Airport Price Regulation: Rationales, Issues and Directions for Reform

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This submission is provided to the Commission’s Inquiry as a commentary by an expert rather than as a statement by an interested party. Professor Forsyth is uniquely placed to contribute to the debate on Airport Price Regulation by virtue of his long developed expertise and independence.
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Summary

• This paper deals with rationales for price regulation of Airports, how airport price regulation works in Australia, and how it can be improved.

• Price regulation lessens, rather than increases, the overall efficiency of airports. While not perfect, a private, unregulated airport is likely to perform better in pure efficiency terms than a regulated airport because of the efficiency costs of regulation.

• The dominant rationale in Australia for airport price regulation is one of eliminating excess profits from the use of market power. This is not strictly a distributional objective. It implies that, at least to a significant extent, that regulation must be cost based.

• For present purposes, it is assumed that price regulation will be implemented in Australia; the objective then will be to minimise its efficiency costs.

• Airports in Australia possess considerable market power, given the low elasticity of demand for their services and the lack of good substitutes.

• The “countervailing power” of airlines is a mirage; airlines cannot credibly threaten to leave airports because they do not have substitute sources of supply.

• Overall price levels are an insignificant determinant of efficiency at airports, though price structures are moderately significant. For busy airports, congestion is unnecessary, but capacity allocation mechanisms may be efficient or inefficient. Productive inefficiency is potentially a major source of efficiency loss at airports. Investment programs also pose significant problems for achieving efficiency.

• The New Zealand experiment with implicit or shadow regulation of airports provides no obvious lessons for Australia.

• Regulation, as applied in Australia, tends towards cost-plus regulation, and weakens incentives for productive efficiency. CPI-X regulation is essentially a format for regulation; it can be consistent with either incentive regulation or cost-plus regulation. In Australia it is becoming quite cost based. In its recent draft decision on Sydney airport charges, the ACCC proposed regulation of specified non-aeronautical services which is essentially pure cost-plus regulation.

• The problems with cost-plus regulation can be avoided or lessened through greater reliance on benchmarks or yardsticks when setting prices. These do pose measurement difficulties, but the primary reason regulators avoid them is because of their implications for profit volatility.
• With busy airports, regulated prices do not serve the primary allocation function; this is taken over by the slot allocation system.

• Price structures matter—weight related charges, which are encouraged by the current structure of the price-cap, promote inefficiency at busy airports such as Sydney. Price-caps can easily be redesigned to promote efficiency.

• Detailed involvement by the regulator in monitoring quality and approving investment is needed under price-caps. However, the ACCC’s approval of price increases for investment which adds to capacity is inappropriate, and more systematic and comprehensive investment criteria are needed.

• Actual regulated prices serve no major allocative role nor are they signals for investment. Price regulation can be made consistent with efficient investment signals, and with the efficient allocation of traffic between new and old airports (a problem which may develop at Sydney). Existing frameworks do not tackle this issue however.

• The dual versus single till issue is not a major one for efficiency, since there are several conflicting arguments for both approaches. However, the argument for a single till is weakest at busy airports.

• Airports do possess market power in some non-aeronautical services; prices for these cannot be entirely attributed to locational rents. It is possible to measure the extent of use of this market power. While this market power may be being exercised, this does not imply that regulation of it will improve efficiency.

• Airport price regulation cannot achieve the goal of “light handedness”. Unless important problems spawned by price-caps are ignored, the regulatory involvement must be detailed.

• Regulation of the non busy airports in Australia has so far been well designed. However the primary concern is that it will become too cost based, and will thus promote productive inefficiency. Greater reliance on benchmarks, and less reliance on costs, is essential.

• There is little to be gained from switching away from the dual till approach.

• Investment criteria need to be revised to eliminate the link between extra capacity and higher regulated prices, and to incorporate more comprehensive evaluations of investments, such as by cost benefit analysis.

• The regulation of busy airports such as Sydney poses several additional efficiency problems.

• Price-caps need to be redesigned to promote efficiency in the allocation of scarce capacity, not inefficiency as at present.
• Price regulation will need to be redesigned to promote efficiency in the choice of major investments, and to allow efficient allocation of traffic between old and new airports.

• The proposed half way house between dual and single tills at Sydney airport represents cost-plus regulation, and should be replaced.
I The Objectives of Airport Price Regulation

Introduction

In this paper, the rationales for price regulation of airports are examined, and ways to improve how it is done in Australia are explored. A critical look is taken at airport price regulation in Australia; how it is implemented, and what the challenges for the future are likely to be. The Issues Paper (Productivity Commission, 2001) identifies a broad set of questions, and the key ones are examined in this paper. We consider why airports are subjected to price regulation, what the problems that emerge are, and what can be done to improve regulation.

The question of why airports are regulated at all is examined at first. Naturally, this is related to the issue of market power. It is difficult to conclude otherwise than airports possess considerable market power, and that privately owned airports will use this power to charge high prices. However, while in this sense, market power may be abused, regulation may not increase efficiency. While regulation lessens some forms of inefficiency, it promotes others. If efficiency is the sole or major objective, an unregulated airport may perform best. It will, though, earn high profits, and this may be seen by decisionmakers as unacceptable. The objective of regulation then becomes one of removing excess profits; in reality, this will be the core objective of regulation. If this is so, and it has been decided that regulation will be imposed, the problem becomes one of designing regulation so that it achieves this objective at a minimum cost in terms of efficiency.

Much discussion of airport efficiency and regulation is ill focused, and tends to concentrate on relatively minor issues, such as whether there should be a single or dual till. The serious potential sources of inefficiency need to be identified to give guidance for reform. An important distinction which needs to be made is that between busy airports which are operating under capacity constraints (such as Sydney) and airports which have no significant capacity limitations (such as the other airports in Australia). These airports face different efficiency problems and should be regulated rather differently.

Granted that regulation is to be imposed, it is necessary to be aware of how it works, both in Australia and elsewhere. Typically, the reality of regulation is rather different from the intention- while the design of regulatory frameworks is couched in the language of “incentive regulation”, the actual implementation is much closer to “cost-plus” regulation, which has poor incentive properties. This is understandable since the objective of the regulation is to produce zero excess profit outcomes, in other words, result in prices which are close to costs. To this extent, it must be assumed that the actual application of regulation will not be costless, and that regulation will result in some inefficiencies, especially productive inefficiency. This poses the question of whether it is feasible to design regulation better, to lessen the reliance on cost and improve incentives for efficiency.

The ways in which price regulation interacts with several airport specific issues is considered. How can price regulation (which keeps prices down) relate to the effective
allocation of scarce capacity at busy airports? How can signals for investment in quality improvement be given? How can price regulation operate in the context of major new investments such as the building of a new airport, and the allocation of traffic between the new and old airports? The single versus dual till choice is another issue. Finally can airport price regulation be made light handed, or is it inherently detailed and intrusive?

In this paper, a distinction is made between airports which are busy and capacity constrained (such as Sydney) and others which are not capacity constrained (like all Australian airports other than Sydney). This is done because the efficiency problems which they face are different, and this calls for different structures of price regulation.

These issues are considered in this paper. The answers point to ways in which price regulation can be improved, especially where it is applied to busy capacity constrained airports. Some potentially interesting issues are not dealt with here. One of these is the long run scope for increasing competition between airports, for example, between the existing and a possible new airport at Sydney. Another issue not dealt with is that of environmental regulation is warranted and how it would impact on price regulation. The privatisation of Sydney airport is dealt with peripherally; for more discussion, see Forsyth (2001).

**Why Airports are Regulated**

Price regulation of natural monopolies is normally justified in terms of promoting efficiency. It is argued that a firm will possess market power, and that left to itself, it will exercise this power through charging prices in excess of costs. This in turn leads to inefficiencies in the form of the dead-weight loss of monopoly. Price regulation will lower prices so that they are closer to costs, and thus the dead-weight loss is lessened. Hence, there is an efficiency case for imposing this regulation.

This justification cannot be applied with any credence to airports. It is true that many airports possess strong market power, and that if they are privately owned, they will use it. There will be some efficiency loss as a result of this, but granted the ability of airports to practise quite fine price discrimination, this dead-weight loss will be quite small. By contrast, price regulation in itself will create problems for efficiency. In practice, all price regulation is, to a significant extent, cost-plus based, and thus it will reduce the incentives for the firm to achieve productive efficiency. Some loss of productive efficiency must be assumed to be present when firms such as airports are subjected to price regulation. In the case of airports, this loss of productive efficiency is most likely to outweigh any reductions in the dead-weight loss from the use of market power. This may be true for industries other than airports, but the efficiency case against regulation the airport context is particularly strong.

