises to each agent the consequences of agreeing or disagreeing to supply, and hence can ensure that each agent faces the correct price signal in taking the approval decision.¹⁶ Under this circumstance, only Pareto-enhancing proposals will be accepted. However, while

¹⁴ See Mancur Olsen The Logic of Collective Action (1965).

¹⁵ The classic treatment is by Nobel Laureate James Buchanan in The Demand and Supply of Public Goods (1968); see also John Head Public Goods and Public Welfare (1974).

¹⁶ This is the basic rationale underlying the Wicksell-Lindahl argument for near-unanimity requirements as a basis for decision-making about public good supply.

Pareto efficiency will be a **necessary** requirement under this decision rule, it will not be **sufficient** to ensure that approval occurs. This will be the case whenever there is some heterogeneity among decision-makers and more generally where there is scope for any one decision-maker to secure benefits for itself at the expense of others (say by being allocated a lower share of the costs of the public good). While rules such as that requiring all parties to bear equal cost shares¹⁷ can address this problem, they then typically create other inefficiencies.

3.2.3 Cheap-riding

While involvement by the airlines in the investment decision-making process may result in better quality decision-making because of the additional knowledge and perspectives provided by the airlines, strategic behaviour through cheap riding may undermine this. Cheap riding, a phenomenon related to 'free-riding' occurs in any collective decision-making process where one or some of the parties understate the value (to them) of the project being considered in order to reduce the amount they may subsequently have to contribute to its funding or to avoid contributing at all. The ability to cheap ride presupposes a method of recovering contributions toward specific investments differentially between the beneficiaries. In many cases uniform pricing rules may preclude this. Cheap riding incentives may lead to either under-investment in particular facilities or to some airlines bearing disproportionate costs compared to others.

Cheap riding opportunities are not solely available to airlines. It is important to recognise that the airport owners, while vertically separated from the retail layer in aeronautical services, are vertically integrated with respect to retail space at the terminals. This aspect of vertical integration has given rise to an allegation by BARA that Sydney Airport Corporation Limited has 'free ridden' at the airlines' expense in the SA2000 Project. BARA's 30 November 2000 submission to the ACCC regarding SACL's draft pricing proposal notes, at page 18, that the SA2000 project, intended to increase the number of terminal gates and increase the amount of retail space at the International Terminal, has resulted in a 66% increase in retail space and only a 17% increase in terminal gates. The airlines have been asked to contribute 62% of the funding for that investment. BARA identified alternative investments which would have created a greater increase in terminal gates and lounges at lower cost to the airlines.

3.2.4 Forced-riding and Raising Rivals' Cost

The classic example of forced riding is where a pacifist might object to the spending by his/her government on defence, but is forced to go along for the ride and suffer the perceived disbenefit of an enlarged national military capability.

A concrete example of forced riding in the case of airports may be less clear because a free-rider's 'victims', the expropriated, are similar to forced riders. However an analogous situation might arise if it is decided that airport investment plans are to be formulated and approved subject to agreement between the airport and airlines. In this setting, one instance of forced riding would be where an airline operating solely domestic flights and which therefore had nothing to gain from customs facilities was

¹⁷ Analytically, equal cost shares with majority voting has properties similar to a unanimity rule in respect of homogenous populations of decision-makers.

obliged to take part in negotiations and eventually contribute to the funding of investments to upgrade customs facilities.

More generally, in the absence of a unanimity rule, heterogeneity of interests can create scope for some degree of forced-riding. Thus, airlines with a limited interest in particular investment projects may find themselves burdened with some share of the cost of those projects, effectively redistributing producer surplus among competing airlines.

Forced-riding can be especially problematic if it is strategically used for anti-competitive purposes. For example, if bigger airlines can bear higher charges than smaller airlines because they are better resourced and enjoy economies of scale and scope, they may favour investment projects which are disproportionately burdensome for small airlines and which disproportionately raise small airlines' costs - even though the investment increase the costs of all airlines.¹⁸ Moreover, all else being equal, demand for the services of airlines with small market shares will be more price-elastic than demand for the services of airlines with larger market shares, allowing the larger airlines to more readily pass on any increase in costs.¹⁹ The bigger airlines are also likely to have more bargaining power under almost any agreement rule between the airlines which could be defined. Thus, they might perceive an opportunity to impose an additional cost burden on the smaller airlines, in turn affecting price-setting behaviour in downstream markets, by voting in favour of very large capital investments which lead to increased aeronautical charges.

3.2.5 Barriers to airline entry

Similarly, the large airlines may also expropriate the smaller airlines by voting against entry-facilitating investments which would have created a more level playing field between the larger and smaller airlines.

Where the airport is the sole authority for formulating and approving investment plans (subject to the agreement of the Minister), it may fail to take fully into account the need for investments which facilitate entry of new airlines. The airport may have difficulty in recouping sufficient incremental revenue to justify a socially efficient level of entry-facilitating investments. Such investments might include common user gates, departure lounges and common user executive lounges, for example.

Failure by airports to take the full advantages of entry into account will most obviously occur when the largest part of the benefits of entry will accrue to final consumers in the form of reduced prices or improved service quality.

Even if the airport did have incentives to undertake entry-facilitating investments, these investments might be vetoed if they require agreement between incumbent airlines and the airport. The existing airlines, small and large, would have very little incentive to agree to the provision of facilities which would facilitate entry to the market by airlines who are not yet members of the club.

¹⁸ Similarly, Oliver Williamson (1968) has shown that efficient firms may favour high wages because, even though it increases their own wage bill, it puts less efficient firms at an even larger cost disadvantage so that industry wide wage increases can be used as a strategy to raise rivals' cost. See Oliver Williamson, "Wage Rates as a Barrier to Entry: The Pennington Case in Perspective," *Quarterly Journal of Economics* 82 (1968), pp.85-116.

¹⁹ Thus, in a Cournot model with firms with varying market shares, the firm-price-elasticity is a decreasing function of the firm's market share.

