

AIRPORT MANAGEMENT AND AIRLINE COMPETITION IN OECD COUNTRIES

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Abstract: Airport management practices must be examined from two different perspectives. Firstly, a single entity can manage an integrated network of airports or be responsible for only a few sites. Secondly, airport authorities can be owned either by public institutions or by private firms. These practices have a wide range of effects on the ability of an airport to attract the airlines most suitable for its operations. In addition, any competitive airline strategy depends fundamentally on airport access. In this paper, our main goal is to analyze airport management trends and their effects on airline and airport competition. We undertake this analysis through a benchmarking procedure for the OECD countries.

Keywords: Air transportation, infrastructure competition policy

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1 Introduction

An increasing number of countries have pursued airline liberalization since the United States (US) government deregulated its domestic market in the seventies. Although international services are still regulated in several geographical areas,¹ it can be said that travelers currently enjoy greater choice, higher service frequency and lower prices. There is a strong agreement that the achievement, maintenance, or increase of these benefits in the post-liberalization period depends fundamentally on the existence of effective competition on routes. Discrimination in the access of airlines to airports (particularly airports well suited to be hubs) determines to great extent such competition on routes.

In addition, commercialization (and in many cases privatization) is becoming a general trend in the airport industry in the sense that airports are increasingly run as commercial business and not as public service organizations. There are two causes that explain that airports are mostly been considered as a commercial business, regardless owners belongs to the public

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or private sector. First, airline liberalization has brought competitive forces to the whole chain of the aviation industry, especially with the growth of low cost carriers. Second, the need of undertaking capacity expansions along with constrained public budgets has promoted the involvement of private firms and/or a profit-maximizing behavior. This new scenario has brought opportunities for airport competition and so for further efficiency gains.

The influence of airport dominance on airline competition is the subject of an extensive empirical literature, which focuses mostly on the U.S. case.² However, less attention has been devoted to airport management practices and their role as a potential barrier to air transport competition. Indeed, the particular arrangements between airports and incumbent airlines condition the opportunities for new entry or expansion by other firms. Furthermore, when airports are owned by public institutions or organize as a group, they can prevent any form of airport competition.

The objective of this study is to examine the effects of airport management on airline and airport competition. Our methodology takes as starting point the analysis of the most common airport practices in terms of ownership, finance and airline access policies for the OECD countries. Then, we analyze possible types of airport and airline competition, stressing interactions between both agents.

2 Airport management practices in OECD Countries

In this section, we review airport management practices in the OECD countries. We focus attention on the European Union (EU) and the United States. One consequence of the diversity of the EU countries has been that all possible practices across OECD countries (except for the U.S.) can be found in this geographical area. However, the U.S. case needs specific analysis due to the large size of its aviation industry and the particularities of its airport business. We use as main sources of information for this section reports from *OECD* (1998), *Federal Aviation Administration* (1999), *European Commission* (2002) and *Commonwealth of Australia* (2002).³

¹ There are important exceptions to this rule. Indeed, US alone has well over 50 open skies agreements for international services and almost the entire European market is deregulated.

² Major contributions refer, among others, to *Borenstein* (1989), *Brander/Zhang* (1990), *Evans/Kessides* (1993), *Brueckner/Spiller* (1994), *Marín* (1995), *Berry et al.* (1996) and *Dresner et al.* (2002).

³ Furthermore, it is worth noting that the works of *Doganis* (1992) and *Graham* (2002) provides an excellent general overview of airport management practices.

2.1 European Union

2.1.1 Ownership

Most airports in the (EU) have traditionally been considered public service organizations. Hence, public ownership, albeit with control at different territorial levels of government, has predominated, and airports have been managed either as a national group or individually. However, the privatization policies implemented in the last decades have reached European airports. Hence, a range of different airport ownership types has arisen in the last two decades.