Price regulation of airports will lessen, not enhance, economic efficiency. If efficiency is the only, or primary, objective, the best solution will be to avoid regulating the airport. There will be some loss of efficiency, but this will be less than if the airport is regulated.
Access regulation could be implemented as a substitute for price regulation (see Forsyth, 1999). To achieve the same results, it is likely to be somewhat more cumbersome. The real difficulty is, however, that all of the problems which are encountered with regulation of the final price are also encountered with access regulation.

An unregulated airport will be a very profitable airport however. The airport will have the ability to charge high prices and thereby earn very high profits. The gainers will be the owners and the losers will be the airlines and their passengers. It is these distribution aspects which are of greatest concern to regulators and governments. Whoever the gainers and losers are, the regulator will be embarrassed if the firm it is regulating is earning very high profits; it will not be seen to be doing its duty. The de facto objective of regulation, in the airport context, is to redistribute income, and more specifically, to keep profits at moderate levels. In this paper, it will be assumed that a decision has been taken to subject airports to price regulation, in spite of its costs.

In the light of this, the issue for price regulation is not one of “how to regulate airports so as to promote efficiency”. Rather it is one of “granted the distributional objective, how can this be achieved at minimum cost in terms of efficiency?” An important related question is “is this distributional benefit worth the efficiency costs imposed by price regulation?”

**Distributional Impacts of Airport Regulation**

Airport price regulation will have the effect of reducing prices towards cost, and as such it will have distributional implications. Various parties will be particularly affected. Airport owners will be affected, and these may include governments – this is so in the case of Sydney airport. Airlines may be affected by airport prices, and their passengers may also be.

Where airports are not busy and capacity constrained, price regulation will primarily be to the advantage to airline passengers. Airport charges will, in the main, be passed on to passengers, especially if the airline industry is moderately competitive. Airline passengers will tend to be relatively well off, though with the development of low cost airlines and the expansion of air travel, this is increasingly less the case.

In the case of busy airports which are subject to excess demand, the beneficiaries of regulation will tend to be the airlines themselves (see Starkie, 2001, Kahn, 2001). They will be earning rents which accrue from their preferred access to scarce capacity. Final demand for travel to or from the busy airport will be equilibrated with supply through the air fares, and changes in airport charges will not affect the equilibrium fares. Airlines will thus be more concerned to keep airport charges down at busy airports such as Sydney than at airports such as Melbourne.

A further dimension which needs to be noted is the international dimension. Some of the users of Australia’s airports will be foreign nationals; foreign airlines use the airports, and foreign passengers use both Australian and foreign airlines. On the airport side, some airports such as Brisbane and Melbourne have substantial
shareholdings owned by foreign interests. When regulation lowers charges, foreign interests both share both the gain and the loss from this.

**A Distributional Objective?**

It is clear that regulation has distributional implications in that it shifts benefits between different groups in the economy. However, can we simply describe the preference for keeping prices close to cost as a reflection of a distributional objective on the part of the government? It is not quite so simple.

Typically in applied welfare analysis, when we talk of a distributional objective, what we have in mind is a situation in which the benefits or costs to one group is given a different weight from that given to another group. For example, consumers may be given a higher weight than producers, or rural consumers may be given a higher weight than urban consumers. Given these different weightings, the typical optimal solution to a pricing problem is to set prices differently from cost; perhaps higher, perhaps lower. Thus telecommunications services for rural services might be subsidised, and prices will be set less than cost.

In the airport regulation situation, it is not a matter of having some specified distributional trade-offs between the different groups. There is little by way of identifying who the gainers and losers are, and what their circumstances are. Rather, the objective is one of keeping prices close to costs, and one of avoiding supernormal profits. It does not matter who gains from the supernormal profits (private investors or governments), or who loses from them (airlines or passengers); the objective is to avoid them.

Thus the regulatory objective as it is applied in practice is not strictly one of achieving some specified distributional effects, probably at some cost in terms of efficiency. Rather it is a simple one of pursuing a pricing rule for its own sake; this rule has distributional implications, though they are not systematic. Regulators and governments may impose this rule for political reasons; it is not a rule which emerges readily from normal applied welfare economics.

**II Market Power, Ownership and Performance**

**Do Airports Possess Market Power?**

It is very difficult to escape the conclusion that most airports possess considerable market power. Most airports, especially those in Australia, do not face close competitors or substitutes for the services they sell. Sydney airport, for example, has a near monopoly on airport services in the Sydney region; those who wish to fly into Sydney must use it. There are substitutes for air travel, but they are hardly close; rail is not much of an alternative for inter-city travel, and there are practically no alternatives to air transport for international travel.
There is only very limited scope for competition between airports in a country such as Australia. Two airports might compete to be the base, and perhaps the hub, for new start-up airlines; Melbourne and Brisbane airports did when Virgin Blue entered. However, even with this competition, only a very small proportion of the traffic is up for competition, since the airports which airlines use are basically determined by the routes they wish to fly. Melbourne-Sydney flights must use both Melbourne and Sydney airports. Even in much more densely populated countries such as Britain, the competition between airports is quite limited. Luton competed vigorously to attract Easyjet, the low cost carrier; it offered low airport charges, for a limited time period. Once this was up, it sharply increased charges, and Easyjet had to pay. Luton would be more than willing to take some of BAA’s traffic away from it; however, in spite of massive excess demand for Heathrow, traffic does not switch from Heathrow to the much cheaper Luton. The two airports are simply not good substitutes.

At a particular point of time, competition for an airport may be very limited, but over time, competitors could emerge. This is hardly likely to be the norm, since approval to build new airports is typically next to impossible to obtain. Even with excess demand for Sydney, it would be exceptionally difficult to introduce a new airport, capable of competing across the product range with Kingsford Smith, into the Sydney market. Where existing airports have unused capacity, it would be hazardous for a new entrant to sink large amounts of capital into new airport capacity to compete with the incumbent, even when it has no difficulty in securing approvals to do so. In the medium to long term, some new airports can develop from old airports used for other purposes, for example when general aviation or military airports are switched to regular airline services. However, there is hardly an elastic supply of these in most cities.

Airports supply a service the cost of which is only a small proportion of the total cost of the final service. Airport charges would represent 5% or less of the total cost of operating airline services. A high proportional increase in airport charges will only result in a tiny proportional increase in air fares. Granted that there is no substitute for using the airport, this translates into a very low demand elasticity for airport services—i.e. considerable market power. Airports often deny they have much market power, but when proposing price increases, they always stress how even a high percentage increase will result in a small percentage increase in the price of an airline ticket, which will be hardly noticed by the traveller (SACL,2000). They do not appear to be aware of the inconsistency between these two assertions.

*Countervailing Power?*

It is sometimes maintained that airlines possess “countervailing power” when dealing with airports (for a critical discussion, see PSA,1995). Airlines are usually large companies, often much larger than the airport they are dealing with, and they can look after their own interests. Airlines can refuse to use an airport, and it might seem that as a result the airport would be in dire trouble, losing perhaps half or more of its customers. If Qantas, for example, were to refuse to use Sydney airport, the latter would appear to have major difficulties.
A little reflection should indicate how facile and insubstantial this argument is. If Qantas did switch out of Sydney, it would harm itself more than it would harm its protagonist, since most of its customers on Sydney flights wish to come to or leave from Sydney. Its competitors would immediately take the slack and provide Sydney flights, paying the airport the charges it demands. The countervailing power argument fails because it can only work if the airline has a good substitute airport to use; and it does not. There are no airports anywhere near Sydney that Qantas could use; using Canberra and bussing passengers to Sydney for Brisbane-Sydney flights is hardly an alternative to direct flights into Sydney. It is significant that in the heated debate over Sydney airport’s proposed more than doubling of airport charges, there was no serious suggestion that the airlines might simply refuse to pay, and take their business elsewhere. If a doubling of charges is not sufficient to induce airlines to use their purported “countervailing power” what increase in charges is?

Typically, when airlines have put pressure on airports, it has not been through the use of countervailing power as normally understood. Airlines sometimes put political pressure on airports, but this can only happen if the airlines have the political pressure to exercise. Very often they will have no particular political influence. Sometimes they will have some political clout, though it may not be the large airlines which have it. The small regional airlines have been able to ensure preferential access to, and prices for, Sydney airport by highlighting political sensitivities about rural problems.

Another form of power may be legal. Airlines which do not like what an airport is doing may take it to court. To do this, they must have a case; it is hardly sufficient to simply object to paying higher prices. In some situations, there may be opportunities for airlines to challenge what the airport is doing. This was done successfully by the US airlines when they challenged Heathrow airport’s charges; after a very long case, they won. Airports which practise overt price discrimination may risk litigation, and international air services agreements may open up possibilities for airlines to challenge what airports do. In some situations, airlines may be fortunate in that they have some avenues to legally challenge charges imposed by airport, but this is the exception rather than the rule.

