Slot Reform - Rent Seeking of Airlines, Airports and Politicians

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ABSTRACT

Economic rent seeking is the raison d'être of a commercial undertaking and acts as the manipulator of Adam Smith's 'invisible hand'. The retention of economic rent, however, can cause undesirable distortions, especially if it persists over a long period. Public policy, therefore, often seeks to tempt business with the promise of rent, allow business an occasional nibble, but at the same time create structures whereby business cannot swim away with the bait. The discussion here is of how slot allocation procedures have rent seeking implications that affect both the existence of economic rents and the distribution of these rents. The actors in the game are the airlines, airports and politicians (broadly defined to include the executive as well as legislators). The ultimate distribution is essentially a political decision, as is any form of allocation, but its form is influenced by the underlying nature of the market for slots and the way in which market power is spread.

INTRODUCTION

The economics of airports has been changing considerably over time. Those in many countries, such as the UK, have largely been privatized, whilst others, such as the larger ones in Canada, have been corporatized to decouple them from government control. Even where airports remain in public hands, there have been efforts in a number of countries to make them more efficient and market sensitive, often by initiating new regulatory structures or by restructuring the wider framework within which they operate.[1] Many of these developments have come about because of a change in the perception of the role of airports. Whilst some element of public service obligation remains in the thinking about airports, there has been an increasing interest in the unbundling of the various services provided at airports, and in giving the private sector more say in the provision of many of these services (e.g., ground handling in Europe).

The interest here is less with the nature and detail of the actual changes that are taking place, although removing to a world of total abstraction is not intended, but rather it is concerned with the natural reactions and attitudes of the various actors involved in the provision and use of airport services. The focus is on slot reform and looking at changes from the current, essentially incumbent dominated structure that pertains in many countries, to procedures that are more akin to a market system. These latter reforms may involved more rational pricing within relatively unreformed allocation procedures but they may also extend to such things as slot auctions with secondary markets.

Even within this framework, the focus is specific. Much of the literature on slot allocation has been concerned with issues of congestion and the peaks in demands that are placed on facilities.[2] This is an

[1] One should perhaps add to this the role of such entities as the European Union in pushing for a greater decoupling of airports from public control. In the particular context of slots there have also been measures to release capacity from incumbents.

[2] Many of the initial contributions on peak slot fees were concerned with estimation procedures (e.g. Morrison and Winston, 1989). More recently there has been an interest on the incidence of congestion charges on major hub dominating carriers versus minority slot holders (e.g. Brueckner, 2002; Daniel, 1995; Mayer and Sinai, 2003). There is also an extensive literature on the technicalities of slot allocation using auctions and similar procedures. Again this is

important issue and is related to the matter discussed here but is not central too it. The interest here is the implications of various broad structures of slot allocation on the economic rent[3] seeking activities of the various parties (e.g. policy makers, airports, and airlines) that are directly involved. Those ultimately affected – namely the traveling public and freight consignors – are also largely set outside of the scope of the paper. The ways in which airport slots are allocated of course have implications for them, but it is one step further along the production chain. Once slots have been allocated to airlines, how these are then used and their costs passed on to airline users is outside of the purview of our discussions. Where the issue of congestion is important is in the distinction between location rent and economic rent. The former is a genuine resource cost. In the context of this paper it is a reflection of the opportunity cost of using land as an input to air transportation supply rather than some other use. This is of limited interest here. Economic rent is associated with the exploitation of monopoly power.[4]

It is also specific in a second sense. The paper only looks at the economic rent extraction from a given capital base. It follows the normal approach of assuming that the physical capacity of the airport (or airport system) is fixed. There is no discussion of how either the total amount of economic rent generated by the airport, or the ways in which it may be distributed, can affect investment decisions. The excuse is simply one of space. Quite clearly their acquisition of economic rent affects how various actors view investment, its scale, its form and its method, of finance. But in practical terms, airport capacity decisions are seldom constrained by a shortage of finance. Planning procedures and environmental considerations mainly drives them.

The emphasis is also on slots and the economic rents associated with their various allocations. These are not the only assets associated with an airports and they are not the only ones that raise issues of rent seeking and distribution – there are hotels, car parks, retail outlets, lounge facilities, etc. (Forsyth, 2004; Golasazewski, 2004). Treating slots in a largely independent manner is perhaps somewhat unrealistic. There is inevitably a degree of joint supply of many outputs at an airport. But again it does mean discussion of the slot issue is much easier.

Finally, the discussion says little about network effects. Airline services provide numerous links between the airport hubs and, therefore, ideally the topic of economic rent attainment should be couched in a network economics context. This can be particularly so if there is a single entity (public or private) with control over a set of complementary or competing airports. Networks are complex and, although adding important nuances to some arguments, can be largely avoided if one thinks in terms of airports being providers of services and airlines being their customers that area also interested in rent seeking.[5]

THE SIMPLE ECONOMICS OF RENT SEEKING

Initially it is perhaps useful to look at some of the basic implications of rent seeking, and in particular to look at the distributional implications of alternative allocative mechanisms in a very general way. A basic diagrammatic approach is adopted, and Alfred Marshall's well-known words certainly should be borne in mind – 'It is to be remembered that graphical illustrations are not proofs. They are merely pictures corresponding very roughly to the main conditions of certain real problems'.