In several countries national governments retain full ownership and control of their airports. In these cases, airports are usually organized jointly as a national network. We can find examples of such airport groups in Spain, Portugal, Greece (outside Athens), Finland and Sweden,⁴ although there are privatization plans in Portugal. National control is also the case in the new accession countries with the exception of Hungary, Malta and Slovenia, where private firms are involved in the major airports.⁵ Under this model of management, a state-owned entity controls the relevant features of the airport business (decisions on investments, finance, marketing policies and allocation of new space for airlines). It is worth noticing that all these countries but Spain are characterized for having only one large airport and a small domestic market for flights. Indeed, Spain is the only EU country with critical size whose airports are managed as a totally integrated network exclusively owned and managed by the State.

Airports not structured as a national network are usually managed individually or as a small group by a public or private authority.⁶ In this way, some international airports remain effectively under national government control but have been converted into single corporations. The national government can be the sole shareholder, as in the case of Aéroports de Paris (ADP), which manages the Paris airport system, or the recently created Dublin Airport Authority Plc, which manages the Dublin airport. It can also be the major shareholder. Relevant examples of the latter form are Amsterdam Airport, Schipol (AAS), and Athens, Spata, airport. Other shareholders in Athens come from the private sector, while the national and regional government jointly own Amsterdam.⁷

⁴ Airports in Norway are also organized as a public network.

⁵ There are privatization plans in several new accession countries, such as the main airports in Cyprus, Czech Republic, Estonia and Slovakia.

⁶ It is common that neighbour airports are owned by the same operator. This is for example the case in the regions of Lombardia, Hesse or Randstadt.

⁷ In the latter case privatization is currently planned.

Regional and local governments have full or partial ownership of many European airports, although several of these airports are involved in a gradual process of privatization. Examples can be found in the United Kingdom (Manchester, Newcastle, Leeds and several smaller regional airports), Italy (Milan system, Pisa, Venice and several smaller regional airports) and Belgium (all commercial airports outside Brussels).⁸ Yet another form is found in French airports (outside the Paris system) and some Italian airports (such as Bologna) where management is by local chambers of commerce and industry. A rather complex scenario arises in Germany, where traditionally airports have been jointly owned by the federal, regional and local governments. Since private firms are increasingly involved in some airports, the current picture is quite diverse. Indeed, private firms and local governments have equal shares in Hamburg and Düsseldorf airports, while a private firm has a minority stake in Frankfurt. Regional and local governments are the major shareholders in Munich, Berlin and Köln/Bonn, where the federal government retains a minority stake in the capital of the airport authority.

Finally, a substantial number of airports in the EU have been fully or partially privatized. There are two possible privatization models. First, publicly listed airport groups, such as BAA plc (which owns and manages three airports in London, and also those in Glasgow, Edinburgh, Aberdeen and Southampton) and Fraport AG (which owns one third of Frankfurt airport shares and manages and/or owns 15 airport companies around the world). Second, airports managed individually with the private sector as the major or unique shareholder (Rome, Naples, Vienna, Copenhagen, Brussels, and several regional airports in UK). Ownership of the land and of the company that manages the airport are usually separate. While ownership of the land remains under public control (except in some airports of the United Kingdom, most notably airports managed by BAA), management is in charge of the private sector through management contracts or operating concessions.

2.1.2 Finance

Most network providers are financed with revenues from aeronautical charges and other commercial income. Given their structure, cross-subsidization between individual airports within a group can be substantial. Although cross-subsidization should take place from large profitable airports to small unprofitable airports, this is not necessarily the case (*Bel/Fageda* (2005)). In general terms, major airports managed on an individual basis are also self-financed through revenues from regular operations and commercial concessions. However, smaller

⁸ This is also the case of the two main Swiss airports (Zurich and Geneva).

regional airports usually require operating subsidies from governments. In addition to this, several airports have funded capital expenditures with grants and loans from different territorial levels of government, regardless of management is undertaken on an integrated or separate basis.