Sources of Inefficiency at Airports

If efficiency is to be promoted at airports, or if the efficiency costs of regulation are to be minimised, it is necessary to be explicit about what these efficiency losses are. All too often proposals are made for airport regulation which go to considerable lengths to minimise one aspect of inefficiency, while at the same time, paying no attention to other forms of inefficiency which the proposals may well exacerbate. Here, both allocative and productive efficiency aspects are considered.

Price Levels

Allocative inefficiency will occur when prices are different from marginal cost; overall price levels may be too high or too low. This source of inefficiency is given some attention in the airport context; for example, when airports have ample capacity, the marginal cost of users may be well below the average cost, thus resulting is an
efficiency loss if cost recovery is achieved. With airports, however, it is unlikely that inefficient choice of price levels will create a large dead-weight loss. Demand elasticities are very low, and the efficiency cost of diverging from optimal prices will be small; furthermore, the price structure can be used to minimise the dead-weight loss. Hence, the choice of overall price level will have very low significance for efficiency.

*Price Structures*

Price structures are potentially more significant than price levels. For non-busy airports, the problem of cost recovery with minimum loss of efficiency can be resolved through adopting an efficient price structure. The weight-based charges of most airports amount to a quasi Ramsey price structure, which achieves minimum distortion (Forsyth, 1997). Very few users are dissuaded from using the airport, because users which are likely to have low willingness to pay are charged low prices. However, the price structure can also be quite inappropriate, and cause efficiency losses. For example, where weight-based charges are levied at busy, capacity constrained airports, an inefficient pattern of use is encouraged, because low value users are not rationed away in favour of high value users. This happens at Sydney and London Heathrow airports. Price structures are moderately significant as determinants of efficiency.

*Congestion*

When there is excess demand, and inadequate definition of the rights to use the airport at preferred times, congestion will become the rationing device. Queues will develop, as happens with many busy US airports. Since there is a real cost in terms of personal and aircraft time, this is the most inefficient way of rationing capacity; even an inefficient slot allocation system will avoid the waste of time (Forsyth, 2000). If congestion develops, it will be a very significant source of inefficiency. While more congestion is inevitable as the price for operating closer to theoretical capacity (Forsyth, 1993), in Australia it can be presumed that an allowable throughput is chosen and congestion will not be used as the rationing device.

*Rationing Excess Demand*

When there is excess demand for an airport, this excess can be rationed either efficiently or inefficiently. It could be rationed by price, though typically this is not the case, since market clearing prices could be very high for a popular airport (and this would conflict with the regulatory objective of avoiding high profits). It is possible to declare the capacity, in terms of slots, for the airport, and to ration these efficiently, for example by auctioning them, or promoting trading in a free market. In reality, slot allocation mechanisms fall short of the ideal, and embody some inefficiency. Grandfather rights to slots, coupled with limited trading, ensure that slots do not go to users which value them most. While the overall price level is (nearly) irrelevant as a source of inefficiency, since the bulk of the rationing task is absorbed by the slot allocation system, the price structure can matter. An inappropriate price structure, such as one based on weight, will allocate capacity to some relatively low value users—efficiency requires that all users pay the same price for the limited capacity. This
source of inefficiency is of low to moderate importance, depending on the airport and the nature of the slot allocation system.

**Productive Inefficiency**

Whatever the output that the airport is producing, it is desirable that it produce it at minimum possible cost, consistent with the quality of service being offered. A firm which is not forced by competition to minimise costs can allow costs to rise above the minimum. It may employ more staff than necessary, and it may overinvest. Related to this, a firm may fail to take advantage of commercial opportunities, thus resulting in higher cost service than could be achieved. Publicly owned and private regulated firms have often performed poorly with respect to productive efficiency, since they do not face strong incentives to keep costs at a minimum. Where it is present, productive inefficiency can be a very significant contributor to overall inefficiency. If for example, costs are 10% higher than they need by, this is likely to dwarf any deadweight losses from allocative inefficiency. Even though it attracts much less attention than other aspects of efficiency in the airport context (this may be being remedied with the benchmarking studies underway) it may be the most significant source of inefficiency in many cases.

**Investment Decisions and Quality**

In the long run, efficiency requires that the firm provide the capacity and quality which the users are prepared to pay for. Sometimes the firm will face incentives which lead it to adopt inefficient investment patterns. Rate-of-return regulated firms, and some publicly owned firms undertake excessive investment, and provide quality levels which users would not be prepared to pay for (gold plating, or, in the case of airports, marble facing). Price-capped firms have an incentive to undersupply quality, since, by doing this they can reduce costs with little reduction in revenue (Rovizzi and Thompson, 1992). They will also allow congestion to develop rather than invest in additional capacity. Achieving efficient investment patterns is a particular problem for regulated airports, since every form of regulation creates perverse incentives with respect to investment. The scope for inefficiency is greatest when entire new airports are needed; there is a distinct possibility that they will be built too soon or too late, and when they are built, there is the problem of allocation traffic efficiently between the old and the new airport. Investment problems can be a moderately significant source of inefficiency for airports.

**Benefits and Costs to Foreign Nationals**

The discussion so far has implicitly assumed that all benefits and costs from the operation of the airport accrue to nationals of the country. This is not the case. Foreign airlines will use airports, and both home and foreign airlines will be carrying passengers from other countries. When prices are increased, some of the cost accrues abroad, and when prices fall, some of the gains accrue to foreigners. Privately owned airports often have significant overseas shareholdings; this is true of the major privatised airports in Australia. If regulation changes the profitability of these airports, some of the gain or loss will accrue abroad.
This poses problems for applied welfare analysis. If only those benefits and costs which accrue to home nationals are to count for welfare calculations, measuring efficiency becomes much more complex, since it will be necessary to separate out the effects on home from foreign nationals. Price structures should become either explicitly or implicitly discriminatory, to increase prices for foreign users. This also could provoke retaliation from other countries in air services negotiations.

One approach is to analyse the options from the perspective of world-wide welfare, not just the welfare of the home country. Another might be to make an assumption that effects balance out, granted that both users and owners of airports in Australia include a minority of foreign nationals. This is a rough and ready assumption, which is not met in important cases, such as that of Sydney airport, which is fully Australian owned. What ever approach is chosen, the presence of foreign users and owners highlights the fact that statements on the efficiency properties of the different options cannot be made with any degree of precision.

Ownership and Objectives

Explicit regulation of airports usually comes about when airports are privatised, or at least, corporatised. The effects of regulation, or lack of it, depend on how the airport behaves. Behaviour, in turn, is linked to ownership.

A fully privatised airport, like other fully private firms, can be expected to maximise profits. This is an assumption made about firm behaviour in much of microeconomics. There may be exceptions to this, but it has stood the test of time as a working hypothesis. Firms are not all equally efficient or effective in maximising profits; some private firms seem more adept at losing rather than making money. Firms which have majority private ownership can also be expected to maximise profits. However, some airports have substantial government minority shares. It is possible that the objectives of government shareholders will differ from those of the majority owners, and there is scope for dissension. This is of particular relevance to airports, since several privatised airports have government minority holdings.

The objectives and behaviour of government owned airports are much more difficult to characterise. Invariably, profit is less important as an objective, though a corporatised airport will try to take advantage of commercial opportunities. Government firms may well go in for excessive investments (building monuments and marble facing), and they may be unresponsive to user requirements. They may promote employment objectives. Typically, government firms do not make large profits even when they can; they keep prices close to costs.

Several airports are owned by local government authorities (as is Cairns airport). Here again the objectives can be diverse. Some local government owned firms may indulge in monument building. On the other hand, a local government owner may use its airport to attract visitors to the region; if this is the objective, it will induce the airport to keep costs low and to keep prices in line with costs. It is also possible that some local governments will require their airports to maximise profits, so that they can use these to cross subsidise land rates.
It is only possible to be unambiguous about the behaviour of the privately owned airport; both central and local government owned airports can be expected to behave in a variety of ways. The private firm can be expected to make use of its market power; the government firms may eschew the use of market power, though they may also use it but convert profits into costs of one form or another. The potential case for price regulation of private airports is clear; the impact of regulation, and hence the prima facie case for it, is less clear for government owned airports.

The Unregulated Private Airport

One option is not to regulate privately owned airports at all. Genuinely unregulated airports would not be subjected to any form of price or rate-of-return regulation, whether explicit or implied. Probably there are no fully unregulated private airports in the world; airports in countries such as New Zealand are subject to the threat of regulation (see below) which will have similar effect to explicit regulation. How would an unregulated private airport perform in terms of efficiency?

The answer is, probably very well. Undoubtedly, its prices would be very high. It will have considerable market power, and it will have every incentive to use it. If it is not a busy airport, it will charge high price levels, but the dead-weight losses from these high charges will be minimised since it will be able to implement a very effective form of price discrimination, through size or weight related charging. If it is a busy airport, it will switch away from weight related charging to a charging system which rations the use of the airport by price. It will not be necessary for a slot allocation system to come into being, since the airport can profit from charging rationing prices. It will not allow congestion to develop, since congestion is a wasted profit opportunity.

