Airport Regulation Inquiry
Productivity Commission
PO Box 1428
Canberra City, ACT 2601

Darryl Biggar
Consulting Economist
ACCC
GPO Box 520
Melbourne, VIC 3001

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Re: Submission: Economic Regulation of Airport Services: Issues Paper: January 2011

Dear PC,

Please find attached a paper which I invite you to consider as part of your inquiry on the Economic Regulation of Airport Services. This submission is made on my own behalf and does not necessarily reflect the views of the Australian Competition and Consumer Commission or the Australian Energy Regulator.

This paper deals primarily with an issue which is not specifically raised in the Issues Paper: the question of the fundamental rationale for airport regulation. In 2004, in the context of the Gas Access Review the Productivity Commission (PC) observed that: "Any policy intervention should target a clearly identified set of problems". It follows that, before making any assessment of the effectiveness of the current regime for airport regulation, the PC must come to a view on the problem that airport regulation is designed to solve.

The PC has articulated its view of the rationale for airport regulation before – in its 2002 and 2006 reports. In those reports the PC followed a mainstream, conventional, economic approach in arguing that the primary potential economic harm that might arise if airports were not subject to any pricing constraints would be the exercise of market power – specifically the ability to increase prices above marginal cost, giving rise to the economic harm known as deadweight loss. The PC subsequently argued that for various reasons (such as the low elasticity of demand for airport services and the ability for airports to price discriminate) the deadweight loss would be small and therefore the major airports in Australia should be subject to only light-handed regulation.

But what if the primary rationale for airport regulation is not the minimisation of deadweight loss? The attached paper points out that most economists have missed a core element of public utility regulation – the need to protect and promote the sunk relationship-specific investments made by customers and end-users. This argument, which can be traced back to Goldberg (1976) has recently been developed in Biggar (2009). In the attached paper I argue that this approach explains the key features of

regulatory practice that we observe. It is also a solid foundation for public policy decisions going forward.

In particular, a key public policy implication of this approach is that the regulatory framework for public utilities should be designed in such a way as to re-create the long-term contract that the parties would have negotiated if they could have negotiated costlessly prior to making any sunk investment.

The key question for this review of airport regulation, therefore, is the following: Would the current regime (within which airports have a substantial degree of pricing discretion) be the likely long-term contract that would have arisen if the airlines, and the travelling public, could have costlessly negotiated with airports before either made any sunk investment? If the answer is yes, then the current regime cannot be improved. If the answer is no – that is, if the parties would have sought a different arrangement in that hypothetical negotiation – then the Commission cannot conclude that the current arrangements for economic regulation of airport services in Australia are fully achieving their objectives. Instead, the Commission should ask: What long-term contract would the airlines, airports, and the travelling public enter into in that hypothetical ex ante negotiation?

Thank you for the opportunity to make this submission. I am happy to answer any questions that you might have.

Regards

Dr Darryl Biggar

WHY REGULATE AIRPORTS?

A RE-EXAMINATION OF THE RATIONALE FOR AIRPORT REGULATION

Darryl Biggar*

27 January 2011

What is the primary rationale for the regulation of airport take-off and landing charges? The conventional economic response focuses on the potential to exercise market power, resulting in the economic harm known as deadweight loss. Despite its widespread acceptance among economists, this conventional view does a poor job of explaining the actions of regulators and the concerns of airport users. Following Biggar (2009) I argue that the primary rationale for regulation of airports is not the minimisation of deadweight loss but the protection and promotion of sunk complementary investments by airport users – particularly by airlines and individuals in the catchment area of an airport. This approach can explain the key features of regulation and the actions taken by regulators that we observe in practice. I argue that this approach is a better foundation for public policy towards airport regulation going forward.

* Consulting economist to the Australian Competition and Consumer Commission (ACCC). The views expressed here are those of the author and not necessarily those of the ACCC.

Address for correspondence:
Dr Darryl Biggar
Regulatory Development Branch
Australian Competition and Consumer Commission
GPO Box 520
Melbourne, VIC 3001
Australia

1. Introduction

Why regulate airport charges? The mainstream economic view is that at least some airports possess a degree of market power and that they will exercise that power, raising prices above marginal cost and reducing output, resulting in an economic harm known as deadweight loss.[1] According to this perspective, the primary rationale for economic regulation of airports is the elimination or minimisation of that deadweight loss. For example, the Australian Productivity Commission (PC) writes:

> "The prima facie rationale for price regulation of certain airports is their perceived market power – that is, the ability to raise prices above efficient levels – and their perceived incentive to use it …In essence, a firm with market power … will restrict the amount supplied and raise the price in order to increase its profits at the expense of consumers. The source of efficiency loss is the reduction in production and consumption of the good or service below the efficient level – the so-called monopoly deadweight loss."[2]

But, is airport regulation primarily about controlling deadweight loss? This question is both timely and important. In January 2011 the Australian Productivity Commission kicked off a third review of the framework for airport regulation in Australia.[3] Should the Productivity Commission carry out its next review within the conventional economic framework, with its focus on deadweight loss? Or is there a better approach?

The primary purpose of this paper is to call into question the mainstream economic approach to airport regulation and to suggest an alternative. I suggest that the economic framework for airport regulation should be grounded in economic theory, but should also enable us to understand the patterns of regulation of airports that we observe in practice. Does the hypothesis that airport regulation is primarily about the control of deadweight loss adequately explain the patterns of regulation that we observe in practice?