Although income from concessions (car parks, retailing activities, restaurants and so on) are increasingly an essential source of airports revenues for all OECD airports, aeronautical charges still play an important role, especially in the interaction between airlines and airports. In this light, it is worth noting that pressure on airport aeronautical charges has increased with the emergence of low cost carriers and the periodic financial difficulties of traditional airlines. In fact, several regional airports have succeed in attracting low cost carriers to their site through subsidies so that aeronautical charges can be in those cases even negative. Since many of these regional airports are still in public hands, competing airports and airlines has claimed about the existence of State aid that distort market conditions. On the contrary, it is argued that small regional airports can not be profitable due to the existence of scale economies at low levels of traffic and indivisibilities of airport expansions (*Gillen/Hall (1997)*, *Martin/Roman (2002)*, *Pels et al. (2003)*). Furthermore, it is also argued that low cost carriers can promote regional development. An important example of this debate was the financial aid provided by the Charleroi airport and the Wallon region to the major European low cost carrier, Ryanair, which was partially rejected by the European Commission.⁹ To this regard, the European Commission has recently published guidelines on financing of airports and start-up aid to airlines departing from regional airports with the goal of establishing the conditions for which public subsidies to airports and public aid to airlines is permissible.

Within this context, it must be said that the two main aeronautical charges in European airports are landing fees for aircraft using the runways and passenger facility charges for use of the terminal building. Landing fees are based on a unit rate per maximum take-off weight of the aircraft (MTOW).¹⁰ Generally, the basis of the passenger facility charge is departing passengers, a fee typically paid by the airline (and included in the ticket price) that varies depending on whether the destination is international or domestic. In the majority of EU member states, the setting of aeronautical charges is usually subject to some form of economic regulation. Economic regulation varies according to the scope of airport activities that are

⁹ Commission Decision 2004/393 EG, OJ L 137/1.

¹⁰ Exceptions can be found at some airports, most notably at London airports. In those airports, instead of a unit rate based on MTOW, there are fixed charges differentiated by peak and off-peak rates.

regulated or the method of regulation.¹¹ Typically, the scope of economic regulation in terms of airport services and functions focuses on aeronautical services. Aeronautical services are regulated within the context of a single-till where the aeronautical charges are set taking into account the non-aeronautical revenues of the airport.¹² Regarding different methods of economic regulation, price-cap regimes are currently applied at Ireland, at the three London BAA airports and Manchester in United Kingdom, at Hamburg in Germany and at Vienna. Less formal regimes exist in public networks, such as Spain or Portugal.

2.1.3 Access of airlines to airports

Airline access to European airports is determined fundamentally by slot allocation rules,¹³ which in turn are based on Council Regulation (EEC) No 95/93 and IATA-coordinated rules. In practice, however, allocation follows historical precedence (or “grandfather rights”); the user of a slot can claim the slot in the subsequent season. In addition, the “use it or lose it” rule applies; an incumbent carrier may lose its right to a series of slots if it has not used more than 80 per cent of the series. Available slots are put in a “pool”, 50 per cent of which is to be available for new entrants. Two carriers may exchange slots on a one-for-one basis.¹⁴

Additionally, it is needed to mention that scheduled airline services operating on international routes are largely controlled through a system of bilateral air service agreements. These agreements (made by the corresponding governments) have traditionally determined market operations through regulations on the designating airlines, the points to be served in each country and even prices and the frequency of air services. Importantly, bilateral agreements between the U.S and European nations have contained, until recently, a nationality clause that excluded airlines from other EU member states from the negotiated routes (e.g.; an agreement between the U.S. and the United Kingdom did not allow French or German airlines to fly from London to U.S. cities). On November 2002, the European Court of Justice ruled that nationality clauses violate the freedom of establishment principle contained in Article 43

¹¹ See *Oum et al.* (2004) for a recent study that analyses the effects of alternatives methods of economic airport regulation.

¹² However, in the United Kingdom there is an influential debate about reviewing the current regulation regime. The UK’s Civil Aviation Authority (CAA) claims that the single-till system should be replaced by a dual-till where aeronautical charges would be set strictly in relation to aeronautical costs. The CAA argues that such a system would deal efficiently with excess demand by setting prices that reflect both the costs and the scarcity of airport facilities.