The private unregulated airport will have a strong incentive to make the most use possible of its commercial opportunities. It will have some market power in non-aeronautical services, and it will use this. As a result, there will be some dead-weight loss associated with this. Private monopolies do not necessarily achieve a perfect optimum in their choice on quality level, but there are good reasons to expect that they will chose about the right quality (Spence, 1975). This will be so because they can convert an increase in quality into additional revenue, since users are prepared to pay higher prices for higher quality. The private airport will be willing to make investments which improve the service to users; such as an extension to a runway which lowers the costs faced by users, because these users will be prepared to pay higher prices.

The private airport will also have a strong incentive to minimise costs and to be productively efficient. Unnecessary costs reduce profits. Just as prices will be inefficiently high, the private monopoly airport will not make efficient choices when it comes to long run major investments in new capacity; rather it will have an incentive to hold off development, restricting supply and allowing prices to rise. However, the dead-weight loss from this may not be so much of a problem if it is able to price discriminate effectively; it will still be able to charge high value users high prices.
while adding to capacity, and thereby not losing the revenues that low value users can provide to it.

Overall, the unregulated private airport is likely to perform very well in terms of efficiency. The dead-weight losses from excessive prices are likely to be very small, and it is likely to perform well on most of the other aspects of efficiency. It will supply about the right quality, it will invest when appropriate, and it will produce efficiently. Not all firms which are privately owned firms perform as the theoretical model indicates; some fail to maximise profits and allow inefficiency to develop, or miss out on market opportunities. Granted that all forms of regulation create serious problems in terms of incentives to perform efficiently, it is very likely that the unregulated private monopoly will be the option most conducive to achieving efficiency.

Shadow Regulation in New Zealand

Currently, New Zealand is remarkable in that there is no formal price regulation of airport. Two airports, Auckland and Wellington have been privatised, though other airports remain in majority public ownership. Does the New Zealand experience provide any lessons on airport price regulation? Regrettably, the answer must be no.

The two airports have only recently been privatised, in the sense of transfer to majority private ownership. This occurred in 1998, after a period during which they had been corporatised and opened up to minority private shareholdings. These airports have an incentive to maximise profits, though there may be some break on this from minority local government interests.

Though they are not formally regulated, they are subject to the threat of price controls. The Commerce Commission could choose to implement price controls. What is more, the Commission instituted an inquiry into price regulation at about the same time as privatisation took place (Commerce Commission, 1999). This inquiry continues, making the threat of regulation a real one. The airports in New Zealand can hardly be regarded as “unregulated”; for this to be the case, it would be necessary for the government to have given a credible commitment not to regulate.

The threat to regulate is not the same as actual regulation, but its impacts on the firm may well be much the same. The regulated firm does not know what behaviour on its part will induce the regulator to impose formal regulation. One possible trigger might be its profitability; if the firm earns high or supernormal profits, the regulator may intervene. If this is what the airports believe, this shadow regulation would have the same effects as cost plus regulation. The incentive to keep costs at a minimum would be weak, since lower costs and higher profits will result in regulation being imposed. The inefficiencies created by cost-plus regulation will also be present with this shadow regulation.

The New Zealand approach to regulation cannot be regarded as light handed (Forsyth, 2001). In airports, as with other, industries, ambiguously specified regulation has led to litigation, which can prove highly costly. The best known example of this was the
Clear case, in which an entrant, Clear, sought access to natural monopoly facilities of Telecom NZ, so that it could compete with it. Extensive litigation followed, and some issues were finally resolved at the political level. This regulation is neither light handed nor transparent.

These are still early days with New Zealand’s shadow regulation of airports. It will be some time before any effects on productive efficiency are evident. The New Zealand experiment is neither clearly a failure nor a success; there is little, if anything, which can be learned from it.

III Regulation and Efficiency

Regulation and its Costs

The costs associated with rate-of-return regulation are well known. This regulation can induce the regulated firm to invest excessively, but more seriously, it weakens the incentives for productive efficiency. Because it is effectively a form of “cost-plus” regulation under which the firm gains little if it is able to reduce costs; the savings are passed on to its customers. Empirical measurements of the productivity of rate-of-return regulated firms indicated that they often performed very poorly in terms of productive efficiency.

The extreme opposite to cost-plus regulation is regulation which pays no attention at all to the firm’s own costs. If the allowable price is set entirely without reference to the firm’s costs, then it has a strong incentive to minimise costs; all of the efficiency gains are reaped by the regulated firm. This form of regulation is not costless; it imposes a considerable risk on the firm, and risk is costly. Since prices are not related to actual costs, there is a risk that prices will fail to cover costs and the firm will be driven into bankruptcy. A first best regulatory solution is not feasible. The second best solution will allow for some influence of the firm’s actual costs on prices; this could come about either through formal regulatory structures, such as sliding scale or profit sharing regulation, which incorporate costs, or informal structures such as price-caps which are revised taking into account actual costs. Once actual costs influence prices, the incentive to minimise costs are weakened.

CPI-X regulation, which specifies a price path for a period which is related to changes in general prices, was originally suggested as a means of getting away from cost based regulation (see Armstrong et al, 1994, Ch 6). As it is being implemented, in Australia and elsewhere, it is becoming more like cost based regulation such as rate of return regulation (see Gans and King, 2000). This is especially true when the end of the first regulatory period after privatisation comes up, and the price-cap must be revised. The first price-cap is normally set using the existing prices as the starting point; there is no specific linking of prices to costs. This is what happened when the Australian airports were privatised.
The challenge for regulation comes at the time of the first price revision, at the end of the first regulatory period. The regulator comes to a fork in the road, and must choose between two fundamentally different options. It can:

(a) Set a new price-cap for the next period with reference to the firm’s actual costs at the time of the review, or

(b) Set the new price-cap with reference to some external benchmark, giving the firm’s costs little or no consideration.

Regulators invariably choose the former. In doing so, they move the content of regulation towards cost-plus regulation. It is not surprising that they behave in this way. Choice of benchmarks is always difficult, and it is not simple to obtain adequate comparisons for the regulated firm. More seriously, if prices are linked to those of benchmark firms, more risk is imposed on the firm, since profits can become very high or very low.

This is a risk for the firm, but also a risk for the regulator. Regulators are regarded as having done a good job if they ensure that profits are kept at moderate levels. If profits are high, the regulator will be accused of being too slack, even though the profits may have come as a result of an unexpectedly good efficiency performance. If profits are low or losses are incurred, the viability of the firm- an essential utility- is threatened, and the regulator is blamed. This the regulator has a strong incentive to regulate so that the firm earns moderate profits. In effect, this means implementing cost-plus regulation.

Thus regulators tend towards regulation which embodies a high cost-plus element. This is possible within several different forms of regulation. For example, CPI-X regulation will approximate cost plus regulation if the periods are short, and prices are set close to cost at the time of the review. The firm will have more opportunity to keep some of the gains from efficiency improvements if the regulatory period is long, and if there is some efficiency carryover mechanism between periods.

It is important to be aware that the term “CPI-X regulation” nowadays refers more to the format of the regulation which is implemented rather than the content of that regulation. CPI-X regulation could be consistent with incentive regulation, in which the allowable prices are set with little or no reference to the firm’s actual costs. Alternatively, it could also be effectively a means of implementing cost-plus regulation; this would come about if allowable prices were revised frequently so as to enable a specified rate of return to earned on the firm’s asset base. CPI-X regulation and rate-of-return regulation are formally different, but they can be made very similar in implementation, through the choice of parameters and regulatory period. While it started out differently, CPI-X regulation is no longer necessarily “incentive regulation”.

In Australia regulators have been implementing regulation which takes the form of CPI-X regulation, but they have been doing so in ways which give considerable attention to actual costs. Indeed, the ACCC has recently proposed a regulatory structure which is tantamount to pure cost-plus regulation of non -aeronautical
services at Sydney airport (ACCC, 2001). Prices are revised with reference to costs at the end of each regulatory period. The heavy emphasis on costs has resulted in some regulated firms claiming that they are effectively being subjected to rate-of-return regulation (United Energy, 2000. See also Gans and King, 2000). There is every reason to expect that this pattern of regulatory behaviour will be replicated in the case of the Australian airports, which are currently subjected to CPI-X regulation.

This poses two issues for airport price regulation. The first is that if something like the current approach to regulation is maintained, it must be regarded as at least partially cost plus regulation. To this extent, the incentives for productive efficiency and efficient investment programs are considerably weakened, and that it is likely that regulation will lead to some loss of productive efficiency. This means that regulation will probably be quite costly in terms of efficiency. The second issue concerns the alternatives to cost based regulation; alternatives such as benchmark or yardstick regulation do exist, but is it realistic to expect that they can be applied to airports?