The incumbent airlines would perceive a loss of profits from agreeing to fund new open access facilities. Thus, even if the airports have an incentive to provide these facilities, the airlines would resist. Depending on how the agreement rule is formulated, the airlines would be able to veto the investment proposal, possibly leading to socially suboptimal competitive entry by airlines.²⁰

3.2.6 Suboptimal provision of club goods

Where formulation and approval of investment plans is made solely by the airport, it may face insufficient incentives to invest in club goods which provide benefits primarily to airlines. When investments are subject to agreement between the airport and airlines, one might expect the airport to place greater emphasis on benefits to the airlines. However, suboptimal provision of club goods may also arise regardless for two reasons.

Firstly, investments in quality may be vetoed by the airlines if they pertain to facilities for which there is no passenger perception of airline responsibility. For instance, there may be 'un-branded' processing facilities common to all airlines. Individual airlines might not suffer any reputational effects from the poor quality of these facilities, even though customers might suffer disamenity. Moreover, each airline might not be able to fully capture any benefits its customers obtain from service quality improvement. Although all airlines might suffer in the long run from inadequate investment in those facilities, none may then have an incentive to accept the added costs.

Secondly and similarly, there may be services or upgrades of particular facilities that are not valued strongly by airlines, but which would be valued by passengers. The demand impacts of not providing these services or appropriate upgrades may be very low for individual airlines, compared to the costs which these airlines would incur. Thus, provision of these services or upgrades to sufficient quality levels may not arise out of user input or consultation. Furthermore, even if the airports want these services or upgrades to be provided and have the incentive to do so because they have a longer investment time horizon, the airlines may be able to either reject these investment proposals altogether or hold out for a lower charge which the airport owner may then not have sufficient incentive to agree to. The end result is the under-provision of these necessary services or facilities.

²⁰ Of course, if there are fixed costs to the business of supplying airline services, entry into market may be excessive from the social point of view. In other words, a competitive equilibrium could involve excess entry. This possibility does not however justify the type of conduct discussed in the text, which is very unlikely to result in a socially efficient entry tax.

4 The main options for providing additional incentives, where needed

Section 3 has set out the scope and nature of the problem to be considered – namely the need to overcome the approval problem when funding outside the price cap is required for additional investment. There is also a question as to whether “high powered” or “low powered” price regulation should be applied to the additional revenue. This section sets out a range of possible incentive mechanisms for addressing the challenges outlined in **Section 3**.

In brief, the alternatives considered here are:

- 1) Status quo: regulator approval, cost pass-through
- 2) Price cap parameters set on basis of expected investment requirements
- 3) Project Control Group approval process, cost pass-through
- 4) Project Control Group approval process, adjustable X

Before explaining these alternatives, several points should be emphasised. Firstly, there will be a range of investment situations where existing price cap arrangements should remain in force, and no additional funding should be provided to the airport. These include:

- “maintenance” investment
- cost-reducing investment
- capacity enhancements which are likely to be self-funding without changes to current prices
- investment to meet Government-imposed standards which were anticipated at the time the current price cap was set.

Secondly, necessary new investments with purposes other than those listed above should be funded by permitting the airport to earn additional aeronautical revenues, subject to an appropriate approval process. For simplicity, we shall call these investments the ‘incentive-dependent’ investments, because they would be unlikely to proceed in a timely fashion without financial incentives for the airport. Such investment purposes would likely include:

- quality enhancements
- capacity enhancements which are unlikely to be self-funding without changes to current prices
- investment to meet new and unanticipated Government standards.

Thirdly, the four alternative incentive schemes listed above represent points on a two-dimensional grid, as they represent combinations of two different approval processes, and two different methods of price-regulating the additional revenue, as the table below illustrates:

	Regulator approval	PCG approval
ROR cost passthrough	Status quo	PCG approval, cost passthrough
CPI-X parameter adjustment	Expected investment requirements	PCG approval, adjustable X

4.1 Status Quo

The first alternative incentive mechanism to be considered is the status quo, which involves funding of incentive-dependent investments through rate of return cost pass through, subject to regulator approval. The regulator must consider the degree of user support for investments, amongst other criteria, before permitting cost passthrough.

The incentive mechanism is known as the ‘new investment cost pass through’ regime and is provided for under Direction 13 of the PSA 1983. Direction 13 allows an airport operator to increase charges at a rate in excess of CPI-X where it seeks to recover the cost of ‘necessary new investment.’

The cost passthrough approach employs a form of rate of return regulation rather than price cap regulation. If the additional investment were funded by an upward adjustment of the price cap, the average level of aeronautical charges would be adjusted upwards to contribute to funding the investment. A price cap adjustment would place the cost risk of the investment with the airport. Under a rate of return cost passthrough, however, any cost overruns from the investment (either in the construction or later operation stages) would be borne by the airlines. Thus cost passthrough, like all rate of return regulation, imposes less financial discipline on the regulated firm though it protects the firm from exogenous cost shocks.

Assessment of new investment proposals is a two stage process. The first stage goes to the question of whether the proposal qualifies as a ‘necessary new investment’. The second stage then assesses the specific proposals which satisfy the ‘new investment’ test against the relevant criteria (listed below). Assessments are performed by the ACCC.

With respect to the first stage of the test, the ACCC’s ‘Position Paper on New Investment Cost Pass-through’ provides some guidance on how the ACCC would decide whether a proposal qualifies as a necessary new investment.

To interpret the term ‘necessary new investment’, the ACCC accepts the standard definition of ‘investment’ as ‘an increase in fixed durable inputs or capital.’ User support is considered an important, but not always conclusive, indicator of an investment’s necessity. Interestingly, the ACCC states in its position paper that the presence of user support for an investment, including the associated charges, is a useful indicator of a project being ‘new’. Weight is also placed on user agreement in the second stage evaluation when the investment which qualifies as ‘necessary new

investment' is then assessed against a set of criteria. In the context of the first stage, the ACCC sees user support as leading to a presumption that the investment is a 'necessary new investment.' This interpretation is supported by the ACCC's statement that²¹

Where there is no user support the Commission will refer to an economic approach to distinguishing between 'new' and other types of investment.

In other words, the ACCC really only starts to apply an evaluation at the first stage in the absence of user support. Otherwise, the airport is virtually guaranteed of passing the first stage of the test. However, the ACCC does not precisely define what is a sufficient degree of user support at either stage of the evaluation.