I suggest the answer is no. The hypothesis that airport regulation is primarily about the control of deadweight loss does not explain key facts such as the focus by regulators on the total cost of providing airport services (rather than just the marginal cost), the concern of regulators to maintain prices that are broadly stable, the reluctance of regulators to pursue peak load pricing of airports, and their unwillingness to permit (and indeed encourage) airports to price discriminate across airlines. Furthermore, the hypothesis that airport regulation is primarily about the control of deadweight loss cannot explain why some airports (such as those with very low elasticity of demand for their services) continue to be regulated at all.

Of course, economists are aware that their policy prescriptions are not always followed, but they have tended to view this as the fault of the regulators or policy-makers. Specifically, they have tended towards the view that the reluctance of regulators or policy-makers to fully embrace the economic approach is due to: (a) the inability or unwillingness of regulators and policymakers to understand economics; (b) capture by

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[1] See, for example, Starkie (2001, 2002), Forsyth (2001, 2006), PC (2002).

[2] PC (2002), page 82-83.

[3] PC (2011)

special interests at the expense of overall economic welfare; or: (c) the desire to use the regulation process to distribute income from one group to another.

In my view, these arguments, when viewed objectively, are hard to maintain. While individual regulators or policymakers may indeed at times be unable or unwilling to understand concepts of economic welfare and/or intent on pursuit of special interests, to argue that regulators and policy-makers around the world are systematically, materially, and for extended periods of time departing from arrangements which broadly maximise overall welfare implies a failure of public governance and oversight on a scale that is not credible. I suggest that an alternative simpler hypothesis is that economists have failed, in some way, to understand the true rationale for airport regulation.

Specifically, I suggest that the conventional economic approach has overlooked the fundamental role played by sunk investments – especially sunk, relationship-specific investments by airport customers and end-users – and the role of regulation as a mechanism for protecting and promoting that investment.

Airport users, such as airlines and the travelling public, must make a substantial sunk investment in specific airports to extract the most value from the service they provide. It is widely accepted that airlines need to make a substantial relationship-specific investment, especially at a hub or "base" airport. This investment might take the form of construction of customised facilities (such as customised terminals or maintenance bases), marketing of services to or from that airport, acquisition of take-off and landing slots, or the establishment of flight schedules, operating procedures and staffing. In the absence of conventional price regulation, airlines want to protect these investments through long-term arrangements or vertical-integration with airports. Where there are obstacles to entering long-term arrangements or vertical-integration, airlines will be reluctant to make the necessary complementary investments, for fear that, once the investment has been sunk, the airport will be able to expropriate the value of the investment by raising the airport charges.

Furthermore, not only airlines, but also the customers of airlines – that is, the end-users (whether individuals or businesses) will also often be called on to make an investment in reliance on the services of a particular airport. Consider, for example, the case of a small business which expects to be heavily reliant on air travel. Let's suppose this business faces a choice: Its preferred location is close to a major airport on which it will be totally reliant. On other hand, at some cost in terms of convenience and time, it can choose to locate in the catchment area of two airports, reducing its dependence on either airport alone. In the absence of conventional price regulation, this firm might wish to enter into a long-term contractual arrangement with the dominant airport in its preferred location. However, this will often simply not be practical. Instead, the business may be reluctant to choose its preferred location for fear that, once it has made an investment in its location, the airport will expropriate the value of that investment by raising the airport charges. The failure to select the most efficient location for this business results in a reduction in economic welfare.

Where airlines, customers and end-users must make relationship-specific sunk investments and where long-term contracts or vertical integration are infeasible, there is a role for conventional airport regulation. Specifically, that regulation should recreate the long-term contract that the parties would have agreed to if they could have negotiated costlessly prior to making any sunk investments. That long-term contract would seek to

protect and promote efficient sunk relationship-specific investments by all parties - the airport, airlines, and end-users.

In summary, extending the argument in Biggar (2009), this paper argues that conventional economic approach to airport regulation is flawed. Instead, the primary rationale for regulation of airports is the protection and, thereby, promotion of sunk investment, especially by airport users, so as to maximise the value of air transport services. This is achieved by, amongst other things, ensuring a long-term stable path of prices and services at levels which allow the airport to cover its prudently-incurred costs and risks. This approach allows us to better understand the patterns and trends in the regulation of airports that we observe in practice and provides a better foundation for public policy decisions on airport regulation going forward.

2. The conventional economic approach to airport regulation

All mainstream economic texts on airport regulation (and public utility regulation more generally) start from the perspective that the central economic rationale for airport regulation is the minimisation of deadweight loss.[4] Specifically, as noted above, the central concern is that an airport with market power will charge a price above marginal cost, increasing the price and reducing the volume of services sold relative to the efficient level, resulting in the economic harm known as deadweight loss. This is the approach adopted by the Productivity Commission in its 2002 and 2006 reviews of airport regulation in Australia.

Following Biggar (2009), let's refer to this as the "deadweight loss hypothesis". Let's take the observed patterns of regulation around the world as the data points to be explained, and ask: how well does this hypothesis fit the facts? Is it the case that the observed patterns of regulation of airports are best explained as an attempt to minimise deadweight loss? Or is there a better explanation?

There are at least a few suggestions that the primary objective of airport regulation is not, in fact, the minimisation of deadweight loss:

Is low price elasticity associated with an absence of regulation?

According to conventional economic theory, if the residual demand curve facing a firm is inelastic over a range of prices between the competitive price and the firm's actual price there is no welfare loss from charging a price above the competitive price. Therefore, if airports face very low elasticity of demand for their services over a relevant range of prices, the economic harm from pricing above marginal cost will be small or zero.[5] Such airports should be subject to little or no constraints on their charges – at least over the range of demand in which demand is inelastic.