**Yardstick Regulation: the Perennial Bridesmaid?**

Yardstick regulation, or benchmark regulation, is always a promising form of regulation which is not quite ready for adoption. The essence of it is that the allowable price for a firm is set with respect to price or efficiency which is being achieved in comparator firms, not with respect to the firm’s own costs. As mentioned, the incentive properties of yardstick regulation are very good, though there are risks attached, since there is no certainty that the performance of the firm will closely match those of the selected benchmarks. It is possible to develop mixed regulatory systems, such as sliding scale regulation, in which the costs of the firm are taken into account also alongside the performance of benchmark firms when the price is being set; these mixed systems lessen the risks but they also weaken the incentives for productive efficiency.

The obvious problem with yardstick regulation is that of achieving comparability between firms. The conditions under which firms operate differ, and thus their measured performance will differ. It is possible to compare performance if these differences are factored in. Techniques such as data envelopment analysis and cost or production frontier analysis have been developed which enable efficiency comparisons between firms operating with different input and output mixes and under different conditions. However, any efficiency measures developed are sensitive to parameter values, and thus one should be cautious about reading too much into a measure for a specific firm.

Airports have proven particularly difficult to benchmark. There are studies of airport charges (Hague Consulting Group, 2000, Transport Research Laboratory, 2000), but these cannot be used unadjusted in regulation because input prices differ significantly between airports; an airport with low prices by international standards need not be particularly efficient, if it also faces low input costs. Airports tend not to be very similar across jurisdictions, since one airport may supply a rather different range of services from another, and differential reliance on contracting out services makes comparison difficult. Nevertheless, comparisons can be made, especially between
airports which operate in similar circumstances (for a North American study, see Gillen and Lall, 1997). For example, it is possible to compare the major airports in Australia, which face similar input prices and the differences between which are reasonably well documented, and thus can be standardised for (for a total factor productivity study, see Hooper and Hensher, 1997). Sufficiently reliable comparisons for regulatory purposes should be feasible.

Regulators have been unwilling to rely much on benchmarks when setting allowable prices. Typically, when a regulator is setting new prices for a period, it will comment that it sought out benchmark comparisons during its processes. It will state that it is very difficult to make meaningful comparisons between firms, but that more thorough analysis of benchmarks should be a priority for the next round of price setting (see, for example, ORG, 2000). By the time this next round comes about, little progress on benchmarking will have been achieved.

Possibly the real problem lies in the incentives which face regulators. As mentioned above, regulators are likely to be very risk averse, and they seek to keep the regulated firm’s profits at a moderate level, by relying heavily on actual costs. While yardstick regulation provides stronger incentives for productive efficiency, it involves more risks not just for the firm, but also the regulator. Ultimately, if a firm is to be regulated, the only way to improve incentives is to rely less on actual costs and more on external indicators, such as those obtained through benchmarking. Regulators are unwilling to make credible commitments to relying much more heavily than they do at present on external benchmarks.

A possible way around this may be to design the regulatory framework so as to give the regulator little discretion to disregard benchmarks. If the allowable price can only give a specified maximum weight to the firm’s actual cost, the regulator may have to rely on external criteria, including the best benchmarks that are available. This might be achieved by mandating a regulatory structure, such as a sliding scale framework. Simply legislating to require the regulator to “take due account of benchmarks” is very likely to prove ineffective.

IV Reforming Airport Price Regulation

Regulation and Efficiency at Busy Airports

An important question for busy airports is how does price regulation fit in with achieving allocative efficiency. This will be a specially difficult problem if the objective of the regulation is to keep profits low. The problem at busy airports is that market clearing prices will be high, and possibly extremely high, and they will lead to the airport being very profitable. This is one of the two major conflicts between the profit limiting objective of price regulation and the achievement of efficiency. (The other conflict concerns the role of prices in allocating traffic between airports, to be dealt with below).
The answer to this question is to remove the rationing role of prices. When the airport’s capacity is in excess demand, this can be rationed by higher prices. However, alternative rationing devices can be used, and the regulated prices will not have an allocative role. All that they may do is determine the extent to which the alternative mechanism is used (for a more detailed discussion of this, see Forsyth, 1993).

Suppose an airport, like Kingsford Smith at Sydney, is subject to excess demand. The capacity might be a fixed number of slots, and users wish to purchase more slots than are available. Alternative slot allocation mechanisms may be used; these mechanisms might be either efficient or inefficient. If slots are auctioned, or if rights to slots are clearly specified and the slots are freely traded, an efficient allocation of the scarce capacity will come about (on experience of this, see Starkie, 1994). The regulated prices will have no direct role in the allocation, though how high the prices are will determine the value of the slots. Price levels are not related to efficiency.

Other, less efficient, mechanisms may be pursued. Slots may be administratively allocated amongst users, and trading may be prohibited or restricted. There may be grandfather rights to slots, whereby allocation of slots is based on previous usage patterns. Such allocations will be less than perfectly efficient, though it is difficult to determine just how inefficient they are. Certainly, a system of declaration of capacity and allocation of slots will be preferable to a system of rationing by congestion, whereby aircraft movements form a queue to use the airport. Even an inefficient slot allocation process will break the link between price levels and efficiency, though there may still remain some unsystematic links remaining. For example, an increase in the overall price level may have an impact on usage if it discourages the low value users more than the high value users.

In practice, imperfect slot allocation mechanisms are the way price regulation is reconciled with rationing excess demand. For example, at London Heathrow, excess demand is rationed through a slot allocation system which is based on grandfather rights, and under which trading is restricted though indirect trading is possible. Airport charges are barely relevant to the capacity rationing problem, though the price structure is having some impact (the price structure contributes to the inefficiency of the allocation). In all likelihood, unless this issue is addressed, the system at Sydney will develop in a similar manner to Heathrow.

**Designing Better Price-Caps**

In the light of this, is price regulation irrelevant, or can the form of price regulation improve the allocation of capacity? The answer is yes; in fact, the form of the price-cap can be of moderate importance.

The normal structure of airport charges is a quasi Ramsey structure, whereby there are higher charges for the heavier (and higher value and less elastic) movements than the lighter movements. This represents a good practical solution to the problem of designing an efficient price structure for airports with ample capacity. The problem is one of structuring prices which yield revenues no less than cost with a minimum reduction in quantity. However, this is the reverse of the regulatory problem for the busy, capacity constrained, airport. The problem here is to set prices such that
revenues are not much above costs, but which cut back the excess demand sufficiently. What is needed is a price structure which helps this, and a Ramsey price structure is precisely what is not wanted; rather uniform prices for all movements would be desirable, since these would ensure that there can be no efficiency gains through altering the allocation of capacity (Forsyth, 1997).

One of the often quoted merits of price-caps as they are normally structured is that they give the regulated firm an incentive to adopt quasi Ramsey prices. The price-caps applied to the Australian airports by the ACCC (ACCC, 1997) currently do this. However, price-caps of this form are quite unsuited for busy airports, such as Sydney or London Heathrow. What is required is a different form of price-cap, which induces the airport to choose a different price structure—specifically, a uniform price structure. Fortunately it is possible to design price-caps to do this; one which puts a cap on price per passenger or price per tonne would have this effect. The airport can increase passenger numbers by substituting large for small movements, and increasing the average load. It will do this by raising its charges for small movements and lowering them for large movements. Since there will be a strong correlation between the willingness to pay for the slots and the size of the movement, this will result in an improvement in the allocation of slots to movements. Of course this would still not result in maximum efficiency, since the slot allocation system is itself quite imperfect, but it would dampen the incentive to structure charges in a way which exacerbates inefficiency.

In practical terms, this is perhaps one of the most severe criticisms of the way price regulation has been applied to airports. For many years, BAA’s Heathrow airport has been imposing a charges structure which exacerbates the excess capacity problems. In fact, over time, it has made its charging structure less efficient (Starkie, 2001). It has been encouraged to do so by the form of the price-cap which the regulator imposes upon it.

There are other ways in which the form of price regulation affects the capacity rationing problem at busy airports, though they are not as significant as that discussed above. Consider the choice between a dual or single till. Suppose also that some non-aeronautical services are profitable, and that the use of these services is related to the passenger throughput of the airport. Under a dual till, the more passengers, the greater the profit for the airport; hence the airport will have an incentive to increase passenger numbers. It can do this by increasing the average size of movements, as above; in short, it will have an incentive to restructure its charges to ration capacity more efficiently. If it operates under a single till, this incentive will be missing, since it does not add to its profits, through sale of non aeronautical services, by increasing passenger numbers. This said, however, it would be preferable to design the price-cap to promote efficiency directly, rather than rely on this indirect effect.