As for the rest of the test which it applies in the absence of user support, the ACCC defines new investment as a change in fixed durable inputs that does not simply seek to replace natural degradation of capital. On this basis, it concludes that an expenditure is 'new' investment if it is not merely aiming to replace capital that has degraded naturally, whether through exposure to the elements, or through wear and tear from continual usage. In contrast, replacement investment is expenditure that merely aims to maintain the pre-existing levels of capacity and quality of the facility.

Once the investment proposal qualifies as a necessary new investment, it then goes to the second stage test where its specific characteristics against a set of criteria reproduced below from the 'Guidelines for assessing proposals to increase charges to recover the costs of necessary new investment' under Direction 13:

(6) The ACCC is to use the following criteria to guide its assessment of proposals to increase charges for declared aeronautical services at a rate in excess of the CPI-X cap as a result of necessary new investment:

(a) the operator's plans for new investment or service innovation and the associated costs;

(b) the relationship between the proposed increases in aeronautical charges and the costs (including the level of rate of return) of the new investment or service;

(c) support from airport users with a significant interest in the investment for the operator's proposals, including in relation to charging changes;

(d) contribution of the new investment/service to productivity improvements at the airport;

(e) overall efficiency of the airport's operation;

(f) the particular demand management characteristics of individual airports, including any demand management schemes in place, capacity constraints and any under-utilisation of airport infrastructure;

(g) airport performance against quality of service measures, including services under the control of the airport operator;

²¹ ACCC ,*New investment costs pass through*, Position Paper, April 2000, p. 4.

(h) airport performance vis a vis other Australian airports and any comparable international airports; and

(i) the extent to which the proposed investment will facilitate the operations of new entrants to domestic or international aviation.

Note that some of these criteria seem to be tailored to address the strategic behaviour problems discussed earlier, e.g. criterion (i) which requires the regulator to consider the entry-facilitating aspects of the investment. What is more significant is that criterion (c) relates to user support for the investment.

It can be suggested that given the inclusion of the user support criterion in the guidelines, there is some overlap between the status quo incentive mechanism and an investment mechanism which involves agreement between the airlines and airport as is the case with the PCG mechanism - indeed the PCG mechanism grew out of the existing necessary new investment regime and one of the considerations of this report is to what extent it can or should become a formal requirement under the investment approval process.

4.2 Expected investment requirements

Under this incentive mechanism, price caps are adjusted at the start of each price cap review period, based on information provided by all affected parties, including the airports themselves, regarding anticipated investment needs. The difference between this approach and the status quo is in essence a sequential one.

Under the status quo approach there is a periodic review of price caps every 5 years and the essential parameters in the price cap, namely the X factor and p_0 , are adjusted based on the ACCC's analyses of the airports' projected demand, costs and expected productivity improvements and economic performance. However, additional 'necessary new investments' i.e. capital expenditure plans which the airport may formulate in between review periods are separately provided for through the process discussed in the previous sub-section.

By contrast, under the expected investment requirement approach, the investment needs of the airport are anticipated and provided for under the price cap set at the beginning of each review period. This price cap would not be altered until the next review period.

Whatever bargaining takes place between the regulator, airport and airlines does so at discrete points in time, towards the beginning of each price cap determination, when each of the interested parties has an opportunity to present submissions, just as they currently do. As in the status quo, a price cap review under the expected investment requirements approach would not explicitly provide for any private contractual dealings between the airport and airlines though the negotiation over investments may take the form of negotiations over price cap adjustments, in which the airport and airlines attempt to influence the regulator's decisions through submissions, information and the commitments they make. Enforcement of such commitments is informal and tacit (i.e. the regulator may retaliate against broken commitments in the next review).

The expected investments approach raises the stakes during each price cap review, since many of the investment funding issues must be resolved at that time.

The expected investment requirement approach is the general approach adopted by the UK towards most of its regulated utilities and transport infrastructure, including airports. It is worth outlining briefly how this approach works in the UK to better illustrate it.

Under the *Airports Act 1986* the UK's airports regulator, the Civil Aviation Authority (CAA) has to reset price caps on airport charges generally every five years at airports designated by the Secretary of State. The airports currently designated are Heathrow, Gatwick, Stansted and Manchester. Before it can set a price cap the CAA must, consistently with the *Airports Act*, make a reference to the Competition Commission unless the Secretary of State directs otherwise. The reference asks the Commission to report on what the maximum limit on airport charges for the following period of five years should be, and whether, since the date of the previous reference, the airport has pursued a course of conduct contrary to the public interest. The maximum amount calculated incorporates a projection of the airport's capital expenditure needs over the five years. The projection is ultimately determined based on the regulatory agencies' weighing up of the evidence, submissions and information provided by the affected parties.

The extent to which the projected capital expenditure is actually fulfilled will be monitored so that the process can be improved, and in order to ensure that the airports are not extracting rents due to a mis-calculation of the projections and/or misrepresentations by the airports.

For instance, in the CAA's March 2000 report, *BAA London Airports: A regulatory report*, the CAA justifies the price cap set for 1997 to 2002 as follows:

The current price cap set for the BAA London airports for 1997/98 to 2001/02 was set by the CAA in 1996 following recommendations set out in the 1996 MMC review. An important factor influencing the price cap was BAA's projected capital expenditure programme. Not only was the price cap set to allow a rate of return on assets reflecting BAA's cost of capital, the price cap adopted explicitly allowed for an element of pre-funding of the large capital costs of Terminal 5. Reflecting the importance of the capital expenditure projections in setting the price cap, the CAA decided to monitor BAA's actual capital expenditure over the quinquennium, and to monitor changes to the capital expenditure programme as it developed over time.