Figure 1 represents for simplicity the costs (MC) and demand for slots (D) associated with a single runway airport. For ease of presentation the demand curve is drawn as linear, and the cost curve is horizontal. There

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not discussed here but Grether et al (1981, 1989) are examples. The argument thus has more to do with the way slot congestion is created and the ways in which it is (or may be internalized) than with rent seeking per se.

3 Perhaps the clearest definition of what neo-classical economists understand by rent is to be found in Alfred Marshall (1920: 129, fn.2). Essentially, in its purest form it is the return to a factor that is completely inelastic supply. More generally it is said to be earnt whenever a factor of production receives a reward that exceeds the minimum amount necessary to keep the factor in its present employment.

4 The air transport literature has recently seen a resurrection of discussions about exact definitions of rent, and in particular where actions such as airlines' yield management strategies fit into this. This is not discussed here but for one view sees Levine (2002).

5 For a discussion of the economics of networks see Economides (1996)

is assumed to be adequate capacity to meet all effective demand currently in the market.[6] The issue is the very simple one of the overall level and distribution of benefits from alternative allocating mechanism assuming that only airlines and an airport is involved. It is assumed, unless stated otherwise, that both the airlines and the airport are seeking to be economic rent maximizers.

- *Competitive airlines/competitive airport*. This yields the Pareto outcome of a price of P_2 and an output of Q_2. The combined rent of buyers and sellers is maximized as the area **afP_2**. The airlines enjoy all of the surplus from the use of the airport[7]. The same outcome would emerge if the airport were a monopoly that is regulated requiring it to marginal cost price its slots.

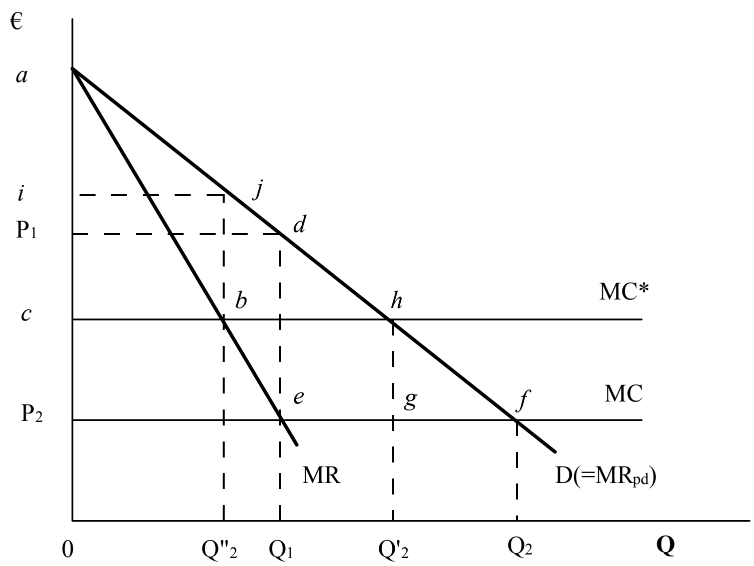

Figure 1. Illustration of cost and demand for airport slots

- *Monopoly airline/competitive airport*. Since the airport has no market power, the airline will be able to force it price its slots down to the airport's marginal cost of providing the slots, P_2. The airlines will again gain all of the economic rents, again **afP_2**.[8]

- *Competitive airlines/single pricing natural monopolist airport*[9]. This is the neo-classic case of a monopoly with slot prices reaching P_1 and the number of slots limited to Q_1. The gains from the airport's activities are shared between the airlines (**aP_1d**) and the airport (**P_1deP_2**). But there is a welfare loss equal to the area **dfe** – the Harberger (1959) 'deadweight loss triangle'. This is the sort of institutional structure that one could imagine under a regime where the airport sets its slot prices at P_2 and then allows any airline to take up slots at this rate with subsequent slot swapping allowed. If once the slot fees have been paid the airlines can buy and sell slots, then there would

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[6] If there were a binding physical capacity constraint at a level before Q_2, as strict classic theory would require, then the MC curve would become vertical at the point capacity is reached. This does not affect the fundamental tenure of the rent seeking argument as presented here, and is thus ignored. But in these circumstances charges become a rationing device for the limited capacity as well as a reflection of the costs incurred in providing the existing capacity and as a means of extracting economic rent.

[7] This is rent that is going to the airlines in the sense that their willingness-to-pay as mapped by their demand for slots is a reflection of what they can earn from the final consumers of air services – passengers and freight consigners.

[8] In the case of a declining cost situation, the airport would not be able to recover full long-run marginal costs and in the consequential absence of a core market instability would ensure (Telser, 1978)

[9] For simplicity it is assumed that the airport is confronted with the same demand for its slots irrespective of whether the market is competitive or not and the only effect is on whether it can equate MC with MR or not.

be transfers of benefits between them to the extent of **aP$_1$d** with no effect on either the airport's rent or aggregate welfare.