**Price Regulation and Investment**

Two levels of problems emerge as a result of the interaction between price regulation and investment. The first concerns small to medium sized investments, directed towards capacity expansion at an airport or improving the quality of service. These
types of investments would include runway extensions, terminal improvements and smaller investments around the airport. The second level of problem emerges with major investments in new capacity, such as new airports.

The first of these can be handled in a relatively straightforward manner; the regulator can adjust the allowable prices to enable a return on the investment. This is the approach taken by the ACCC (ACCC, 2000a, and for an application, see ACCC, 2000b). The second level of problem poses much more fundamental issues for the way airports are regulated.

A privatised price-capped airport will face some, though limited, incentives to invest. It will be willing to invest in additional capacity if this is required to serve additional demand. If it serves this demand, its revenue will rise, and most likely, profits will increase. It will have no incentive to invest in projects which improve the quality of service to users—this will be so because the benefits of the quality improvement accrue to the users, but the airport will not receive any additional revenue as a result. In fact, if it can handle additional traffic at some reduction in quality (for example, using a terminal more intensively at the expense of passenger congestion) it will have an incentive to handle it this way, rather than to handle it by investing in greater capacity.

This problem can be resolved if the airport is allowed to charge a higher price if it improves quality. If the airport can pass on to the airlines the cost of the investment, it will be willing to undertake it. Clearly, efficiency will be promoted only if the airport is permitted to increase prices to cover the cost of investments which are worthwhile, in the sense that the users would be willing to pay for them. The regulator will have to take on the role of evaluating investments. In Australia the ACCC has developed procedures (ACCC, 2000a) for approving investments and allowing the regulated airports to pass on their cost to users. The approach is a pragmatic one which appears to be working quite well. Some comments are in order however.

Firstly, the current procedures allow for price increases to be approved to cover the cost of investments which either increase quality or capacity. The cost of investment to increase capacity will normally be passed on to users. When extra capacity enables extra traffic to be handled, revenues will increase. There is no general reason why the price of using the airport should increase as its traffic expands; this would only be warranted if average costs were increasing with the size of the airport. If fact, there is more likely to be constant or increasing returns to scale for a given airport as it expands. Of course, the airport may not invest when demand expands, and it may handle the greater traffic at a lower quality level. If this occurred, it would be a problem for the quality regulation or monitoring system; there is a recognised role for quality regulation under price-caps to take account of just this problem. In the absence of quality regulation, the regulator might have to allow higher prices to the airport to induce it to invest, but this would hardly be an efficient approach to regulation. The ACCC’s current approach allowing price increases for capacity increasing investments is perverse.

Secondly, the criteria which the regulator uses to assess investments are critical. To promote efficient investment, each proposal should, ideally, be subjected to a cost benefit analysis, which would assess all costs and all benefits. A cost benefit analysis
need not be large or complex, and its thoroughness should be dictated by the size and nature of the proposed investment—minor investments warrant simple analyses. At present, the ACCC works to a list of general criteria, which in themselves are reasonable enough, but which do not lead to a systematic evaluation of investments. They may be sufficient when there is little dispute between users and the airport, or between users, about the merits of the proposed investment. However, when there is dispute, as is inevitable sometimes, a more thorough and consistent approach such as cost benefit analysis should be used.

Thirdly, it may be possible to promote agreement between users and the airport over many investments. Negotiated agreements will be sufficient in several cases, where users are willing to pay the cost of investments. Ideally, this approach is preferable to regulatory intervention.

Fourthly, this approach whereby the regulator approves investments leads to an intense involvement by the regulator in the operation of the regulated firm. It is the antithesis of light handed regulation. The regulator becomes the primary decision maker in most investment decisions by the airport. It becomes quite involved with the micro management of the airport, since even small investments must be subjected to the regulator for approval. The ACCC has become involved in assessments of quite minor investments. There may be scope to lessen this involvement by giving the airport some discretion to pass on costs of small investments.

Incentives for Major Investments

When major investments are contemplated, such as investment in an entirely new airport, a new set of challenges for price regulation will emerge. Any new airport is likely to have higher costs than the existing airport. The actual construction costs may well be higher than the sunk, historical costs of the existing airport (not that these have much economic relevance, but existing price levels, and the price at which the airport was sold, may be related to them). A new airport is likely to be on the city fringe, and thus be much less attractive to users than the existing one, even though it may be using lower value land. Also, for many years, the new airport will have fewer services, and thus it will be a much less desirable airport to use for changing flights. Users will be willing to pay a very high premium to use the old airport.

This poses a difficulty for price regulation. If the objective of price regulation is to keep prices low, and close to costs, (somehow measured), they will not be able to be used to ration traffic between airports. Efficient rationing will imply that the old airport is able to charge much higher prices than the new one, and it will imply that profits at the old airport could be very high. This is further complicated by the fact that it will be efficient to charge low prices at the new airport, granted that it will have ample capacity for an extended period; thus it will not be able to earn a normal rate of return. Achieving zero supernormal profits at either or both airports together is an impossibility. This is a real problem which will be encountered if an additional airport in the Sydney region is to be developed (such an airport may not be an entirely new airport; it could be an existing airport such as Bankstown upgraded to take some commercial traffic—see O’Dea 1998).
As with the problem of busy airports which are in excess demand, this problem can be solved with an efficient slot allocation system. Again, the slot allocation system takes over the allocative role from prices, and actual price levels at the busy airport can take a range of values and still be consistent with efficiency. Effectively, it will be the value of slots at the old airport which carries the main burden of rationing movements between the two airports. If the old airport is strongly preferred, the price of using it, including the cost of a slot, will be high, and some movements will be induced to use the less preferred, new airport. If the slot allocation system itself is efficient, there will be an efficient allocation of traffic between the airports. If it is not efficient, then there will be an allocation of traffic, but this allocation will be less than optimal. Effectively, this is what happens at busy airports such as London. Heathrow is in excess demand, and demand is rationed by an imperfect slot rationing system; this system also effectively rations traffic between Heathrow and the other London area airports.

There remains the question of how regulation can exist alongside efficient pricing at the new airport. Immediate cost recovery may not be feasible; the regulator may have to aim to set prices which cover costs over an extended period, at least five or ten years. The regulator may allow prices to cover costs, and since the airport will be able to charge quasi Ramsey prices, the cost in terms of efficiency will not be great. High average charges for the new airport will mean that the value of slots at the old airport are pushed even higher. Finally there may be some scope for the profitable old airport to subsidise the unprofitable new airport; this will be so if the owners of the two airports are the same (and the potential for competition between the airports is foregone). This will amount to a “single till” being imposed over the airports. It will be consistent with achieving the regulatory aim of low profitability and efficiency if there is an efficient slot allocation system in operation for the busy airport. Again, regulated prices will not play the rationing role, which will be taken over by the slot system.

One question which remains is that of whether there will be an incentive for the old airport, or any other investor, to invest in expanding capacity through building a new airport when this is warranted. Here the divorce of the value of the slot from the price received by the airport can serve a useful function. If the airport was able to charge market clearing prices, it would not have an incentive to build a new airport when this was warranted; rather, by not building the airport, it would be limiting capacity, and it would be able to increase prices and profits. On the other hand, if the airport is price regulated in a way such that it can cover its costs at both the new and the old airport, it will have an incentive to invest when appropriate. It will be only able to increase revenue by building new capacity; and it will only do so when it finds this worthwhile. If prices at the new airport cover its costs, the airport will invest when it believes demand at the new airport will be sufficient. If the regulator is able to set prices at the right level- and this is something of a presumption- it will be able to induce investment at the appropriate time.

Finally, a general observation is in order. It has been noted that the traditional role of price as a short run rationing device will be supplanted by a slot allocation system. Further to this, the price as charged will not have its normal role as a signal for investment either. High actual prices at the old, preferred airport are not required to
ensure efficiency. In an unregulated market, a price which is actually being charged which is higher than the long run price is a signal for investment. When prices are regulated, actual prices do not serve this function. Rather, investors will be guided by the prices which the regulator proposes to allow when the investment is undertaken. Here the role of the regulator in giving credible commitments is critical. The regulator may keep prices low prior to an investment being made, but when the investment is in place, it may allow a higher price. Expected future regulated prices are the signal to invest, not actual regulated prices.

**Dual or Single Till Regulation?**

One issue which seems to attract more attention than most is that of whether a single till approach to regulation is preferable to a dual till or not. This attention is not warranted by the issues importance in determining efficiency; it is difficult to determine which approach is preferable on efficiency grounds. Rather the interest is generated by the fact that the choice of approach has implications for the sharing of rents; under the dual till, the airport will gain at the expense of airlines and passengers relative to the single till. Invariably, airports argue for a dual till and airlines for a single till (see SACL,2000 and BARA,2000).