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[4] See the citations in footnote 1.

[5] See, for example, Forsyth (1997), page 299 and PC (2006), page 29. The same argument is also made in a 2002 speech by Gary Banks, Chairman of the Productivity Commission, reproduced in Banks (2010), page 129.

Is this what we observe in practice? The answer seems to be no. If anything, the opposite seems to be closer to the truth. For example, the empirical study by Bel and Fageda (2010), finds that:

> "…[T]he crucial aspect in the choice of regulation is the potential market power of the airport. Large airports, with substantial market power, tend to be subject to detailed regulation and airports that have nearby competing airports tend to be deregulated".[6]

Even in Australia, which currently has a fairly light-handed regulatory regime for airports, it is those airports which were held by the PC to have a *low* elasticity of demand which are subject to the stricter form of monitoring.

Are price discrimination and peak-load pricing actively encouraged?

According to conventional economic theory, price discrimination by a dominant firm may reduce or eliminate the deadweight loss. Both Forsyth (2001) and PC (2002) argue that even if an airport possesses significant market power, provided it is able to price discriminate, it may be able to reduce or eliminate any impact on the deadweight loss. If the primary economic rationale for airport regulation were the minimisation of deadweight loss, we should expect to see price discrimination by airports actively encouraged by regulators and policy-makers.

But this doesn't seem to be the case. One of the key principles embodied in the 2009 European Union Directive on Airport Charges is that airport charges should be *non-discriminatory*.[7] The ICAO in its Policies on Charges for Airports states that the charges must be non-discriminatory between foreign and domestic airlines and between two or more foreign airlines. In Australia, the PC (2006) notes that airports do not usually differentiate between their airline customers at least for their standard 'posted' rates, particularly since airlines frequently insist on 'terms no less favourable' than those offered to competitors.[8] The new proposed telecommunications legislation governing the National Broadband Network explicitly rules out forms of discrimination.[9]

Moreover, to make matters even more puzzling, under the conventional economic approach certain forms of price discrimination are commonly accepted in airport charging, whereas other forms of discrimination are ruled out. For example, the ICAO Policies on Airport Charges permit landing charges based on a weight formula (which results in higher charges for heavier aircraft) but disallow charging on the basis of the length of stage flown by the aircraft.[10] If the focus is on minimising the deadweight loss,

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[6] Bel and Fageda (2010), page 12.

[7] Directive 2009/12/EC, Article 3.

[8] In 2002, Gary Banks observed that regulation typically limits the extent to which parties can price discriminate: "Regulated access prices have generally been uniform and cost-based". Banks (2010), page 129.

[9] Sections 152AXC and 152AXD of the Telecommunications Legislation Amendment (National Broadband Network Measures – Access Arrangements) Bill 2010, specify that when carrying on a range of listed activities "An NBN Corporation must not … discriminate between access seekers".

[10] ICAO (2004), page 8-10.

in principle, *any* additional information on the characteristics of the buyer will allow finer price discrimination and therefore will reduce the deadweight loss. If the primary objective of the regulation is the minimisation of deadweight loss, the exclusion of discrimination on the basis of stage length (or any other factor) makes no sense.

Similar questions can be raised about the particular form of price discrimination known as Ramsey pricing. Although Ramsey pricing is theoretically optimal, studies of airport regulation have repeatedly found that airport tariffs depart in important ways from the Ramsey ideal.[11] Is it that the regulation is systematically inefficient? Or is the focus on deadweight loss itself flawed?

A closely related issue relates to the use of congestion charging. For many decades economists have argued that at those times where demand for a monopoly facility exceeds its capacity, the price should be increased to efficiently ration demand (also known as peak-load pricing or congestion pricing). Depending on the shape of the cost curves, rationing demand by raising the price at peak times may allow revenue to be raised to cover fixed costs while incurring no additional deadweight loss. If regulation is primarily about minimising deadweight loss, regulators should actively encourage various forms of peak load pricing or congestion pricing.[12]

Yet this is not what we observe in practice. Congestion pricing of airports has, at best, a chequered history. Where airports have pricing flexibility they have been slow to introduce peak/off-peak charges. Such charging structures are often strongly opposed by airlines. Where congestion pricing has been tried it is often unwound or scaled back.[13] If the primary rationale for airport regulation is the minimisation of the deadweight loss why isn't peak/off-peak pricing more common?

Perhaps even more puzzling is that although the use of price to ration access to scarce airport resources has proven unsuccessful in practice, some forms of quantity rationing have proven both successful and durable. Instead of increasing prices to ration demand, airports often issue rights to use the airport at peak times, commonly known as "slots". If these rights are tradeable, the exercise of a slot right incurs an opportunity cost equal to the revenue that could be obtained by selling that slot to some other user. As a result, slot-based rationing can in principle efficiently allocate scarce airport capacity. But, unlike congestion pricing, slot-based rationing of airport capacity has proven acceptable and durable in practice. In fact, there are proposals for extending this approach to congested roads.[14]

In principle, both price-based and quantity-based rationing efficiently allocate scarce airport capacity. Why should we observe regulatory opposition to congestion pricing of airports, but, at the same time see regulatory support for rationing airport capacity through long-lived slot rights? This observation cannot easily be explained within the conventional economic framework.

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[11] Morrison (1982), Hakimov and Stolz (2009).

[12] See, for example, PC (2002) and Starkie (2005).

[13] See Starkie (2005), Schank (2005).