- *Competitive airlines/single pricing institutionalized monopoly airport*. Here the price and output combination is the same as the above but the airport will potentially enjoy a smaller rent and social welfare will be less. Tullock (1977) argues that there is likely rent dissipation in this case. The airport to retain its institutional monopoly will be willing to expend up to **P$_1$deP$_2$** to defend this position –e.g. through lobbying, political support, advertising and legal actions. Even a small amount of rent is preferred to none. Since such actions are essentially non-productive, not only does it cost the airport money but it also represent a loss of social welfare.

- *Competitive airlines/perfect price discriminating natural monopoly airport.* In this case, through such actions as auctioning of individual slots, the airport can extract slot prices down the demand curve. This action produces for the airport economic rent of **afP$_2$** with the airlines having none. The outcome maximizes welfare[10].

- *Competitive airlines/single natural monopoly airport with X-inefficiency*. Leibenstein (1966; 1979) argued that monopolies have limited incentive to minimize their costs but rather operate in an inert area where there is little incentive to seek maximum efficiency.[11] If this is the case then the cost curve will rise to MC* and the single profit maximizing monopolist limit the supply of slots to Q''_2 and extract rent of **ijbc**. The airlines will be left with **aij**, but perhaps most important, the social welfare associated with slot use will be **cbjfP$_2$**less than when there is competition in both the airline and airports markets.

- *Competitive airlines/perfect price discriminating natural monopoly airport with X-inefficiency*. The situation here is that the airport will provide Q''_1 and enjoy rent of **ahc**, with the airlines taking none. Compared with the situation where there is no X-inefficiency, the total social welfare is reduced by **chfP$_2$**.

CONSIDERING SOME OF THE SIMPLIFYING ASSUMPTIONS

These simple diagrammatic representations are insightful in highlighting the role of various market structures in determining the aggregate rent available and how it may be distributed. But they have their limitations. It is helpful to remove some of the simplifications inherent in these diagrams.

Decreasing Cost Problem

Airports, and in particular their runways, are not normally seen as constant cost entities. Runways are capital-intensive investments with low marginal maintenance and operating costs. The resultant downward sloping cost function makes full cost recovery difficult without some degree of monopoly power.[12] This problem, however, is far from unique and many industries have been forced to find innovative ways of tackling the problem. Indeed, seeking mechanisms for full cost recovery have provided a fruitful area of study for economists from the inception of the railways. There are in fact numerous ad hoc ways in which full costs may be recovered. Briefly these option encompass in the airport context:

- *Direct subsidies*. On the premise that airports meet a public need and sometimes, although erroneously, their services are seen as public goods, governments have provided direct subsidies for airport development and operations. This approach has tended to become less popular as the

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10 De facto this means the AR curve represents the airport's marginal revenue curve with price differentiation. The outcome is this Pareto optimal.

11 The inertia may be brought on by a variety of factors such as the considerable managerial effort required to negotiate labor contracts when confronted by unions.

12 Airlines offering scheduled services may also require a degree of monopoly power if they are to recover their full costs (Button, 1996). This issue is not discussed here.

commercial potential of airports has been realized and issues of X-inefficiency have raised questions about the effectiveness of direct subsidies.

- *Natural market power.* Provided the demand curve is outside of the airport's cost function there will be a single slot price that will ensure costs can be recovered. Perfect price discrimination again extracts all economic rent for the airport.

- *Institutional market power*[13]. This gives the same results as a natural monopoly airport, although the legal structure of the monopoly arrangement may limit the power of an airport to exercise extensive monopoly power.

- *Internal coalitions.* Airports in a competitive situation could theoretically combine to seek the power of a cartel to extract sufficient revenues to cover their full costs. Such coalitions between airports are rare and when they do exist they are often aimed at reducing costs rather than generating cost recovery revenues.

- *Internal cross-subsidization*. If some activities are highly profitable but their viability is dependent on other activities then the full costs of the latter may be partly covered by transferring revenues from the profitable activities. This is possible when airports gain significant revenue from commercial concessionary activities. It is the standard joint product case.[14] The interesting issue then becomes that of optimization of prices and investment between the two activities if they are not strictly in joint supply – which can lead to policy debates such as those involving the 'two till' versus 'single till' argument (UK Civil Aviation Authority, 2002).

- *Long term contracts between supplier and customer.* The normal aim of this strategy is to obtain a guaranteed revenue flow that allows the supplier to adjust capacity to meet this predetermined demand. There is limited scope for doing this at airports because of the physical nature of the infrastructure.

- *Unbundling of services*. Airports provide a range of services, not all of which are directly related to airline operations. Airports have clarified their costs by outsourcing or privatizing some of their activities. Many major US airports, for example, have airline owned/leased terminal facilities. This removes some items from their cost function and makes clear where core costs lie.

- *Two-part tariffs.* Two part tariffs involver an explicit elements to cover fixed costs. This has been a long-used mechanism for telecommunications companies but is seems of limited scope at airports.