The regulator's comparison of the initial investment plan with the actual investments made by the airport over the period between regulatory reviews is thus of great importance to the efficient working of the expected investment requirement approach. However, there are also difficult ambiguities involved in the use of such information as the CAA's following comment in the report points out:

There may be many reasons other than poor incentives why a regulated company's actual investment might differ from investment planned at the time the price cap was set. There may be unforeseen developments or constraints, better means of delivering an output may be established, or the company may simply coax more efficiency gains from the programme. It is one of the benefits of price cap regulation that the company is rewarded for generating efficiency improvements. Consequently the regulator should

have no general presumption that deviations from planned capital expenditure are undesirable. However, given the importance of the capital expenditure plan to users and for setting BAA's price cap, it is important that changes in actual investment, and changes to the investment plan are clearly documented and transparent to users and the regulator.

Reliance on the price cap alone creates obvious risks when the price cap is set with error, and when there are long periods between price cap reviews. In those circumstances, allowing some contracting for new investment supplemental to the cap may reduce the costs the regulator would otherwise cause when setting the cap too tightly. However, it is equally clear that having several alternative means of assessing and determining price and revenue ceilings can induce inefficient and ultimately costly forms of regulatory arbitrage.

4.3 PCG approval process

The 'Project Control Groups' (PCG) approval process has been trialled by the Brisbane Airports Corporation Limited (BACL), as noted in its recent cost pass-through application²². Essentially the PCG process involves consultation and implicit bargaining between the airport and users in order to cement agreement on the details of the investment proposal. The investment proposals were then assessed by the ACCC according to the 'necessary new investment' guidelines discussed previously.

The ACCC envisages the PCG approach as used in the BACL application, being used to the fullest extent in²³

- the design stage of projects, considering input from airport users and the operator prior to the development of costing;
- assessing the costs of projects and reaching agreement between user and the operator on the level of costs associated with the project; and
- reviewing the 'actual' cost of projects upon completion in order to determine the basis for any increased charges.

To highlight the specific features of the PCG approach it is worthwhile to compare it, as BARA has done in its 30 November 2000 submission to the ACCC regarding SACL's draft pricing proposal, to the consultative process employed by the FAC/SACL in developing the SA2000 project.

"The ACC Working Group meetings with the FAC/SACL were very different from the project control group ('PCG') process which has now been implemented at some of the privatised airports. The format of the ACC Working Group meetings usually involved a presentation by the FAC/SACL and the Project's builder, Civil & Civic, of works which had already commenced, or which were to be commenced very shortly, so that airlines had limited opportunities to provide comment and input. Airlines consistently criticised the quality of information provided by the FAC/SACL/Civil & Civic, however these concerns were rarely satisfactorily addressed.

²² ACCC, *Brisbane Airport: Proposal to increase aeronautical charges to recover the costs of necessary new investment*, Decision, April 2000.

²³ Ibid, p.20.

“Airlines were not properly consulted about:

- *the method of delivery of the Project which was adopted – a project manager/builder was appointed under a design and construct contract and, until mid 1998, the Project did not have a separate independent project manager; and/or*
- *the detailed design of the Project, including airlines’ preferences in respect of design options.*

“Additionally, airlines were not provided with details of actual cost or variance to budget, as detailed further below.”²⁴

The PCG approval process as implemented in BACL has set a useful precedent. The third alternative incentive mechanism being developed here builds upon a generic version of the PCG approval process which abstracts from the description in the BACL case.

The generic PCG approval process is based upon a standing group comprised of representatives of the airport and its users. It is important that there be continuity of membership at both the organisational and the individual officer level. This standing group can be contrasted to an ad hoc committee convened each time an investment decision is being considered. All airlines would be free to attend all PCG meetings.

The ACCC would have a continuing role in approving and scrutinising investment proposals, but it would be a requirement that proposals be subjected to the PCG process before the ACCC is asked to judge them. One issue which remains unsettled is how the agreement rule within the PCG would be defined (i.e. at what point do we say that the members of the PCG have agreed on the investment proposal?). Since the airport itself clearly forms one distinct party and the airlines another (because they have some substantial common interests notwithstanding any heterogeneity there may be between the members of the airlines group) this issue reduces to defining what the level of agreement between the airlines should be. However, this issue in turn leaves unresolved the issue of how the voting interests of the airlines should be weighted, if at all i.e. simply by having one vote per airline or weighting the votes according to cargo, freight, passengers, etc.

4.3.1 With cost pass-through

The PCG process as practiced in the BACL application was subject to the cost pass-through funding method of the status quo incentive scheme. This scheme, which involves allowing the airport operator to raise charges to fund the investment, has already been described above.

4.3.2 With adjustable X

Rate of return cost passthrough is not the only funding option. The airport could alternatively recover some of its new investment costs through an upward adjustment of the price cap parameters.

²⁴ BARA Submission to the ACCC regarding SACL’s Draft Pricing Proposal, 30 November 2000, p. 16.

Unlike the expected investment requirements approach, the ‘adjustable X’ approach would involve making adjustments to the price cap parameters at various times within a single five year regulatory period. An adjustment might be made each time a significant new investment was approved which required additional funding.

The prospect of reviewing X more often overcomes one of the most problematic aspects of the expected investment requirement approach, which is unresponsive to changing circumstances except at five yearly review events. An ‘adjustable X’ could be employed to reduce prices if an airport reneged on promised investments, and this adjustment would not have to wait for the next quinquennial review.

Note that p_0 and X would only be adjusted to reflect significant new investments, not whenever cost or demand conditions change. It is necessary to maintain the rigour of a CPI-X price path in order to maintain the high powered incentives spoken of earlier. A first difficulty with this approach is therefore that of credibility: that is, whether the conditions under which the cap could be changed could be defined sufficiently tightly to prevent opportunistic behaviour by the regulator and gaming of the system by the regulated airport.

An additional objection might be raised that the administration of a moveable X could prove burdensome. To address that concern it should be noted that the relationship between the X adjustment and the investment cost would be based on algebraic expressions of the type developed above in section 3.1.1. If the X calculation is transparent, and it is sufficiently clear which investments form part of in the p_0 and X calculated at each period, then this approach should be capable of being administered efficiently.

5 Evaluation of investment incentive plans

Each of the incentive schemes discussed in **Section 4** can be evaluated on the basis of how successfully it achieves the objectives set out in **Section 2** namely

- i) Addressing the market power of the airports;
- ii) Providing the right signals for investment;
- iii) Relying on negotiation between users and service providers to the greatest extent possible;
- iv) Simplifying regulatory involvement in investment approval.