[14] Viegas (2001).

Is the focus of the regulator exclusively on marginal prices and marginal costs?

If airport regulation is primarily about minimisation of deadweight loss, regulators should care primarily about the *structure* of airport charges – in particular, ensuring that the prices charged at the margin are close to marginal cost. As long as the deadweight loss can be reduced to a minimum, regulators should have relatively little to say about the overall *level* of charges.[15]

Yet, this is not the case. A common principle in airport regulation is that charges be cost-based. The ICAO Policies on Airport Charges include the policy of "cost-relatedness". According to the ICAO, in determining the cost basis for airport charges, only those facilities or services used to provide (international) air services can be included. In the US, airport revenue non-diversion laws require that airports receiving federal or state grants must ensure that revenues generated at an airport are only spent on the capital or operating costs of that airport. In contrast to the predictions of the deadweight loss hypothesis, regulators and policy-makers seems to care as much or more about the level of airport prices than they do the structure.

The same questions arise, of course, in public utility regulation more generally. Regulators simply do not focus on the price-marginal cost margin and instead focus on the overall level of prices. In a 2004 public hearing before the Productivity Commission, Ed Willett (Commissioner of the ACCC and member of the AER) stated that: "Marginal revenue equal to marginal cost has nothing to do with what we do. What we do is more akin to an average cost approach".[16] Indeed, the primary objective of the so-called "building block approach" that has been adopted by most regulators in Australia is the achievement of a level of revenues which matches the expenditure of the firm over time. It does not seek to, and in general, will not achieve the objective of marginal price equal to marginal cost.[17]

Moreover, regulators seem to care not just about the level of airport prices but their rate of change. If minimising deadweight loss is the objective, airport charges should vary – as often as necessary – in line with changes in marginal cost or with changes in the elasticity of demand. Instead, we find regulators actively seeking to smooth changes in prices over time – especially increases in prices. The ICAO Policies on Airport Charges state that "increases in charges should be introduced on a gradual basis". If minimising deadweight loss is the objective, why do we find this emphasis on gradualism? And why do we observe an asymmetry in the treatment of price increases and price reductions?

It is possible to find many more examples of this type of behaviour. In a recent speech, Sibylle Krieger, commercial lawyer and member of IPART describes the price setting process of IPART as follows: "IPART balances the need for cost-reflective pricing against the protection of consumers from excessive price shocks. … It balances the need

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[15] In fact, if the deadweight loss associated with airport charging is smaller than the deadweight efficiency losses associated with taxation more generally, it may make economic sense for a municipal or local authority owner of an airport to raise airport charges to reduce other, more costly forms of taxation.

[16] Transcript of hearings related to the Gas Access Review, page 709. The

[17] The use of the building block approach was considered by the Productivity Commission in PC (2004). If the PC had been consistent in its insistence on minimizing the deadweight loss, it would have recommended that the use of the building block model be discontinued, on the grounds that it does little or nothing towards the objective of minimizing deadweight loss.

for state utilities to invest in capital expenditure in big lumps against the needs of consumers to have prices glide upwards rather than step upwards".[18] Why, if the primary focus of regulators is on deadweight loss, should regulators care about excessive price shocks or the need to have prices glide upwards rather than step upwards? Again, it seems that the deadweight loss hypothesis does a poor job of explaining the way that regulators behave in practice.

In my view the most coherent conclusion is that the conventional economic framework is missing something important. Regulators do not behave in practice as though the minimisation of the deadweight loss is their primary concern. Nor do policy-makers implement rules whose primary purpose is the control of deadweight loss. Putting aside deadweight loss, mainstream economic theory offers no other viable rationale for public utility regulation.[19]

This observation has not, of course, been lost on economists. Forsyth (2001) recognises that the minimisation of deadweight loss cannot explain the existence of airport regulation, but in his case he suggests that regulators are pursuing not economic efficiency but distributional objectives: "The de facto objective of regulation, in the airport context, is to redistribute income, and more specifically, to keep profits at moderate levels". But, on further examination, he finds even this conclusion difficult to sustain:

> "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. … 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. … Thus, the regulatory objective that is applied in practice is not strictly one of achieving some specified distributional effects … *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".[20]

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[18] Krieger (2010).

[19] Of course, other forms of regulation (such as environmental regulation, or consumer protection) have other economic rationales arising from other market failures, but these are not relevant for our discussion of public utility regulation here. In addition, in recent decades there has been a focus on regulation as a tool to promote competition in upstream or downstream markets. However, such competition can be achieved through vertical separation alone (which is already mandated in the case of airports in Australia). In any case, as many economists have argued, achieving the goal of competition in upstream or downstream markets only requires attention to the *margin* between the wholesale and the retail price – through a mechanism such as the Efficient Component Pricing Rule, or an "imputation test". This is not the primary focus of conventional public utility regulation. Indeed, provided such a margin is enforced through some other means (such as competition law), the level of the access price has virtually no impact on the level of competition upstream or downstream.

[20] Forsyth (2001), page 10, emphasis added.

In effect, Forsyth (2001) suggests that there is no economic rationale for the patterns of airport regulation we observe – what we observe is simply a matter of pursuing a pricing rule for its own sake.

This suggestion – that there has been a collective failure of political governance around the world with regard to airports – is not credible. The simpler hypothesis is that the conventional economic rationale for airport regulation flawed. But what, then, is the primary economic rationale for price regulation of airports?