- *Vertical integration.* Vertical integration allows control over the 'value chain' that feeds costs into the activity under review. Airports seldom have ties with links further up the chain (e.g., air traffic control and global distribution systems).

- *Discriminate pricing.* Airline through their yield management systems have engaged in price discrimination but airports have seldom been able to do this. In some instance, such as the US there are legal constraints that prevent such actions. The accountancy-based-rules of the International Civil Aviation Organisation also make any form of discriminatory pricing for international services difficult.

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13 One would include here international gateway airports, although there are other institutional structures that confer considerable monopoly power – e.g. the Wright Amendment gives Dulles/Fort Worth considerable monopoly power over long haul services into and out of the region. This also involves cases where a group of airports in operated by a single entity with institutionalized monopoly power across the group. The BAA structure may in very broad terms be seen to operate in this way.

14 In some cases, such as Spain, there is extensive cross-subsidization across airports.

The difficulty for any individual industry, including airports, is to find a mechanism that is practical, ensures sufficient income is generated, and has low transactions costs associated with it. In many cases a combination of approaches are adopted – in part these may be seen as strict cost recovery measures, but also in part when there is a profit motive they may act as a rent seeking device. Separation of these components usually involves significant challenges.

Objective functions

The diagrammatic analysis above assumes that both airlines and airports seek to maximize their profits. This may not be the case. Airlines have recently been the subject of numerous measures to inject much more competition into the sector, but in the past have been viewed as providing public services. The US domestic air cargo industry was deregulated in 1977 and the Airline Deregulation Act of the following year removed economic controls from the passenger market. The three 'Packages' of reforms from the late 1980s have resulted in a liberalized intra-European market. These changes, combined with the privatization of airlines in Europe and the imposition of anti-trust and mergers policies in many major markets have resulted in significant reductions in air fares (Figure 2 provides details of the European Union situation.) One may safely conclude that airlines are in general seeking to maximize their rents within a competitive environment[15].

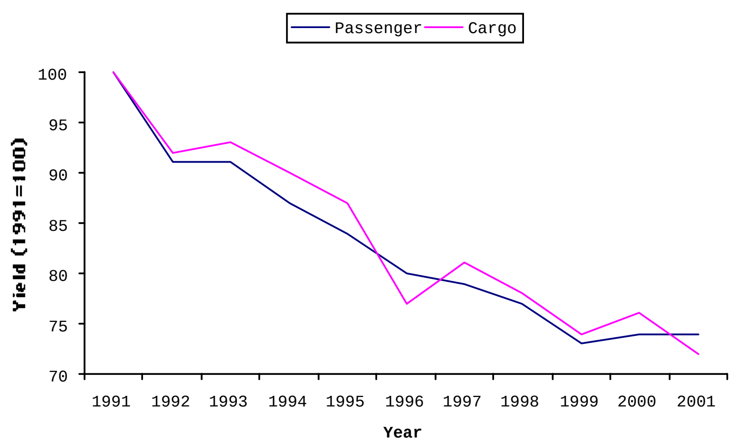

Figure 2 Passenger and cargo yield for European Union scheduled airlines

Airports, however, often remain in public hands (albeit frequently at the local or state rather than national level) and are often managed on a system wide basis with considerable amount of cross subsidization (e.g., as in the Spanish system.). The motivation driving the management of airports is thus not always that of rent maximization even when there is a high degree of monopoly power involved. In many cases the airports are seen as part of regional policy and their strategic managerial goal is to assist in a larger planned development of a region.[16] To attract industry to an area, the airport often set slot rates at below long-run cost. In some cases airlines are subsidized to fly to the airport[17].

[15] In both the US and the EU there are programs of financial support to ensure that a limited number of specific services meeting social needs are provided but these are put out to tended in a manner that reflects competition for these markets.

[16] In public policy terms this is often referred to as the 'Continental Approach'. It treats airports as a part of a larger entity and strict internal efficiency of airport operations is not a necessary criterion in this context.

[17] There is a fundamental legal difference here between whether the airline is subsidized from state funds (which is a subsidy as the EU Court of Justice found in the case of Strasbourg Airport) or from private companies that collectively guarantee the sales of a minimum number of tickets (as happened at Wichita in the US.)

How an airport approaches rent seeking in these circumstances is not clear. Many airports are given the explicit objective of meeting demand and to recover costs in doing so. This offers little incentive for X-efficiency let alone rent seeking. Provided that sufficient revenue is forthcoming the objective is to push out utilization of the airport to the point in Figure 1 where average costs – in this simple case marginal costs – are recovered but leaving the rent to the airlines with the aim of stimulating lower fares. There is no incentive when there is limited capacity to ensure that airlines that could enjoy the greatest benefit would gain use of this capacity.

In other circumstances, even when there is private ownership, fear of monopoly exploitation can call forth regulatory controls that act as de facto restrictions on the ways in which rent is allocated between the airport and customer airlines. In general, the aim is to ensure a distribution of rent that maximizes aggregate welfare and offers and incentive for acceptable future levels of capacity expansion. The price-capping mechanism deployed by the UK government over the BAA is an example of such a measure.