There are several efficiency aspects to the choice, and many have some content, though whether any is particularly strong is not obvious. The final choice is a matter of judgement. A list of some of the main arguments that have been used is as follows:

(a) The Broad Base for Pricing Argument. If cost recovery is spread over a wider set of services, the overall outcome will be more efficient. In particulars, profits on non-aeronautical services will lower aeronautical prices, bringing them closer to marginal costs in airports with ample capacity (NECG, 2000a, Crew and Kleindorfer, 2001). This favours the single till.

(b) Underpricing Busy Airports. If profits from non-aeronautical services are used to subsidise aeronautical services, this will reduce prices below their efficient levels (Starkie and Yarrow, 2000, Starkie, 2001, Kahn,2001). This favours the dual till.

(c) Cost Allocation. A dual till requires more detailed cost allocation between aeronautical and non-aeronautical services, if a cost based approach to regulation is adopted (NECG,2000). This favours the single till.

(d) Defining the Basket. Dual tills pose problems for the regulator in defining the regulated basket of services because airports will be introducing new charges which elude regulation (Forsyth, 2001). This favours the single till.

(e) Interdependent Demands. Additional revenues from passengers may induce the airport to improve capacity allocation at busy airports (Starkie and Yarrow, 2000, Forsyth,2001). This favours the dual till.
(f) Investment Incentives. If non-aeronautical revenues are regulated in a cost-plus manner, there will be an incentive to overinvest in non-aeronautical services (Starkie and Yarrow, 2000, CAA 2000). This favours the dual till.

(g) Extending the Regulatory Base. If regulation imposes costs, these will be increased by the single till, which extends the scope of activities regulated (Forsyth, 2001). This favours the dual till.

(h) Cost Based Regulation. The dual till is more consistent with incentive regulation, since only one set of benchmarks (for aeronautical services) need to be used. The single till is more consistent with cost-plus regulation because benchmarks for non-aeronautical services are difficult to find or implement (Kunz and Niemeier, 2000).

Other arguments for and against the single till have been advanced. One matter that is clear, however, is that the case for a dual till is stronger with busy, capacity constrained airports such as Sydney, than at airports with spare capacity (CAA, 2000).

It is thus peculiar that the ACCC regulated the non busy airports in Australia with a dual till approach, but it has recently proposed regulating Sydney with what amounts to a variant of the single till approach (ACCC, 2001). Profits from specified non-aeronautical services will be applied, in their entirety, towards reduction of aeronautical charges. This proposed approach is doubly inefficient in that it amounts to pure cost-plus regulation of the affected non-aeronautical services, since all profits from them will be taken away, and the airport will face no incentive to minimise costs.

Market Power in Non-Aeronautical Services

The arguments surrounding the single and dual till approaches presuppose that the airport is able to make profits on non-aeronautical services. One reason why it may be able to do this stems from the preferred position of airports in selling tax free goods. This is moderated in Australia by the existence of duty free outlets in the city centres; these compete against the airports. Since the introduction of the GST, airports have been advertising themselves as “GST Free Zones”. This source of additional revenue and profit to airports relies on to government policy, which can be changed.

Profits can also be made if the airport possesses market power. The extent of market power is debated; airports frequently deny that they have any in non-aeronautical services. They may not have much or any market power in those services in which they face competitors elsewhere; for example in the retailing of socks and ties. However, many of the services they supply are more or essential complements to the aeronautical services; for example, surface access to the airport (taxis and car parking) and aircraft refuelling must be purchased by users if they are to make use of the airport. If these services are not regulated or included within the regulated till, the airport will be able to use its market power.

It is often argued that high prices for these services simply reflects locational rents. This is not very plausible. It must be remembered that locational rents are the result of scarcity of land or space at a preferred location; it must be questioned how scarce terminal space and land are in the short and long run. In the short run, and airport may
be designed and a terminal may be built in a way which puts a premium on space and land. In the long run, the airport can be expanded and more terminal space can be provided. The cost at which this can be done provides a measure of whether market power is being used or not (Forsyth, 2001). If prices are well above the cost of additional facilities, this suggests that market power is being used, or, that capacity is temporarily inadequate. Capacity may be kept inadequate to keep prices high, and terminal design and airport boundaries can limit competition.

Of course, locational rents do exist at airports. The price for using the car park closest to the terminal can be expected to be higher than that for using more remote car parks. A duty free store at the airport may gain higher revenues than a city store because of its convenience. One may question what the locational rents from retailing socks, night-gowns and Wedgwood jasperware at airports might be (though there are tax advantages).

Evidence on the presence and use of market power can be obtained. Prices which are high relative to the long run costs of supply suggest either temporary inadequate capacity, or use of market power. Price discrimination is a symptom of market power; if car parking charges discriminate between user groups (short stay versus long stay differentials which cannot be justified by differences in location), this can only be possible if market power is being exercised. Finally, if airports are setting rents for terminal space with reference to benchmarks such as rents in the CBD, this is symptomatic of use of market power. If rents are true locational rents, the seller does not set the price with reference to benchmarks (of questionable relevance); rather, the seller takes what the market offers. The seller of a block of land in the CBD of Melbourne cannot simply choose a benchmark, such as the price of land in Sydney, and charge that price. Instead, the seller must accept what the market is prepared to pay.

The fact that there are rents which airports enjoy which stems from their position as monopoly provider of aeronautical services does not necessarily mean that these rents should be regulated away. There will be some market power used, and this will lead to some lessening of efficiency. However, correcting for this, perhaps through a single till or applying the profits to reduce aeronautical charges, may well create greater efficiency losses than those which are being avoided.

**Regulatory Involvement and Airport Operation**

One of the most commonly expressed hopes for regulation is that it should be light handed. By this is meant that the regulator’s involvement with the operations of the firm should be minimal. Ideally, the regulator sets broad parameters and the firm is able to do what it wishes within these parameters. Heavy handed or detailed regulation is viewed as undesirable, and likely to lead to inefficiency. Two questions which can be posed are:

Is airport regulation, as implemented in Australia, light handed? and,

If it is not, can it be?
At present, airport regulation in Australia is very detailed and in that sense, heavy handed. The ACCC regulates investments of airports in detail, and its approval is required for even quite minor investments. Access regulation involves the ACCC arbitrating access disputes for relatively minor facilities. Price-caps, to be effective, require the support of comprehensive quality monitoring or regulation. As implemented in Australia, with a dual till approach, price-caps require the ACCC to become involved in highly specific issues such as those raised by taxi levies. If the present system of regulation is to continue, the resetting of prices at the end of the first regulatory period would involve the ACCC in detailed cost allocations. As yet the complex problems posed by Sydney airport have only been touched upon by regulators. Overall, price regulation of airports in Australia is resulting in very detailed involvement by the regulator in the affairs of the industry.

There is some scope for reduction in this detailed regulation. Replacement of the dual till with a single till would lessen the cost allocation problems, and lead to fewer attempts by airports to circumvent the price-cap by introduction of new charges. Greater reliance on benchmarks would enable less attention being given to the firms' actual costs. More negotiated agreements between airport and airlines over investment would also lessen regulatory intervention.

However, despite these possibilities, detailed involvement is, to a large extent, inevitable. Access regulation is of necessity quite detailed if highly specific facilities are declared for access. Quality monitoring, and perhaps regulation, is essential if price-caps are not to be thwarted by quality degradation. Investments which change the price/quality trade-off must be assessed and approved by the regulator if they do not meet the approval of all parties. Major investments, such as new airport capacity for Sydney, are likely to involve detailed scrutiny from regulators, if only because of their environmental consequences. Operating a dual till means that cost allocations, which will be complex and to an extent arbitrary, will be unavoidable if a cost based approach to regulation is implemented (if aeronautical charges are set solely with reference to benchmarks this will not be so). Given that all these issues will need to be resolved, the only way to achieve light handed regulation is by ignoring the problems. There is a diverse set of decisions or trade-offs which must be resolved, and these cannot be done by the airport itself, or through negotiations between the airport and users.

This detailed regulation has its costs. It opens up the possibility of rent seeking and perhaps litigation. The regulated firm seeks inefficient ways around the regulation. Micro management by the regulator is inefficient, since the regulator knows less about the operations of the firm than the firm does itself, but it is the regulator which makes the key decisions, for example, on investment. It may be possible to lessen, but not eliminate these costs of detailed regulation. The inevitability of some heavy handed regulation, and the costs it entails, must be factored in as a cost of regulation if airports are made subject to price regulation.

Conclusions: Designing Price Regulation For Australian Airports
As it is practised in Australia, and indeed other countries, price regulation of airports is essentially about controlling the abuse of market power, in the sense of keeping prices close to costs. This is becoming an objective in its own right, and it is not done to enhance efficiency, nor is it done to advance specific distributional objectives.