This section carries out such an evaluation for each of the options set out above, considering each of the criteria in turn.

5.1 *Status Quo*

Addressing the market power of the airports

All other things being equal, the airport has less opportunity to abuse its market power in deciding on appropriate investments, the greater the scrutiny put on its proposed investment plans and how it funds these investments.

Under the current incentive scheme, the ACCC approves the cost pass through by which 'necessary new investment' is funded using a two-stage test. ACCC scrutiny helps to ensure that the allowed cost pass-through does not simply provide an opportunity for the airport to exercise its market power by raising charges.

Supervision by the regulator can, at a cost, help guard against the following strategic behaviours:

- Bundling of necessary and unnecessary investments;
- Threats to 'hold up' necessary investments unless they are funded through the cost pass through.

Providing the right signals for investment

The status quo incentive scheme attempts to address the following problems through ACCC scrutiny –

- Inadequate investments in infrastructure which facilitates the entry of new airlines;
- Suboptimal provision of 'club goods' whose benefits are shared between the airport and airlines.

Though the ACCC, in its vetting of investment proposals submitted by the airports seems to have a 'negative' rather than a 'positive' role in investment decision making - it rejects inappropriate investments rather than micromanaging the plans made by the airports - there is some scope within the scrutiny process for these matters to be

taken into consideration. For instance, the Direction 13 guidelines recommend that in assessing proposals, the ACCC should take into account

(i) the extent to which the proposed investment will facilitate the operations of new entrants to domestic or international aviation.

However, the main problem with the status quo is that the regulator faces an information asymmetry problem. The regulator inevitably has less information about how best to invest and about the needs of airports users than the other parties. In addition, the greater the level of regulatory scrutiny, the higher the administrative costs of the system overall and the compliance costs of the airport.

In considering the extent to which the status quo incentive scheme provides the 'right' investment signals, one must also take account of the funding method used. As discussed earlier, funding an investment through cost pass-through (i.e. rate of return regulation) has different incentive effects than funding it by adjusting the parameters of the price cap.

Cost pass-through encourages a 'cost plus' mentality on the part of the investing firm - it will be significantly less motivated to pursue appropriate cost control and cost-reducing investments if its revenue is set to ensure a particular profitability target is achieved. On the other hand, given the low-powered incentives created by rate of return-style pass-through, investments in quality of service will not be discouraged under rate of return regulation, as they might have been under a price-cap system with adjustments.

Relying on negotiation between users and service providers to the greatest extent possible

The status quo incentive scheme does not have any specific provisions requiring that airports consult with users before formulating their investment plans. In that respect, the scheme falls short of encouraging negotiation to the greatest extent possible. A strictly private negotiation between the airport and airlines is not possible under the current legislative framework, which requires ACCC involvement.

An obvious contrast with this approach is the 'default price cap' approach being contemplated by the UK Civil Aviation Authority²⁵. Under the default price cap approach, the regulatory framework should provide for a default price cap related to a defined set of outputs only. Users who valued higher (or possibly lower) levels of service quality could reach agreement on a bilateral or multi-lateral basis with the airport for the provision of these different service levels outside of the default price cap. Facilities could also be contracted for outside of the price cap. The aim of a default price cap is to give airports and users a basis for entering into direct contracts for service provision, while providing parties with a satisfactory fallback position (the default cap) in the event that negotiations fail. As shall be seen, there are some similarities between this scheme and one requiring a formal consultative process between airlines and airports, though it is less 'hands off' because a role remains for the regulator to scrutinize the final agreement and take account of distortions introduced by the strategic behaviour problems discussed previously.

²⁵ Civil Aviation Authority, *Direct contracting between airports and users: A default price cap*, Consultation paper, February 2001.

None of this is to suggest that the status quo scheme discourages bargaining. Indeed, the PCG approval process, which is discussed below, grew out of the current scheme. The current scheme has a two stage test for assessing investment proposals. At both stages, account is taken of whether there is user support for the proposal. The ACCC is inclined to look more favourably on the proposal if the airport can garner agreement for it by the users. Thus, the current scheme does encourage some negotiation between users and service providers, though not to the extent of the private contracting envisaged in the UK default price cap idea.

Simplifying regulatory involvement in investment approval

The current regulatory regime imposes significant uncertainty and compliance costs, though not all of these relate to the incentive scheme itself. These costs are a result of the complexity and lack of transparency of the current approach. Firstly, there is a lack of transparency in the original calculation of the X factor in the normal price cap. This is likely to impose some uncertainty on the firm and to that extent hinder its planning abilities. All that is known is that the X factor is based on projections of productivity of the airport under regulation. It is not always clear which investments were taken into account in setting the initial X, and which were not.

Secondly, the current two-stage test may be unnecessarily complex and involve some unnecessarily high uncertainty and compliance cost for the firms. The guidelines which are involved in the second stage of the test are as open to interpretation as is the definition of NNI, which has been the subject of a great deal of analysis by the ACCC. The weighting to be put on each criterion in the guidelines is also open to debate.

One may wonder whether the complexity of current arrangements could be resolved by permitting the airport to recover costs of necessary new investment through adjustments to the price cap, rather than a direct cost passthrough. Overall little may be saved by this method, since the approval problem would be unaffected. In fact, as long as the calculation of the X factor is uncertain and not transparent, the relative advantage of cost passthrough funding is that it would be relatively more transparent. As things currently stand, if the incentive scheme involved an adjustment to X, then there would be difficulties since the basis for X has not been publicly disclosed in any detail.

On the other hand, the X factor is coming under review by the end of 2001 anyway. Thus, if the review leads to a more transparent calculation for X, this objection to substituting a price cap adjustment for the current cost pass through funding would disappear.

Overall, it is clear that the status quo suffers from administrative complexity, and that is a substantial weakness.