Taxation

The simple analysis is devoid of any consideration of taxation. It assumes that the undertaking (airline or airport) that extracts economic rent will enjoy this rent. In some cases, as with many US commercial airports, the authorities circumscribe how these rents may be used and hypothecation to airport enhancement is a common regulation. But there is also the issue of the government extracting revenues for general revenue or for sumptuary taxation purposes.

Prudent fiscal policy indicates that taxes result in the least distortion when applied to goods or services that have low demand elasticities and where collection costs are low. Airports are limited in number and their accounts are relatively simple meeting the latter criteria, and if there is extensive economic rent this suggests in itself a relatively low demand elasticity.[18] Added to this, air transportation is highly income elastic, indicating that it is a superior good and thus the imposition of indirect taxes is unlikely to be regressive. If shadow prices are attached to reflect social welfare preference functions then this provides a normative justification to tax rents.

The tax regime can thus limit the rents that airlines and airports receive, but they may also impact on the distribution of these rents through their incidence. Since by definition the taxation authority is a monopolist, if its aim is to maximize revenue then it will devise a tax structure that extracts all the rent from the airlines and airport irrespective of which is the original recipient. It would, in conjunction, foster a regime that would allow the aggregate rents to be maximized – for example giving a monopoly license to an airport and allowing it to auction slots. If, as an alternative a target level of revenue is sought then this raises problems of defining a tax structure that also meets secondary goals regarding the incidence of taxation and also entails the nature of any supplementary regulations that may be imposed.

THE POLITICAL PERSPECTIVE

Even this very basic discussion of the magnitude and distributions of the rents associated with airport slots highlights the importance of the underlying market structure. But market structures are not neutral entities, governments can influence them. Much has been written on the various mechanisms of slot allocation – the 'grandfathering approach', slot charges, slot auctions, secondary markets, slot-trading etc. But the implications of each of these must be set within the overall underlying market structure and the governance associated with this structure. This in turn leads to the political motivations that underlie the de jure structure that is in place and its de facto operation. Put simply, institutions are important.

As the Public Choice School of economics emphasizes, rent seeking is not just the prerogative of industrial players. The policy-makers themselves have a vested interest in the ultimate market structure and the way it performs in terms of the rents they enjoy (Buchanan and Tullock, 1962). The form this rent takes depends

[18] Strictly, a tax on pure economic rent will not have any allocative effects in a neo-classical framework because of the fixity of supply.

upon on how the political decision-making process is viewed, and it may well not be in terms of a financial return to all actors.[19] There is, for example, a well-established body of thought within the Philadelphia School of economists about the objectives of corporate leaders that transcends simple monetary rewards, and this approach can be extended to political decision-makers with little modification.[20]

If there is the belief that politicians seek to serve the public interest then a definition of public interest is needed. If this is the simple one of maximizing social welfare then the Hicks-Kaldor criteria would indicate that any move towards a regime that increases the combination of rents enjoyed by airlines and airports is desirable – who ultimately gains is then a separate political decision.[21] From a purely efficiency perspective it does not matter whether the airport allocates slots using marginal cost principles or whether there is a monopolist supplier employing perfect price discrimination. The political consideration in a democracy, however, is which of these alternatives is more attractive to the median voter, or more generally if the electorate is sensitive to various ways of taxing that can bring about an alternative allocation of the rents.

There is a significant amount of evidence that maximizing potential rents may not be a first-best political objective to attract the median voter. In particular, work by Bruno Frey and others over the years have highlighted the prime importance politicians and administrators put on the immediate distributional implications of policies – subsequent redistribution having a second order effect.[22] Matters of equity and fairness can be a major driver. In many cases monetary compensation may also not be valued in the same way as actual physical implications. There is also mounting evidence that individuals are often more interested in the relative impacts of policies than in the absolute effect. In other words, the neo-classical assumption of independent utility functions may not be valid.

In these circumstances politicians may not seek to maximize utility, but rather seek to ensure that the expectations, or desires of specific target groups of the electorate are met. The slot allocation procedure that is politically supported may thus see specific groups benefit not only at the expense of other groups but also at the expense of overall economic efficiency. The motivation for doing this and interfering with the allocation mechanism may, for example, involve protection of a national carrier for strategic purposes and defense reasons. This is not just a matter of rent distribution between airlines and airports, but rather it favors specific carriers. There may be certain groups in society that politicians wish to attract, for example regular business users around the airport. In this case the allocation process may be designed to assist the retention of carriers meeting this demand at the expense of other airlines, and of the airport.

Policies are also influenced by the actions of administrations. Although administrations in democratic systems are meant to implement policies passed by legislatures, in practice control over information flows, coupled with an inevitable flexibility in interpretation, provides administrators with the ability to pursue their own agendas to some extent. Just as politicians may not have agendas that maximize the rents from slots, so do administrators (Posner, 1975; Niskanan, 1971).