3. The protection of sunk investment as the primary rationale for public utility regulation

The deadweight loss hypothesis does a poor job of explaining the patterns of regulation that we observe in practice. So what then is the primary economic rationale for the regulation of airports and other public utilities? Biggar (2009) suggests that the primary rationale for public utility regulation more broadly is not to eliminate the deadweight loss but rather, to create an environment in which upstream and downstream customers of the monopoly facility are induced to make necessary sunk investments to extract the most value from the monopoly services.

The full story can be summarised as follows:

(a) In most public utility industries, including airports, the users and consumers of the monopoly service must make a substantial sunk investment in reliance on continuing to receive the monopoly service at a reasonable price and quality.

    For example, large users of an electricity transmission network must make a substantial sunk investment in their location or in assets specialised to the consumption of electrical energy. Most of the investment of, say, a large coal-fired generator or a large aluminium smelter, is sunk and cannot be recovered in the event the generating plant or smelter ceases operation. Even small users must make a sunk investment to extract value from the electricity supply – typically in the form of in-house electrical wiring and electrical appliances.

(b) Once the users and consumers of a monopoly service have made a sunk relationship-specific investment in reliance on a monopoly facility, they face a hold-up problem: the risk that the monopolist will increase the price for the monopoly service, or reduce the quality, thereby expropriating some of the value of the original sunk investment. Naturally, downstream users and consumers are reluctant to make these investments unless they have some assurance that the value of their investment will not be expropriated in the future.

(c) In some cases these investments can be protected by vertical integration or long-term contracts between the monopolist and its customers. For some customers of monopoly facilities there is scope for negotiating and enforcing a long-term contractual arrangement. Airlines, for example, can and do enter into medium-term contracts with airports. However, for most small customers or end-users the transactions costs of negotiating a long-term contract outweigh the benefits. Even for larger customers, the costs of negotiating over all possible contingencies are such that contractual arrangements are inevitably incomplete – either limited in time (say five to ten years), or limited in scope, or both. In either case, if the long-term contract is incomplete there arises a risk of future negotiations after

any necessary complementary investments have been sunk. In short, in the presence of transactions costs, private contractual arrangements often cannot fully protect the value of customers' sunk investment in reliance on a monopoly provider.

(d) Where these sunk investments cannot be adequately protected by private arrangements there is a role for public utility regulation – that is, for policy-makers to step in to recreate the long-term contract that the parties would have written if they could have negotiated costlessly with each other before sinking any investment. That long-term contract would be expected to be similar to other long-term contracts involving substantial sunk investments which must address how key terms and conditions will evolve and adapt over time to changing market conditions (public-private partnerships are one possible example). Under that contract, the regulator plays a role similar to an arbitrator: establishing key policies and updating prices as necessary in the light of new information, taking into account the long-run interests of both parties. That contract, by ensuring a long-term stable and non-discriminatory path of prices and services which broadly reflect the costs of providing the underlying services, protects and thereby promotes sunk investments by both parties – the monopolist and its customers.

These ideas can be traced back to the literature on transactions costs economics in general, and Goldberg (1976), in particular, who observed:

> "In searching for a rationale for regulation we should look not at the shape of the long-run average cost curve, but instead at the complexities involved in devising and administering such a contract. … natural monopoly industries will be characterized … not by their alleged decreasing average costs, but by the features which make long-term relationships between consumers and producers desirable…"[21]

Biggar (2009) refers to this rationale for regulation as the "sunk investment hypothesis". He shows that this hypothesis can explain several of the key features of the way regulators behave in practice, such as: (a) the focus on the long-run costs of the monopoly facility as opposed to the structure of charges; (b) the objective of maintaining a broadly predictable path of prices with a minimum of shocks adverse to users; (c) the tolerance for certain forms of price discrimination, combined with the intolerance of other forms (particularly those forms of price discrimination which increase charges for users which make a higher degree of sunk investment); and (d) the intolerance towards peak-load or congestion pricing, combined with acceptance of rationing through the allocation of long-lived capacity rights.

In summary, I assert that public utility regulation in general – and airport regulation in particular – is not primarily about the minimisation of deadweight loss. Rather the primary economic rationale for public utility regulation is the protection and promotion of sunk relationship-specific investments by the customers and end-users of the public utility. Public utility regulation is primarily about creating a framework in which both sides, but particularly the users of the monopoly facility, will make necessary relationship-

[21] Goldberg (1976), page 431. See also Crocker and Masten (1996) and Williamson (1999).

specific investments in situations where transactions costs prohibit vertical integration or private arrangements between the parties.[22]

4. Airport regulation as the protect of sunk investment by airlines and end-users

The previous section suggests that conventional public utility regulation can be thought of as a mechanism for protecting and thereby promoting sunk investment – especially by the users of the monopoly facility. To what extent does this hypothesis apply to airport regulation? To apply this approach specifically to the case of airports we need to show: (a) that airline customers and end-users must make a material sunk investment in order to extract the most economic value from the airport; and (b) those investments cannot be adequately protected through substitutes such as long-term contracts or vertical integration. In addition, if this approach is correct, it should explain some of the key patterns of airport regulation that we observe in practice.

3.1 What is the nature of the relationship-specific investment by airport customers and end-users?

Is it the case that airlines, other direct airport customers, and their end-users must make a material relationship-specific investment in an airport in order to extract the most value from air transport services? The answer seems to be yes.