5.2 Expected investment requirements

Addressing the market power of the airports

The ex-ante nature of the price cap adjustment contemplated under this option creates opportunities for possible abuse of market power. This is because once the

price caps are adjusted for the long run to take account of the investment needs of the airport, there is often no guarantee, aside from reputation effects and hence credibility of undertakings made in the next review process, that the airport will make the appropriate investments. Instead it may simply pocket the price cap adjusted revenue and avoid the concomitant expenditures.

Whatever regulatory supervision exists under this investment scheme is conducted at long intervals (at each price cap review) rather than every time the airport proposes an investment. The reputation effects are important. The firm is aware that if it is granted a price cap adjustment at the beginning of each review period based on investments which it subsequently fails to make, it will decrease the chances of a favourable price cap adjustment next time.

Nonetheless, such indirect enforcement may provide insufficient discipline on the firm, especially since the regulator cannot always determine whether a failure to invest as promised was vexatious or justified by changed circumstances.

The regulator is aware that if it has under-estimated the actual funding requirements of the firm, then pricing behaviour which seems like rent extraction on the part of the firm (i.e. when the firm fails to make promised investments) may be driven by legitimate costs. As a result of this uncertainty the regulator may fail to 'punish' the firm (i.e. by reducing its price cap by a larger amount to compensate for the rent it has pocketed) for reneging on its investment commitments.

The regulated firm will also be aware of this uncertainty and its 'softening' consequences for enforcement and may even be motivated to 'feed' the uncertainty by making out a reasonable case that it was underfunded. The game playing between the regulator and the regulated firm may result in sub-optimal investment and the inability to extract proper commitments from the regulated firm.

The regulator's difficulties are compounded by the fact that the incentive properties of the cap may be weaker, the greater the regulator's reliance on detailed scrutiny of the firm's actual conduct in setting the cap at each review period. As a result, the regulator faces a difficult choice, as responding to the gap between anticipated and actual investment outlays makes the cap endogenous to the firm's decision-making process. Taken to extremes, such a responsive cap could become a form of rate of return regulation, providing only weak incentives for productivity improvement.

By the same token, however, a wholly unresponsive cap imposes substantial risk on the regulated firm. A priori, there is no reason to state that the economic costs of this risk are outweighed by the stronger incentives such a cap provides for productivity advance. Whether this is or is not the case will depend both on key features of the firm's environment (for example, the variability of its operating environment) and on the risk of regulatory error in setting the cap.²⁶

²⁶ Moreover, even if regulatory error is symmetrically distributed, the costs of error may not be – that is, the error function may be symmetrical without the loss function being so. In these circumstances, it is the shape of the loss function that is relevant to the determination of the optimal degree of responsiveness in the setting of the cap.

Providing the right signals for investment

The more ‘hands-off’ approach of this scheme means the regulator is less able to wield sufficient influence on the firm’s investment decisions. In particular, there is less of a guarantee under this scheme that the firm will invest sufficiently in infrastructure that facilitates entry of new airlines and in ‘club goods’. There is a positive incentive for the airport to skimp on investments once the new price cap is locked in.

Relying on negotiation between users and service providers to the greatest extent possible

The most obvious deficiency of an ex-ante price cap adjustment approach is that it does not facilitate negotiation between users and service providers, except perhaps at regulatory price cap resets. In this respect, the expected investments approach compares unfavourably even to the status quo scheme, which, though lacking a formal rule for user consultation, involves regulatory scrutiny of the investment plan. Under the ex ante approach, the regulator only has indirect influence on the airport via its possible response in the next price cap review. The ‘default price cap’ approach described above might provide the basis for an alternative form of ex ante incentive scheme which would facilitate negotiated outcomes.

Simplifying regulatory involvement in investment approval

The most obvious advantage of this approach is the simplicity and low compliance costs involved for the regulated airport. Assuming that the ex-ante mark-up calculated does not underestimate the funding needs of the airport, then the airport owner would not face any regulatory hurdles to making investments. Aside from the regular price cap reviews, it would not have to expend time and money on preparing an application to the regulator or in eliciting agreement for the investment proposal.

However, simplicity by itself is not a virtue. Given the other problems discussed above, it is doubtful that the benefits of simplicity outweigh the costs.

5.3 PCG approval process

The PCG approval process has been used by the Brisbane Airport Corporation Ltd to formulate a set of investment proposals which were the subject of a recent application to the ACCC²⁷. The PCG approach evolved as a refinement to the status quo incentive scheme. What will be considered here are the costs and benefits of amending the current incentive scheme to formalise a process resembling the BACL PCG concept as a requirement for assessing necessary new investment proposals which are to be funded outside the normal price cap regime.

The PCG process being evaluated here is the generic one described in **Section 4**. Both variations will be considered here – funding through cost pass through and the possibility, untried in practice, of funding through adjustments to the price cap parameters. Since both variations have in common the PCG approval process, this section shall be structured as follows:

²⁷ ACCC, *Brisbane Airport: Proposal to increase aeronautical charges to recover the costs of necessary new investment*, Decision, April 2000.

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- **Section 5.3.1** will evaluate the differences between the two funding sub-options in terms of achieving the relevant regulatory objectives;
 - **Section 5.3.2** will discuss the economics of the PCG approval process before evaluating its expected efficacy in meeting the objectives of regulation.

5.3.1 PCG approval process with cost passthrough versus PCG approval process with price cap adjustment

The schemes discussed so far have been evaluated as to how well they attain the regulatory objectives set out in **Section 2**. The two PCG variations have different effects only with respect to one of these objectives - **providing right signals for investment** – owing to their different funding methods.

The differences between PCG approval process with cost pass-through and the PCG approval process with price cap adjustment reflect the different incentive effects of cost pass-through versus rate of return regulation. As discussed, the former is potentially a low-powered incentive scheme whereas the latter is potentially a high-powered incentive scheme.

In particular, the cost pass-through encourages a ‘cost plus’ mentality on the part of the investing firm. Cost risks in the course of the investment can be passed through to the user. Here, the airport will be less motivated to pursue appropriate cost control.

In addition to weakening incentives for cost control, a cost passthrough method, discourages cost reducing investments relative to other investments for the reasons outlined in **Section 3**. On the other hand, investments in quality of service will not be as strongly discouraged under rate of return regulation as they would be if funding was provided via adjustments to price cap parameters.