In particular, administrators by capturing parts of the allocation process have the opportunity to enhance their own utility. This may take a variety of forms, for example in terms of developing large bureaucracies and complex administrative structures offering career ladders, or the 'gold plating', with its associated prestige effects, of the facilities that they are responsible for. It may be argued that in doing this, the administration is seeking to overcome potential market failings but in itself it has immense potential for

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19 In the case of dictatorships the aim may well be the basic one of the dictator extracting the maximum financial rent. But Stigler (1971) views regulation and control by politicians within a democratic system as 'commodities' upon which the forces of supply and demand play. Interest groups, wishing to benefit from particular policies demand them. Politicians seeking election or re-election supply them. Within this framework there is the scope for coalitions of interests to emerge, in our context either within airlines or airports, or embracing participants from both groups to define a slot allocation procedure that maximizes their joint objectives.

20 Isolating political rent, however, is even more difficult than financial rent but the recent cases before the European Court of Justice do offer tentative evidence that local politicians do see economic rent in supporting their regional airports.

21 This is simply a refection of Robbins (1932) view of the distinction between normative and positive sciences.

22 This extends over a wide range of issues, for example see Frey (2001)

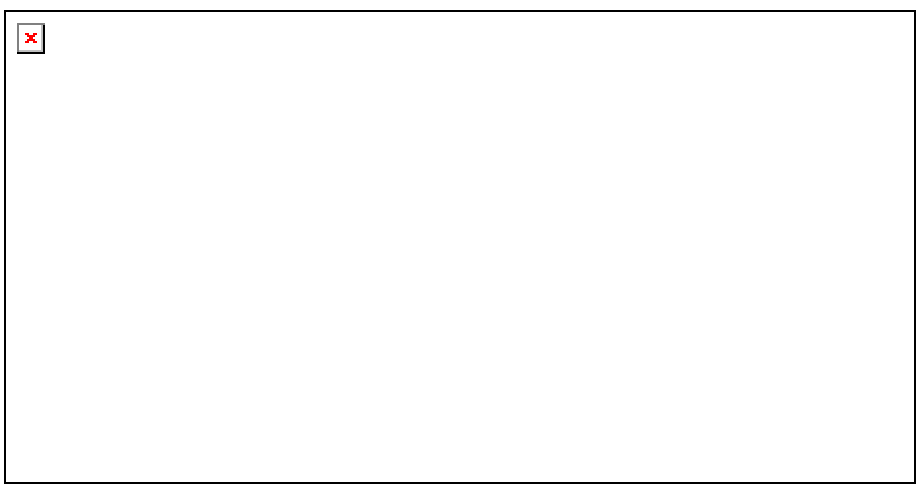
creating even larger market intervention failures. There would also seem to be the tendency to support the constituency that has most affinity with administrators, namely the management of monopoly undertakings.

THE FINANCIAL POSITIONS OF AIRLINES AND AIRPORTS

Isolating what in the real world is rent and what is not is no easy matter. In particular, there is the problem of defining normal profits that fit within the cost function rather than being excess above it. What can be done empirically is to look at the financial performances of airlines and airports in recent years. This does not give a full indication of the rents that are being earned because the cost benchmark requires a normal profits component. This is not readily measurable in industries where there are very different levels of risk involved. There are also difficulties in most of the standard measures used to look at financial performance. Some require an initial input of the opportunity cost of capital that is largely a subjective matter – e.g. the Economic Value Added (Stewart, 1964) or Cash Value Added approaches.

Here operating margins are used, in part because they are a relatively standard indicator, but also because they are available for airports and airlines in a fairly consistent manner over time. They suffer, however, from the varying costs of equity capital incurred in different sectors, and from the differing capital/equity mix that the airlines and airports tend to have.[23] Considerations of whether an airport or airline is privately owned or publicly owned (or a mix) also influence the importance of the operating margin as an indicator of rent.

Figure 3 provides details of the financial performance in terms of their operating margins of US, European, and global scheduled airlines over the recent past. It is clear that over the past 15 years or so the returns of the airlines have fluctuated considerably. They average out at round about a zero operating margin, or even slightly less. What a viable long-term return should be is debatable, but for an industry of this kind it is likely to exceed 4% and probably over 6%. The indications are, therefore, that very limited amounts of rent are being enjoyed by airlines as an entity, although individual carriers have either consistently (e.g., Southwest in the US) or periodically defied this pattern.

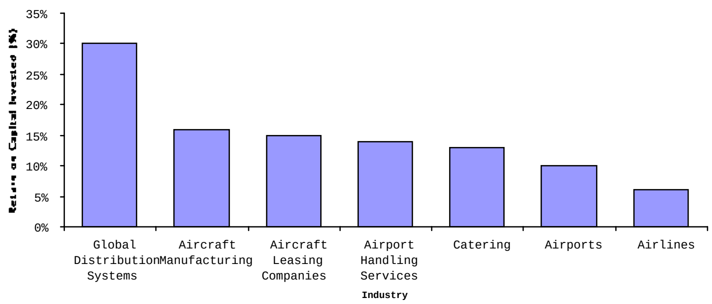


Note: An omitted observation indicates missing data and not a zero operating margin.
Source: Data from Boeing, Association of European Airlines and International Air Transport Association.