Let's start with airlines. Many authors have emphasised that airlines and airports must make a substantial relationship-specific investment to extract the most value from providing air transport services. These sunk investments take various forms:

- The marketing of services to or from a particular airport to the general public and general investment in building a "brand" associated with a specific airport;
- The construction or customisation of dedicated terminal facilities, or related facilities such as maintenance, cleaning or catering facilities.
- The upgrade of airport facilities – such as the construction of additional runways, the upgrade of existing runways, or the installation of automated baggage handling and logistics systems – to the extent that such upgrades would not be needed but for the services of the particular airline.
- The development of operating procedures based around specific timetables/scheduling/ plane routings;
- The purchase or customisation of aircraft (and the associated training of flight crew and maintenance staff) suitable for specific airports (some airports have noise or size constraints on the type of aircraft that are allowed to operate);

[22] For a longer exposition see Biggar (2009). Cowan (2007) includes amongst his list of reasons for regulation: "Relationship-specific sunk investments are incurred, often by both the firm and its customers, but the long-term contracts that could ensure efficient *ex ante* investment decisions are not feasible. Specific regulation can act as a substitute for such long-term contracts and can give security to both sides".

- The costs of developing alliances and arrangements with those other airlines operating from the same airport which provide complementary services such as in-coming feeder services or out-bound connections.

- The cost and time of acquiring slots in congested airports in circumstances where those slot rights are not tradeable (as would be the case in use-it-or-lose-it arrangements, such as where slot rights are allocated on the basis of historic traffic patterns, or through international bilateral agreements).

The degree of relationship-specific investment required by an airline will vary from airport to airport. At some, especially minor, airports an airline may invest in little or no on-site facilities or staff. For these airports the sunk investment is limited to the marketing of the services and possibly the development of operating procedures and timetables which make use of that airport. On the other hand, sunk investments are particularly important in the case of "hub" or base airports. At a hub airport an airline configures the flight timetables to allow customers to transfer between flights, to allow for services between a greater range of origin-destination pairs. At a hub airport the airline is particularly likely to have customized terminal facilities and/or have incurred the costs of recruiting a substantial locally-based staff. In addition, where the hub airport is congested, the airline may have incurred costs in acquiring take-off and landing slots which cannot be recovered if the airline ceases to provide services.[23]

The sunk investment of loss-cost carriers is likely to be somewhat lower – since they typically utilise airports which are not slot constrained, and often contract out for key airport services. Low cost carriers and airports sometimes make substantial relationship-specific investments in, say, terminals, airport capacity, or maintenance facilities, particularly at large base airports. However Fuhr and Beckers (2006) argue that the primary sunk investment of low-cost carriers is building brand awareness and mobilising customers in the catchment area of an airport.[24]

Many other authors emphasise the need for sunk, relationship-specific investments by airlines in airports. See, for example, Ben-Yosef (2005), Goetsch and Albers (2007), Niemeier (2009), Holloway (2008) and Ros (2010). The Productivity Commission (PC, 2002) also highlighted sunk investments by airlines:

> "Even without significant interconnecting traffic, a particular airline is likely to prefer operating out of one airport in a city. Spreading services across airports or moving out of a particular airport could involve significant costs, including sunk costs, for an airline. These costs would relate to infrastructure (including terminals), route development, repositioning aircraft, staffing and administration." (page 104)
>
> "… Once heavy maintenance facilities are established at a particular airport, an airline that decides to relocate its facilities may incur sunk costs. As noted by Qantas, for instance:
>
> > These [heavy maintenance] facilities are substantial, and represent sunk investments, with specialised labour requirements. Qantas acknowledges that in

[23] See Fuhr and Beckers (2006), page 394 and Fuhr and Beckers (2009).

[24] Fuhr and Beckers (2006), page 395.

respect of future investment in heavy maintenance facilities, it is able to exercise a degree of choice regarding the location of such future investment (subject to a variety of labour and locational constraints). However, Qantas has little ability to relocate existing sunk investment. In respect of such investments, Qantas is to a degree captive to the market power of airport operators." (page 172)

"… BARA and MTAA Super Fund observed that airlines incur substantial sunk costs when establishing new routes, costs that act as a barrier to entry and exit." (page 193).

The need for sunk investment by airlines has also been recognised by the courts in Australia.[25]. Other direct airport users – such as air freight operators – often also need to make a relationship-specific investment with a specific airport, particularly at a hub or base airport, such as in the form of dedicated freight handling facilities.

Furthermore, in addition to these primary or direct airport customers, end-users, such as downstream consumers of air travel or air freight services must often make an investment in reliance on a particular airport to extract the most value from air transport services. Consider, for example, the position of a company which is potentially a heavy user of air travel services. Let's suppose this company finds there is substantial convenience value in locating near to a major airport. Once that decision has been made and costs have been sunk in customising facilities and hiring and training staff, that company is exposed to the risk of an increase in the price of air travel – which depends, in part, on the airport charges at its local airport.[26] Such a company might be tempted *ex ante* to choose a less desirable location or incur costs to switch to less desirable transport modes.

Even private individuals must, to an extent, make a sunk investment in reliance on an airport. Most cities in Australia are only served by a single major airport. Most individuals have made a substantial sunk investment in their home location – and therefore, indirectly, in their home airport. Suppose that we have two cities – one served by an airport with long-term stable regulated prices and one served by an unregulated airport. Let's assume that individuals are able to engage in a form of Tiebout competition[27] – selecting their home city before making any sunk investment. An end-user who expects to make use of air travel in the future might choose the city with the regulated airport even when that city is a second-best choice in other respects – precisely to avoid expropriation of the investment sunk in a home location *ex post*.