¹³ A slot is usually defined as the right to schedule an aircraft arrival or departure on a specified day within a specified time frame

¹⁴ In Europe, there is an official statement that airlines may swap slots, but without financial transfers. However, in practice financial transfers can effectively take place. For example, slot-pairs at Heathrow have changed hands

of the Treaty. At the end of 2005, the European Union and United States authorities seem to be near to reach an open skies agreement for the North-Atlantic market. It is expected that this agreement will lead to a consolidation process among carriers involved in the major alliances.

2.2 United States

2.2.1 Ownership

The Federal Aviation Act of 1958 established that a public owned entity, the Federal Aviation Administration (FAA), would be in charge of the U.S air transport industry. The two broad responsibilities of the FAA involve the safety and efficiency of civil aviation. In order to tackle these responsibilities, the FAA performs a number of tasks, such as licensing and regulating all commercial airports and administering Federal grant programs for the capital improvement of airports.

There are approximately 5,300 airports for public use in the United States. Around 10 per cent are commercial-service airports.¹⁵ Local and regional governments (cities, counties, and states) own most commercial airports but they can be managed through commissions, special departments of city or state governments, advisory boards, single-purpose airport authorities, or multi-jurisdictional regional authorities. While all airports used by commercial airlines are publicly owned, there are a few small, general aviation, recreational facilities in the United States that are privately owned.

2.2.2 Finance

Major funding for US airports comes from user charges (both aeronautical and non-aeronautical), private and public bonds (which are usually tax exempt and carrying low interest rates), passenger facility charges (per-passenger fees to finance airport expansion) and federal, state and local grants. In contrast to other countries, aeronautical charges depend on the contractual arrangements established with the corresponding airlines. Indeed, it is particularly important to mention the role of the use and lease agreements between airports and signatory airlines. These agreements specify the financial obligations and other responsibilities that each party assumes with regard to the use of the airport's facilities. Although practices vary greatly, use and lease agreements are usually of three types: residual, compensatory, and hybrid

for side-payments of 10m euros or more. Furthermore, some carriers have begun to show slot values as balance sheet assets (We thank to an anonymous referee for comments on this issue).

Under residual use and lease agreements, airlines agree to assume the financial risk of running the airport. Airlines guarantee that the airport will break even by paying fees that generate revenues equal to the remaining ("residual") costs of operations when all (or a specified percentage of) non-airline sources of revenue have been considered. Under compensatory use and lease agreements, airlines typically pay only for the facilities and services they actually use, leaving the airport to assume the financial risks and rewards from non-airline facilities. Finally, a hybrid use and lease agreement is a variation of the two types that generally takes the form of excluding selected non-airline activities from the residual cost pool. A typical example of a hybrid use and lease agreement is one in which only the airfield remains in the residual pool; i.e., through landing fees signatory air carriers cover the cost of airfield operations that remain after aircraft parking fees and fuel-flowage fees have been collected.

In choosing among these agreements, airport managers face a trade-off. Residual agreements transfer the financial risk of operations but limit the airport's control of sources and uses of funds. In fact, such agreements often deny the managers profits that might finance investments, leaving them dependent on external financial sources. Compensatory agreements, on the other hand, subject airports to the cyclical trends of the industry, but managers have control of their facilities. A hybrid agreement can be considered a middle point in terms of financial risk and airport control.

According to a 1998 Airports Council International-North-America (ACI-NA) survey, residual and hybrid agreements make up from sixty to eighty per cent of all agreements. Furthermore, majority-in-interest (MII) clauses frequently accompany both types of agreements. A traditional MII clause is a contractual provision requiring the airport operator to consult with and seek approval of a prescribed percentage of signatory airlines for any proposed capital project.

On the other hand, how an airport's facilities in the terminal building (gates, check-in counters, etc) are to be used by airlines depends on whether the contractual agreement specifies either an exclusive, preferential, or a common-use arrangement. An exclusive-use arrangement typically assigns one airline the right to use airport facilities for a specified duration and the right to sublet or assign the facilities, conditioned on the prior written approval of the airport

¹⁵ Commercial service airports are legally defined as airports (1) with scheduled passenger service, 2) that annually moves 2,500 passenger or more, and (3) that are publicly controlled, with public ownership of the airfield.

managers. Preferential-use arrangements generally give the tenant airline the primary right to use the facility when it has operations scheduled. Finally, common-use contracts leave airport facilities totally under the control of the airport. The choice of arrangement determines, to a great extent, the airport dominance of incumbent airlines. According to the ACI-NA survey results, exclusively or preferential leased gates were the predominant gate arrangement at 30 large and medium airports in 1998.