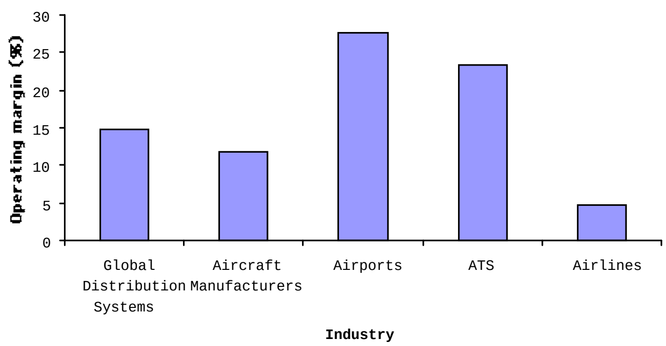
Figure 3 Operating margins of airlines 1988-2002

[23] For a discussion of estimating the cost of equity capital for airlines see Turner and Morrell (2003). Their calculations involving a number of carriers from around the world indicate a wide range of cost of equity, from 6.7% for British Airways to 0.9% for Lufthansa.

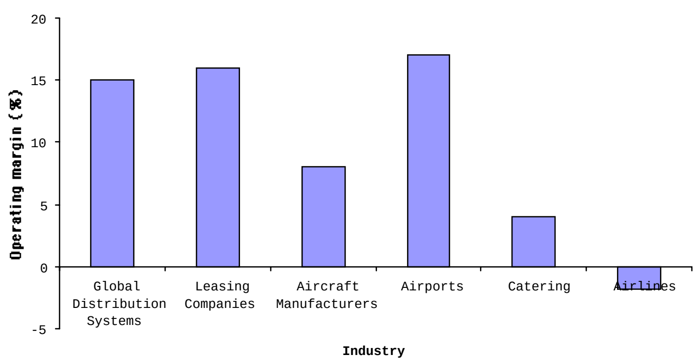
Making comparisons of the returns enjoyed by airlines with the potential economic rents being enjoyed by airports is far from easy, and the findings should be treated as little more than indicative. Figure 4 looks at the returns that airlines are enjoying vis-à-vis other actors in the air service supply chain (or value chain).



McKinsey calculations of return on capital invested (1992-1996)



Airline Business calculations of operating profits (2000-2001)



Operating profits for Europe from company accounts and AEA data (1999-2001)

Figure 4 The returns for various sectors within the air transport supply chain.

The data offer information from three independent cross section studies that looked at the situation during various periods over the past 15 years. They differ in terms of how returns are measured – two use operating margins, and one uses earnings on capital – and in the ways in which the elements in the chain are defined. They also differ in the geographical markets covered – the McKinsey and *Airline Business* analysis being based on the global picture. What is important about the graphs is the consistency with which one finds airlines doing poorly and other elements in the chain doing relatively well. Airports in particular would seem to have been earning higher returns over at least parts of the 1990s.

Caution must, however, be exercised in interpreting these results. Airports are highly capital intensive, require significant periodic capital injections, and have extensive amounts of long-lived assets, whereas airlines have a smaller capital base and can lease or outsource many more of their activities. The latter practices having become more common since markets have been liberalized and airlines have sought greater flexibility in their operations. There are also institutional differences that make comparisons of the intrinsic underlying market structures difficult. The airlines also tend to compete in their markets, either along links or across networks, whereas many of the airports in the studies were state owned or regulated. Nevertheless, the findings do raise important issues about where rent is being extracted in the air transport services supply chain under the current regimes of slot allocation.

Another way of looking at the ability of airlines and airports to engage in rent seeking is to consider the market powers that each enjoy. As highlighted above, institutional and market structures are important determinants of both the overall levels of rent extracted and the distribution of this rent. The airline market, with the exception of a small number of international routes is largely deregulated in terms of market entry, capacity, and fares in both the US and the EU.[24] But this market is somewhat distorted by the existence of large carriers that result from the combination of legacy effects and economies of scale, scope and density that larger operations enjoy. In some contexts this gives larger carriers the ability to exercise some degree of power over airports that they serve and influence slot allocation procedures. While a rather primitive measure of market power, the proportion of throughput of traffic at an airport associated with each carrier offers a proxy. Table 1 provides an indication of this potential monopoly power enjoyed by airlines. The potential for economic rent extraction would seem to be greater in the US than in the UK.