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[25] The Australian Competition Tribunal in the Sydney Airport case accepted the evidence of Mr Ergas that Qantas' "countervailing power is reduced by the significant sunk investment it has in maintenance facilities at airports which reduces the credibility of any threat by an airline to relocate to another airport", Competition Tribunal, Virgin Blue Airlines Pty Limited [2005] ACompT 5, para 492.

[26] A related argument can be made about a range of other services which are complementary to airport services – such as land transport services (e.g., a rail link to the airport, a bus service to the airport), car-parking facilities, car rental facilities, and airport retail facilities. These services may be directly exposed to airport charges in the form of charges for leases, land or retail space. Even where they are not directly exposed to airport charges they may be indirectly exposed in that the potential for future price hikes may restrain the extent to which airlines and other businesses are willing to make a commitment to the airport and therefore the long-term growth prospects.

[27] Tiebout (1956).

To an extent, these downstream users of the airport are even more subject to the hold-up problem than the airlines themselves. Although airlines are exposed to the risk of a change in the structure of airport charges, if there is effective competition between airlines at an airport, any increase in the level of airport charges will be at least partially passed through in the form of higher retail prices for air travel, potentially leaving the margin earned by the airlines unchanged. The scope for end-users to simply pass through airport charges will generally be significantly less.

5.2 Can private arrangements solve the hold-up problem?

Can we rely on private contractual or ownership arrangements to completely solve the hold-up problem between airports and airport users? The answer seems to be no. As the Productivity Commission observes, there is some scope for private contractual and ownership arrangements between airports and "direct" airport users such as airlines. However, the scope for such arrangements between airports and end-users of airports is limited to non-existent.

Again, let's start with airlines. Of course, airlines can and do enter into some medium-term contractual or ownership arrangements with airports – precisely in order to encourage relationship-specific investment.[28] These long-term contracts might be as simple as a long-term lease for land[29], or joint venture or ownership arrangements with specific airport facilities.[30] In some cases, airlines enter into contractual arrangements which essentially give them an ownership share in the airport itself,[31] such as "signatory airline status"[32]. Airports can also encourage airlines to make necessary complementary investments by offsetting costs or reducing risks that would normally be borne by the airline – such as sharing the cost of terminal upgrades, co-operating in marketing strategies, or entering into risk/reward sharing for major airport upgrades.

However, there seem to be two primary reasons why we cannot rely exclusively on such arrangements to solve the airline sunk investment problem identified here:

(a) First, the process of contracting is itself costly. Transactions costs prevent the writing of contracts that cater for all contingencies (so-called "complete" contracts) arbitrarily far into the future. In practice contracts are either reasonably complete but limited in duration, or relatively long-lived but largely incomplete.

    Private contractual arrangements are seldom longer than ten years, yet, the sunk investments that must be made by an airline often have a life much longer than ten years. Even where the life of the sunk investments is less than ten years there is often a need for a series of overlapping investments (in, say, brand awareness)

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[28] See, for example, OECD/ITF (2009), page 48.

[29] As one example, Lufthansa entered into a 65-year lease on land at Frankfurt airport to construct a maintenance facility for the new A380 aircraft. CEPA (2007), page 6

[30] For example: "Terminal 2 of Munich Airport is a joint investment by the airport operating company, FMG (60%) and Lufthansa (40%), the dominant airline at the airport". OECD/ITF (2009), page 48.

[31] See CEPA (2007), page 7.

[32] OECD/ITF (2009), page 48.

which do not all "expire" at the same point in time. In either case there remains a hold-up problem at the time the contract comes up for renewal. Very long-term contracts tend to be "relational contracts" which set out the broad obligations of the parties with recourse to an arbitrator in the event of disputes. But transactions costs restrict such long-term contracts to only the largest players.

(b) Second, vertical integration is often not a practical alternative. Various forms of vertical integration can be observed around the world. In Australia, airlines are permitted to own specific facilities at airports such as terminal facilities. But, airline ownership of the entire airport is ruled out by limits on vertical integration between airports and airlines.[33] These rules are designed to prevent the competition problems (particularly foreclosure and exclusive dealing) that would arise if a major airline were to own one of the major airports in Australia.

The scope for ownership or contractual arrangements to solve the hold-up problem seems even more remote in the case of end-users. Vertical integration between airports and air transport end-users is not typically feasible. Transactions costs considerations largely rule out long-term contracts between airports and air transport consumers.

In the absence of mechanisms for protecting the relationship-specific investments made by airport users, the concern arises that airlines and their end-users will fail to make desirable relationship-specific investments which increase the value of, and/or increase the demand for, air travel services. Specifically:

- Airlines may be less willing to invest in customised terminal facilities which improve customer service, increase productivity and/or expedite the handling of customers;

- Airlines may be less willing to invest in new aircraft or other innovations which require investment or upgrades to specific airports.

- Airlines may be less willing to configure their flight schedules (such as adopting the "hub-and-spoke" model) so as to increase reliance on any specific base or hub airport. Relatedly, airlines may be less willing to incur costs to coordinate flight schedules with other airlines at a specific airport.

- Users of air travel services (such as air freight operators or shipping companies) may choose less desirable locations for their own activities, or may organise their activities around other transport modes, rather than placing themselves in reliance on a single airport.