2.2.3 Access of airlines to airports

In the U.S., airport slot allocation is fundamentally a domestic policy issue. In fact, access to runway capacity in U.S airports is very influenced by the contractual arrangements covering the use of terminals in that tenant airlines (under exclusive or preferential use arrangements) can block the entry of new airlines. However, the FAA has determined that a carrier may not be denied access to an airport solely based on the non-availability of currently existing facilities and that some arrangements for accommodation must be made if reasonably possible. However, first-come-first-served rules for slot allocation continue to limit access.

It is interesting to point out here that the High-Density Rule, which relies on market mechanisms to allocate slots, determines airport access at some of the busiest U.S. airports: Chicago O'Hare, Kennedy, and LaGuardia Airports in New York, and Washington National. Indeed, current regulations allow slot holders to sell, trade or lease their domestic slots, after a prescribed minimum period of usage, and permit slots to be held by any party meeting certain FAA qualifications.

2.3 Other countries

All features regarding ownership models, airport finance and particularly slot allocation rules discussed for the EU case apply also to great extent to the rest of OECD countries.

In Australia, until 1996 a publicly owned company, the Federal Airports Corporation (FAC), managed the 22 largest airports of Australia. In that period, the Australian government sold private operators through long-term leases (50 years with an option to renew for a further 49 years) 17 of the 22 largest airports. The largest Australian airport – Sydney - was also privatized in 2002. Interestingly, price-cap regulation was in place at several privatized airports until 2001. In that period, regulation was substituted by monitoring although it was decided to establish a review of the new scheme every five years that could recommend re-regulation. Additionally, it is worth noting that a relevant particularity of the organizational structure of

the main Australian airports refers to the management of the domestic terminals. Since the late 1980s, the two major domestic airlines, Ansett and Qantas Airways, have operated their own domestic terminals under long-term leases negotiated prior to the establishment of the FAC. Under the leases, which usually run to around 2018, airlines are responsible for all operational features at the terminal. In addition, at some airports, including Melbourne and Sydney, airline responsibility extends to providing and maintaining terminal infrastructure, with the airport operator providing only the land for the domestic terminals under the leases. As discussed above, this type of arrangement is also only common in the US.

Until 1994 Transport Canada, a publicly owned entity, had owned and managed as a group 149 Canadian airports, including commercial airports and local airports for private aviation. At that time, the National Airports Policy established a new framework for airport management in Canada. The federal government retained ownership of the 26 commercial airports, which serve more than 90 per cent of all air traffic in Canada, making up a defined national airports system consisting of the airports in the national, provincial and territorial capitals and those that handle at least 200,000 passengers per year. However, it has transferred their management to not-for-profit local airport authorities through long-term leases. Ownership and management of 69 regional and local airports with scheduled traffic below 200,000 passengers per year was offered mainly to provincial and local governments. In addition, it was a created a national fund (based fundamentally on revenues obtained from the 26 main airports) to finance investment and operating losses of the smaller regional and local airports. Aeronautical fees are not based on a detailed formula but charges are required to be competitive and non-discriminatory.

In Mexico and Korea, national governments have been the traditional owners of airports and have managed them on an integrated basis. However, airports in Mexico were privatized at the end of 1990s through operating concessions for companies that manage different geographical groups of airports. Finally, publicly owned airport authorities manage airports in Japan. These authorities are under control of national and/or regional/local governments. There are currently plans for privatizing Tokyo, Osaka and Nagoya airports.

3 Competition in the air transport industry: the interaction between airports and airlines

In this section, we analyze different types of airline and airport competition, stressing the interaction between both agents. We first review the scale advantages that airlines can obtain

from a high level of operations in an airport. Second, we study how the competitive strategies of airlines have affected the way in which airports can compete between each other.