The presence of an incentive scheme in the first place means that there is a relaxation of restrictions on the pricing behaviour of the airport. All other things being equal (and assuming demand is relatively inelastic), the general level of investments, whatever they might be comprised of, will be higher than otherwise. It should be noted that, under price cap adjustments, cost reducing investments which yield immediate revenue to the firm will be encouraged relative to investments in quality whenever the cap is binding. Enforcement of quality of service monitoring can help ensure that optimal investments in quality are attained even within the constraints of a price cap adjustment incentive scheme. Thus, once other policy instruments are accounted for, funding additional investments through price cap adjustments can have the double benefit of providing for the adequate levels of investments without encouraging a cost plus mentality.

One final consideration in favour of price cap adjustments is that since the underlying method of regulating market power is through price cap regulation, there may be greater benefits in terms of administrative simplicity and transparency in having an incentive scheme which is based on an adjustment to those price caps. However, it is worth re-emphasizing the concerns set out above with respect to “responsive” caps. These have the potential to degenerate into forms of income assurance for the firm, and may in any event induce gaming by the regulated entity.

5.3.2 The economics of the PCG approval process

Essential economic elements of the BACL approach

Abstracting from the Project Control Group approach used by Brisbane Airport Corporation Limited (BACL), two features have particular economic significance.

First, the Project Control Group is open to all airlines and involves itself very early in the development of investment proposals. Airlines are consulted in the design stage, and continue to participate through to the post completion review stage. This full involvement is economically significant because it works strongly to reduce the information asymmetry between the investor and the users of the investment. The ACCC's preliminary view in the draft BACL decision²⁸ was:

“BACL’s proposal for user involvement combined with the requirement for user support appears to give airport users considerable influence in determining the scale and scope of new investments by BACL. The Commission’s preliminary view is that there is limited opportunity for BACL to over-invest as part of its proposal.”

It should be noted that all of the incentive schemes considered so far involve user input into the decision-making process. However, the difference between the PCG approval process and its logical opposite, namely the expected investment requirements scheme, relates to how the user input is incorporated into the decision-making process.

In the expected investment requirements scheme, the regulator takes in submissions from the airports and airlines and then digests and interprets the submissions, thus coming to a conclusion. By contrast in the PCG scheme, what the regulator has to digest and interpret is a submission which would not have been produced unless it received whatever assent from the users is required by the particular PCG rules.

To put it simply, the preferences of the users are incorporated first hand rather than second hand. The PCG process dictates that the users are more directly involved in the decision-making process than they would be in the expected investment scheme. This is because the way that the PCG process is structured compels the airports to take greater account of the preferences of the airlines than they would in the expected investment scheme. In the expected investment requirements scheme, the airports also take into account the preferences of the airlines when designing their submission but primarily for the purpose of influencing the regulator's assessment of the relative merits of the proposals of airports and airlines to the advantage of the airports. It could be argued that there is within the context of the bargaining between the parties in the expected investment requirement scheme, more opportunities for game playing and for exploiting the information asymmetry of the airports and reduced opportunities for the airports and airlines to share their information in such a way that their use of their respective information advantages would more closely resemble the information advantages and incentives faced by a vertically integrated airport/airlines entity.

²⁸ Brisbane Airport Proposal to increase aeronautical charges to recover the costs of necessary new investment, Draft Decision, February 2000, p. 20.

Second, as the Project Control Group is a standing committee, rather than an ad hoc committee convened to consider one-off investment proposals, it has continuity of membership at both the organisational and individual officer level. This continuity is significant in light of game theoretic results that players of repeated games are more mindful of punitive responses in future rounds when deciding on tactics in a single round. In other words, the repeated character of investment games in a PCG context will tend to make the players more moderate and reasonable than they might have been in a one-off game.

It seems likely that these two features: reduced information asymmetry and repeated games, have contributed to the constructive outcomes which the ACCC has so far observed from BACL's use of the PCG approach.

Issues and tradeoffs which need to be addressed

The efficacy of the multiparty bargaining process required by the PCG scheme depends on the extent to which bargaining costs impeding the formation of mutually beneficial agreements and/or opportunistic behaviour can be reduced by design of the appropriate rules for the process. Among the most important rules which determine the efficacy of the process is the 'agreement' rule -- at what point do we say that the members of the PCG have agreed on the investment proposal formulated after consultation between the members which comprise the relevant airport and the users (airlines)?

Since the airport itself clearly forms one distinct party and would be the party actually involved in drawing up the investment plan (though subject to feedback from the airline representatives in the PCG) and the airlines another, this issue reduces to defining what the level of agreement between the airlines should be - how to specify what proportion of the airlines have to agree to the final investment proposal formulated after the PCG consultation process for it to be said that the investment has been 'approved' by the PCG? Resolving this issue also involves resolving the issue of how the voting interests of the airlines should be weighted, if at all i.e. simply by having one vote per airline or weighting the votes according to cargo, freight, passengers, etc.

We shall assume away the 'weighting' problem for the moment since regardless of whether the appropriate measure of the airlines' voice is cargo or passengers or freight, etc the problem of what the appropriate majority of airlines' support (whether weighted by cargo, passengers, etc) should qualify as approval by the airlines as a group remains.

An appropriate starting point is that only parties actually funding an investment have the right to vote on it, unless a proposal will directly disadvantage some of the non-funding parties. Another advantage of this design feature is that it alleviates the problem of 'forced riding'.

The 'agreement' issue then reduces to one of agreement as between the funding parties. We can define a 'tightening' of the agreement rule as one that involves moving it closer to a requirement of unanimity. By implication a 'loosening' of the agreement rule is one that moves it closer to a bare majority.

As the table sets out below, the relationship between the ‘loosening’ or ‘tightening’ of the agreement rule and the encouraging or discouraging of strategic behaviours is not a straightforward one. Though tightening the agreement rule can reduce some strategic behaviours, it encourages others.