In this context, there may be scope for some form of the centralised long-term relational contractual arrangement that we call public utility regulation. The role of that regulation is to create a framework which protects and thereby promotes relationship-specific investment, especially by airlines and end-users. Fuhr and Beckers (2006) point out that

[33] Airports Act 1996, section 44.

public utility regulation is the conventional solution to the governance problem arising from the need for sunk complementary investments between airports and airlines.[34]

In brief, airlines and their downstream customers must make a material sunk investment in reliance on services from specific airports. There is some scope for airlines to enter into medium-term arrangements with airports to protect at least some aspect of these sunk investments. However, transactions costs considerations limit the scope and duration of these contracts. Where it is feasible, airlines sometimes take an equity stake in airports or vice versa. However, these substitutes are imperfect, even for airlines, and are largely infeasible for downstream customers of airlines – the end-users of air transport services. The conventional governance arrangement for resolving these hold-up problems is public utility regulation.[35]

3.3 Does this approach explain the patterns of airport regulation which we observe in practice?

To what extent can this approach explain the patterns of regulation we observe in practice? To begin, this approach suggests that we should be most likely to observe conventional public utility regulation in place at those airports without effective close substitutes – that is, those airports with market power – and for which vertical integration or long-term contracting are not an option. On the other hand, airports without any significant local population or with close local substitutes might be expected to be subject to little or no regulation. This is consistent with the empirical evidence mentioned above.

This approach also suggests an explanation as to why regulators focus on the total costs incurred by an airport, rather than marginal costs, and why they might focus on promoting long-term price stability. It is the threat of changes in prices – and, in particular, increases in prices – which most threatens sunk investment by airport users. The focus on only relevant aeronautical costs and the existence of "non-diversion of revenue" rules[36] can be explained as a commitment device, to provide an assurance to airport users that charges will not go up to fund irrelevant infrastructure, expansion into non-aeronautical services, or merely to increase the revenue of the airport owner.

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[34] "The supply relationship [between hub-and-spoke carrier] and hub airport in particular is characterized by high mutual dependency, high frequency, substantial uncertainty, and a high cost of performance evaluation. The [airline's] quasi-rents are rooted in site-specific assets (slots, traffic rights, and maintenance facilities) and specificity of human capital assets in the scheduling process. In contrast to the typical dyadic interfirm relationship analysed in the transactions costs literature the [airport-airline] transaction is usually administered by a government regulator or governed by a (partial) public owner. We proposed that regulators with a high reputation mitigate the [airline's] incentive to craft a parallel private governance structure." Fuhr and Beckers (2006), page 407.

[35] This is not to say, of course, that all forms of public utility regulation are equally effective or desirable. Indeed, in industries (such as air transport) where most of the public interest is represented in a few large users (in this case airlines) there may be scope for regulatory mechanisms which rely primarily on facilitating private agreements with the role of the regulatory authority limited to dispute resolution (See, for example, Littlechild 2010). The approach set out here provides a foundation or framework for assessing which forms of public utility may be appropriate in which circumstances.

[36] In the US most local airports are municipally-owned and are subject to rules that revenue raised at the airport must be spent on maintaining or upgrading facilities at the airport.

This approach also suggests that some forms of price discrimination will be tolerated – such as weight-based charging for take-off and landing, or possibly even different charges for different routes. At the same time, certain forms of discrimination will be disallowed– such as discrimination on the basis of the identity of the airline customer, since this latter form of discrimination allows the airport the discretion to raise prices the greater the sunk investment made by the airline.

Moreover, we can explain the preference of regulators for allocating scarce capacity through tradeable slot-rights versus congestion pricing: Congestion pricing has the potential to expropriate the sunk investment of some airport customers – particularly those who are least able to shift their consumption from peak to off-peak times. In contrast, with grandfathering of long-lived tradeable slot rights, an airport customer can choose to retain and exercise the slot-right or trade it on the market for a higher value. Either way, this latter mechanism preserves the value of any existing sunk investment and therefore would be expected to be preferred in practice.

Overall, it appears that the sunk investment approach goes some way to explaining the broad patterns of airport regulation we observe in practice.

6. Conclusion

Before embarking on a review of the regime for airport regulation in Australia it is fundamental to first understand the basic rationale for that regulation.

In its reports in 2002 and 2006 the Australian Productivity Commission adopted the standard economic framework with its focus on deadweight loss, and argued for the deregulation of airport services. In my view, this focus on deadweight loss is misplaced. Rather than focussing on the minimisation of deadweight loss, public utility regulation is better viewed as an attempt to create an arrangement within which the sunk investments of both sides – but especially the users – can be protected and promoted.

It is widely accepted that in most cases, in order to extract the most value from air services, airlines and their customers must make a substantial sunk investment in reliance on continued access to a specific airport. Airlines can, in some circumstances, enter into long-term contractual arrangements with airports. But those contracts are seldom longer than ten years and often much shorter. In Australia, legislative prohibitions prevent airlines from vertically integrating with airports. Airport end-users – whether businesses or individuals – typically cannot vertically integrate with airports and transactions costs make long-term contracts infeasible. In the absence of any other mechanisms, there is a risk that airlines and their customers will be unwilling to make necessary sunk complementary investments reducing the value and volume of air travel in Australia.

In this context there remains a role for some form of public utility regulation for airports with material market power. That regulation, by providing airlines and their customers of a long-term stable price for access to airport services, will encourage investment in and reliance on the airport services, enhancing the extent of reliance on, investment in, and the value of, air travel. This approach can explain the broad patterns of airport regulation that we observe in practice.

Finally, this approach also provides an economic foundation for public policy towards airport regulation going forward. Policy-makers should design the regulatory regime for airports so as to recreate the long-term contract that the airlines, the travelling public,

and the airports would have negotiated if they could have negotiated costlessly prior to making any sunk investment. This is the standard by which regulatory policy towards airports should be judged in the future.

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