Airports do possess market power, and in most cases, this market power is very strong. Airports could, if unregulated, set prices well above costs without fear of losing much traffic. This is especially true in Australia, where airports are separated by large distances, and competition between airports, for most traffic, is essentially non-existent. The countervailing power of users is a mirage. For countervailing power to be effective, users must have alternative sources of supply at comparable quality. In the case of airlines using airports, this is not the case. For the most part, a threat by an airline to stop flying to an airport is hollow, since the airline will have no other airport to go to and doing this will hand its business to its competitors. This is true for all airports, small and large; just because an airport is small does not imply that it has less market power, since market power depends on the absence of substitutes, not size.

The New Zealand experiment with no formal regulation is no guide to the behaviour of an unregulated airport, since there is the active threat of price controls, which is likely to have similar effects to actual regulation.

If efficiency is the objective, unregulated private airports will perform best. There will be some loss of efficiency due to monopoly prices, though this will be minimised through effective price discrimination. The high prices will be to the benefit of the owners, perhaps governments, and the losers will be the airlines and their passengers.

In reality, the objective of price regulation, as imposed in Australia and elsewhere, must be taken to be that of keeping revenues close to cost, and eliminating supernormal profits. This might be described as a “distributional” objective, though this would not be accurate. This choice of regulatory rule does not come about from identifying gainers and losers from alternative pricing policies, and achieving a balance between them. Rather it is a rule which is imposed regardless of whom the gainers and losers turn out to be.

There are several possible sources of inefficiency which may be a problem at airports. Prices set above marginal costs could be a problem, though granted the low price elasticities, along with extensive use of price discrimination, this is only likely to be a very minor source of efficiency loss. Price structures are more important, and sometimes they are efficient, but sometimes not. Productive inefficiencies, through costs being higher than marginal costs, are a much more significant potential source of inefficiency than allocative inefficiency problems. A qualification to this occurs when there is a problem of allocating scarce capacity at busy airports; sometimes the mechanisms used are very inefficient. Airports can also be subject to inefficient investment decisions; this can occur at any level, but there is the possibilities of significant inefficiencies when major investments, such as new airports, are made. The process of regulation can also impact on efficiency; detailed or heavy handed regulation has a cost in terms of the operational efficiency of the airport.
Regulation, in itself, has an efficiency cost. This is particularly true when it is rather cost based, as it tends to be in Australia and elsewhere. Regardless of the form this regulation takes, it weakens the incentives to pursue productive efficiency. Regulators find it very difficult to move away from actual cost bases for regulation; they avoid firms earning high or low profits, regardless of whether these come about as a result of efficient or inefficient performance.

This cost of regulation can be reduced by greater reliance on benchmarks or yardsticks, but at a cost in terms of greater profit volatility (which regulators avoid). More use of benchmarks, and less reliance on the regulated firms own costs, will sharpen incentives to keep costs down. However regulators in Australia, and elsewhere, have enormous reluctance to use benchmarks, partly because of measurement difficulties, but mainly because of the effects on profit volatility. It is not possible to increase the use of benchmarks by relying on the regulators’ discretion; their use must be committed in advance through the design of the regulatory framework. A move towards sliding scale regulation as used in the US, which puts specific weights on firm costs and external factors in setting the price-cap, may be a means of increasing the commitment to benchmark regulation.

To the extent that price-caps are not cost based they will create problems for quality and investment. To this extent, it is necessary to have quality monitoring or regulation, as the ACCC recognises when regulating airports. It is also necessary to give incentives for investment in quality improvement by permitting price increases if they are carried out. However, it is not generally correct to allow price increases when airports invest in additional capacity to handle extra demand, as the ACCC does.

The form of the price-cap, as it is currently being implemented in Australia, is appropriate for non-busy airports; it encourages the airport to adopt quasi Ramsey prices which maximise the utilisation of the available capacity. This form of price-cap is completely inappropriate for a busy airport, such as Sydney. At Sydney, the allocation problem is one of rationing scarce capacity; something which is best done if all users face the same price for use. While much hangs on the efficiency of the slot allocation system, (and also there is a political imperative that some users such as regional airlines be given preferential treatment), the price-cap can improve efficiency if it gives an incentive to the airport to charge uniform prices. It is a straightforward matter to redesign the price-cap so that it has this effect.

Busy airports pose major problems for reconciling price regulation (with the aim of eliminating supernormal profits) with minimising the inefficiency costs of this regulation. This has to be resolved by removing the allocative and investment signal roles of prices that are actually charged. Regulated prices will determine revenues, but they will not ration demand or provide a signal for investment.

For the busy airport, capacity must be determined and slots allocated as a task separate from the price regulation task. Ideally this will be done efficiently, though in practice slot allocation is imperfect. It will not be possible to achieve this through price regulation (though it is possible for the price-cap to lessen efficiency, as it does at
London Heathrow airport). The effective prices of slots will allocate the scarce capacity and will allocate movements between old and new airports.

Whether major new investments, such as new airports, are undertaken is a significant efficiency issue. It cannot be handled very simply under price regulation, though it need not be inconsistent with the price regulatory process. At the every least, it will be necessary for the price regulatory framework to be redesigned to take account of the additional complexities; these include offering regulated prices to the airport (or any alternative investor) which enable cost recovery for the new investment. As with smaller investments, the regulator will need to take on the key role of evaluating and approving the investment.

The dual till or single till choice is unlikely to be a major issue for efficiency. This issue is strongly fought over and attracts much attention by regulators, mainly because the choice made affects the sharing of benefits between airports, airlines and their passengers. Efficiency arguments go both ways, and none is very significant in terms of the size of gains or losses; it is a matter of judgement where the balance lies. This said, the case for the dual till is stronger for the busy airport. The case for the single till is stronger the emphasis on eliminating supernormal profits is relative to the desire to promote efficiency.

Price regulation of airports is inevitably going to be detailed and hence heavy handed, especially if price-caps are the chosen form of regulation. Price-caps are a simple form of control, but they open up many subsidiary problems. Further, quite detailed regulation is needed to address quality degradation problems and investment matters. Dual tills mean detailed cost allocation processes. Busy airports require a slot allocation system and possibly investment assessment in addition to the price regulation. It is possible to have light handed regulation, but only if the problems which are a consequence of price regulation are ignored. This micro management does involve costs which must be recognised when the decision to regulate is taken. There are only limited ways in which these costs can be reduced.

Implications For Reform of Price Regulation

One implication which follows from this analysis is that the regulation which has been applied to the non capacity constrained airports in Australia has so been well designed. However, the concern is that when prices are reset, the regulator will move towards cost-plus regulation, and that this will weaken incentives for productive efficiency. Given the experience of regulator behaviour, especially that in Australia, this is a real concern; regulators do see it as their task to remove excess profits. Eliminating supernormal profits at airports will be costly in terms of efficiency. While it is difficult, in practice, to make regulation more consistent with incentives for efficiency, this is, in the long run, likely to prove the most serious issue in the regulation of non busy airports.

There are other aspects of current regulation which may be reformed:

There are no major efficiencies to be gained- or lost- from moving from a dual till approach to a single till (or some half way house, as is being proposed for Sydney).
The current approach to investment approval needs reform. Allowing price increases for increases in capacity is inappropriate, and the criteria for investment needs to become more comprehensive by the use of cost benefit analysis.

When price-caps are implemented, they spawn a range of issues, such as those to do with quality and investment, which will require detailed involvement by the regulator; light handed regulation is not an available option.

The regulation of busy airports, such as Sydney, encounters the same issues that are present with non-constrained airports, but it encounters a number of additional issues:

Price regulation can be imposed, but this must be done in tandem with a capacity allocation system. The allocative role of prices is largely taken away. This is feasible, though much will depend on the slot allocation system adopted, since this may promote either efficiency or inefficiency.

Price-caps for a busy airport will need to take a quite different form from those which are imposed on a non-constrained airport. While the price-caps as imposed on the regulated airports in Australia promote the efficient use of their capacity, imposition of the same form of cap will actually lessen efficiency if imposed on Sydney. The price-cap needs to be redesigned so as to promote uniform, not quasi Ramsey, pricing.

Price-caps can be made consistent with efficient development of airport capacity in the Sydney region, though there is no certainty that this will actually come about. Regulated prices will not have the normal investment signalling role of prices, just as they will not have much of an allocative role. Price regulatory structures can be designed so as to be consistent with efficient investment in additional capacity, such as in a new airport. This is something which has yet to be done, and which should be done prior to privatisation of Sydney. The major role in allocating traffic between the existing airport and any new airport will be played by the slot allocation system, not the regulated prices.

Finally, the proposed introduction of a quasi single till at Sydney represents the worst of all possible options, since it is essentially pure cost-plus regulation; a conventional single till approach would be preferable, though it must be remembered that the case for a single till is weakest for busy airports.

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