Table 1. Flights by the three lead carriers at US and European Airport

Airport	Carrier 1	Carrier 2	Carrier 3
		Top 10 US airports ranked by passengers	
Atlanta	Delta Air Lines 73.7%	AirTan Airways 14.6%	American Airlines 2.3%
Chicago	United Airlines 47.0%	American Airlines 38.6%	Delta Air Lines 2.2%
Los Angeles	United Airlines 30.8%	American Airlines 19.0%	Southwest Airlines 13.8%
Dallas/Fort Worth	American Airlines 63,3%	Delta Air Lines 25.7%	United Airlines 1.6%
Dever	United Airlines 53.3%	Frontier Airlines 15.1%	Great Lakes Aviation 12.2%
Phoenix	America West Airlines 51.1%	Southwest Airlines 27.27%	United Airlines 3.6%
Las Vegas	Southwest Airlines 27.7%	America West Airlines 27.7%	United Airlines 8.7%
Houston	Continental Airlines 82.7%	American Airlines 3.4%	Delta Air Lines 3.0%
Minneapolis	Northwest Airlines 80.3%	American Airlines 3.6%	Delta Air Lines 2.9%
Detroit	Northwest Airlines 79.4%	American Airlines 3.8%	Delta Air Lines 2.8%
		Top 10 European airports ranked by passengers	
London Heathrow (3)	British Airways 41.6%	bmi 12.1%	Lufthansa 4.8%
Frankfurt (7)	Lufthansa 59.4%	British Airways 3.6%	Austrian 2.9%
Paris Charles de Gaulle (8)	Air France 56.6%	British Airways 5.1%	Lufthansa 4.9%
Amsterdam (9)	KLM 52.2%	Transavia 5.5%	easyJet 4.3%
Madrid (14)	Iberia 57.0%	Spanair 12.7%	Air Europa 7.1%
London Gatwick (21)	British Airways 55.1%	eastJet 12.8%	flybe British European 5.6%
Rome (31)	Alitalia 46.2%	Air One 10.0%	Meridiana 3.9%
Munich (35)	Lufthansa 56.8%	Beutsche BA 6.6%	Air Dolomiti 6.5%
Paris Orly (36)	Air france 64.2%	Iberia 8.2%	Air ittoral 3.6%
Barcelona (38)	Ibera 48.55	Spanair 9,4%	Air Europa 5.5%

Note: Figures in parenthesis indicates world rankings by passengers
Source: *Airline Business* June 2003.

[24] The transatlantic market is largely deregulated as the US has pushed through its Open Skies policy. The only major restrictions involve some UK-US origin-destination pairs.

The recent growth in the importance of low cost carriers and their innovative business models suggests that the rent seeking potential of airlines at some markets may be growing (Mason et al, 2000). Figure 5 indicates the various cost elements in low cost and full service European airlines cost functions together with their absolute values. The low cost carriers pay less for landing fees than do the full cost airlines. This may in part be explained by the fact that many of the low cost carriers, such as Ryanair, do not use major termini. The opportunity costs, even with the existing structure of slot fees, is thus less at the regional airports being served. In addition to this, however, the low cost carriers are often monopoly or quasi-monopsonists at regional airports and as such can exercise local market power in these circumstances.

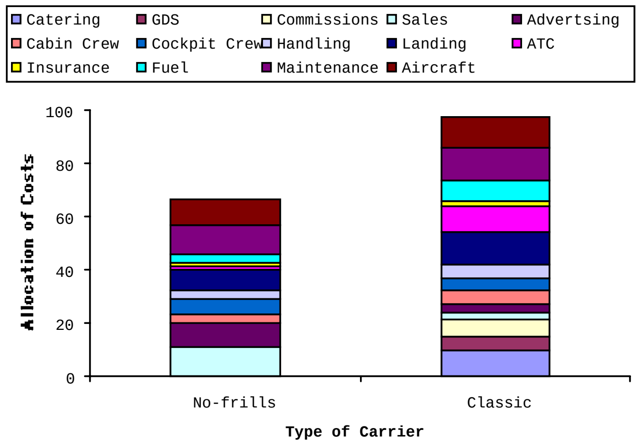


Figure 5 Relative cost structures of European low-cost carriers and traditional full-service carriers

CONCLUSIONS

This paper has sought to offer a broad view of the complexities involved in analyzing the economic rents that can be associated with airport slots. The emergent climate under which air transportation services are increasingly being provided moves airlines and airports away from entities that see their rationale in terms of meeting a public service obligation to one of commercial viability and profit making. This is sometimes tempered as a residue of public sector involvement and regulation remains, most notably on the airport side, but even here the pressure for greater commercialization is growing. In a commercial environment economic rent extraction can act as an incentive to allocate resources more efficiently, but much depends on the institutional environment in which competition takes place and on the technical abilities of the players to themselves act and price efficiently.

Much has been made of the potential of slot auctions for enhancing the efficiency of their use. But as we have seen, whilst this may allow for a more efficient use of slots in terms of the ultimate accepted bids reflecting the willingness-to-pay of airlines, it may not provide an incentive for airports to offer the optimal numbers of slots up for auction. Without the airports themselves being economic rent maximisers there may be significant inert areas and associated high levels of X-inefficiency. There may also be political and administrative incentives not to maximize the rent available to airports and airlines, if this impacts on the rents of decision-makers and policy overseers. These, and other possibilities abound and must be subjected to empirical testing. At present, however, it is difficult to carryout quantitative work, even on the financials associated with rent seeking, because of the intrinsic problem of establishing relevant cost benchmarks. Until this is possible ex ante quantitative assessments of the efficiency and distributional implications of alternative slot allocation arrangements must be largely ad hoc.

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