Type of strategic behaviour	Can be reduced by
Bundling of efficient and inefficient investments	Tightening the agreement rule
Holdup threat by airport	Must be addressed by other means
Holdup threat by airlines	Loosening the agreement rule
Cheap riding by airlines	Loosening the agreement rule
Expropriation of small by large airlines by voting for large, unnecessary investments	Tightening the agreement rule
Expropriation of large by small airlines by small airlines holding up investments important to large airlines	Loosening the agreement rule
Expropriation of small by large airlines by voting against pro-competitive facilities	Loosening the agreement rule
Prevention of competitive entry by incumbent airlines by voting against entry facilitating investments	Loosening the agreement rule
Underprovision of club goods	Loosening the agreement rule

In a ‘small number’ bargaining situation which is most certainly the case in the context of bargaining between an airport and a handful of airlines, the incentive to engage in game playing is likely to be higher than when the bargaining involves a lot of parties. In particular, the probability of agreements constantly being held up is higher under these circumstances the ‘tighter’ the agreement rule is, leading to higher bargaining costs which have to be traded off against the benefits of reaching ‘perfect’ agreements which suit all parties. The greater tendency to hold-up (and thus also the expropriation of the ‘strong’ by the ‘weak’ i.e. in this case large by small airlines) arises because when there are only a small number of parties, each party expects through his own action to be able to modify the behaviour of other parties, possibly to his own advantage. On the other hand, in a ‘large number’ situation, each party will find the payoff from ‘gaming’ to be less viable. In this situation, each party will simply attempt to adjust her own behaviour to the behaviour of ‘others’ who are taken as a given because each party rationally expects that his own behaviour will not be able to have much influence on all the other parties’ behaviour.

When this inherently greater tendency towards ‘gaming’ in small number situations is combined with a unanimity rule the tendency towards gaming is exacerbated because each party has a more powerful ‘weapon’ – each party knows that his dissent alone is empowered to bring everyone back to drawing table whereas if the rule were loosened, then the threat of his dissent would be diluted depending on the extent of the loosening.

Addressing the market power of the airports

This PCG-based approach would be no worse than the status quo in protecting airport users from the airport owner’s market power. All price increases must pass through an approval process which involves both customers and the regulator. The

various strategic behaviours catalogued earlier can be addressed through this approach more effectively than in any of the other approaches considered. In particular, this approach offers several protections to smaller airlines and entrants, whose legitimate interests might otherwise be obscured by those of the larger airlines in the default price cap or expected investment requirement approaches.

Providing the right signals for investment

On the investment signalling score, the PCG-based approach would be no worse than the status quo as either will ensure adequate funding for necessary investments. In fact, the PCG approach may be superior in two respects. The intimate involvement by airport users in the initiation and development of investment proposals provides an opportunity for intense signalling between airport and users. Opportunities for strategic behaviour, which can obscure and distort some investment signals, would be greatly reduced using the PCG method.

Relying on negotiation between users and service providers to the greatest extent possible

The PCG-based scheme contemplated here provides for negotiation between users and service providers to a greater extent than any of the other schemes considered. It explicitly requires that a PCG comprised of airlines and the airport be formed and that it present a forum in which the following issues can be negotiated:

- the design stage of projects, considering input from airport users and the operator prior to the development of costing;
- assessing the costs of projects and reaching agreement between user and the operator on the level of costs associated with the project; and
- reviewing the ‘actual’ cost of projects upon completion in order to determine the basis for any increased charges.

Simplifying regulatory involvement in investment approval

The PCG approach should improve the investment approval process because it invites the airlines to express their preferences and explore tradeoffs with other players at an early stage of the decision making process. It also offers one important benefit for the regulator: the airlines and airports will have addressed a substantial number of the issues involved in formulating the investment plan before it is submitted to the regulator, making the regulator’s task a simpler one.

The airport may incur some upfront costs in setting up the PCG but once the standing group has been formed, given its continuity of membership, the benefits of a streamlined, non-adversarial process should easily outweigh any administrative costs imposed by consultative activity.

6 Conclusion

The challenge faced in designing an appropriate regulatory regime for airports is the common one of balancing monopoly power-curbing objectives with the objective of providing incentives for efficient decisions by the facility owner, including in terms of ensuring efficient levels of investment and not distorting competition between airlines.

The current airports regulatory regime uses price caps as a means of curbing the monopoly power of airports and deals with the investment problem by setting minimum investment standards. However it is also recognised that the incentive of additional revenue is needed to elicit some new investments in a timely fashion or at socially optimal levels, particularly those investments related to quality and capacity enhancement.

Whatever form this additional incentive takes it will ultimately have to be funded by increased user charges, whether through cost pass-through funding or adjustments to price cap parameters. This creates an 'approval' problem because the new investments funded through the additional incentive scheme should ideally involve the vesting of some approval authority with the airlines and/or the regulator so as to avoid abuse of process by the airports. The approval problem arises because bargaining prior to approval of new investment as between the airports and airlines and among the airlines themselves is likely to lead to the manifestation of the following strategic behaviours:

- Proposals to bundle necessary and unnecessary investments;
- Hold-up;
- Cheap riding;
- Forced riding and raising rivals' cost strategies;
- Barriers to airline entry;
- Suboptimal provision of club goods.

The following options for treating new investments under the airport regulatory regime have been canvassed:

- Status quo: regulator approval of investment with cost passthrough funding;
- Price cap parameters set on basis of expected investment requirements;
- Project Control Group approval process with cost passthrough funding;
- Project Control Group approval process with adjustable price cap parameter funding.

The options have been evaluated in terms of their ability to efficaciously meet regulatory objectives and deal with the strategic behaviours described. Each option represents a particular combination of one of two different approval processes, and

one of two different methods of price-regulating the additional revenue. The approval process adopted by each individual option (regulator approval or Project Control Group approval) is most relevant to the option's ability to address the strategic behaviour problems, whereas the price-regulation adopted by each option (cost passthrough or price cap adjustment) is most relevant to the magnitude of likely incentive effects induced by each option.

The Project Control Group approval process with adjustable price cap parameter funding arguably provides the best approach for treatment of new investments under the airport regulatory regime. However, the efficaciousness of this option will depend on the specific design features of the approval process, in particular striking the right balance between an agreement rule that tends towards unanimity and one that tends towards simple majority approval.