3.1 Airline competition

Competition in the provision of air transport services depends highly on airport access issues, especially in congested hub airports. Indeed, prices and service frequency are considered the main determinants of airlines demand, and both features depend on the scale of operations that airlines have in an airport. In order to understand this fact, it is advisable to tackle some concepts of airline economics.

First, on the supply side the seminal study of *Caves et al.* (1984) distinguishes between density economies and scale economies. Density economies refer to unit cost variations due to increases of output on the route. Scale economies refer to unit cost variations due to proportional changes both in the size of the route network and in the output on each route of the network. The existence of density economies is commonly accepted, but there is not clear evidence of scale economies (*Tretheway/Oum* (1992)). Combining density economies along with constant scale economies has an important implication: It is not necessarily cost efficient to have just one airline dominate all the main airports of a national network. However, concentration of services in a few airports has a strong cost reducing effect for an airline.

Second, on the demand side mention must be made of the existence of two different types of travelers. Business travelers are mainly time sensitive, while leisure travelers are mainly concerned with price. Furthermore, air transport is one of the main examples of industries with consumer switching costs (SC). This is due to the use of frequent flier programs (FFP) by airlines in order to create brand loyalty in the travelers who have bought their services. Indeed, as long as travelers use the services of different airlines they lose opportunities to obtain points for several advantages, such as free trips. If we consider these two characteristics of the demand, it is easy to see that the demand-side benefits that an airline can obtain from a high airport presence come mainly from service frequency. Higher service frequency allows a better adjustment to the most preferred flight schedule of travelers, which reduces waiting time.¹⁶ High service frequency also increases the demand-side value of FFPs. Indeed, major carriers offer a greater number of destinations (and so a free trip is more valuable) and a higher service frequency in each airport (and so the accumulation of points is faster) than smaller airlines.

The demand-side advantages of high slot holdings, which relate fundamentally to business passengers, are accompanied by the cost-side advantages (through density economies) that can be exploited particularly on the leisure segment of the market. Both demand and cost side advantages can be mainly exploited by airlines that have network dominance of an airport system. Table 1 shows the high proportion of total departures that hub carriers supply in most of the largest world airports.¹⁷

Table 1: Major airline share of departures in selected world airports (2002)

US Airports	Major airline share (%)	EU Airports	Major airline share (%)	Other Airport	Major airline share (%)
Houston	82	Vienna	65	Toronto	73
Minneapolis	80	Helsinki	61	Zurich	66
Detroit	79	Frankfurt	59	Vancouver	56
Atlanta	76	Paris CDG	57	Sidney	52
Portland	69	London GTW	56		
Philadelphia	69	Munich	55		
Dallas/Fort Worth	66	Copenhagen	54		
Washington Dulles	66	Madrid	52		
Denver	60	Rome FCO	49		
Newark	60	Milan MXP	49		
San Francisco	56	Barcelona	49		
Seattle	55	Manchester	44		
Phoenix	47	Amsterdam	43		
Miami	45	London LHR	40		
Chicago O'Hare	44	Brussels	27		

Source: ATRS Benchmarking Report (2004)

The competitive advantages that airlines can obtain from developing large scale operations in an airport brings us to the question of the inefficiencies that are derived from the slot allocation rules that govern airport access all over the world. This is particularly relevant due to the increasing congestion at most of the largest airports. Indeed, grandfathering makes it difficult for a new entrant to obtain desirable slots, and even if an airline does obtain slots for new or expanded services at a congested airport, it may still be at a disadvantage (that is, a lower scale of operations and/or more inconvenient schedule times) against an incumbent airline. Even under the "use or lose" rules or the new entrant's reservation of 50 per cent of new slots, there are usually very few slots available in the main airports. As a means of

¹⁶The generalized cost of a trip includes both the monetary cost and the time spent on it. In this way, the waiting time is the difference between the most preferred and the actual flight schedule and so, it is a component of the cost of the trip in terms of time.

¹⁷ As we will explain below, it is worth noting that low cost airlines operating from non congested airports have succeeded in competing with network carriers on many routes both in US and EU. However, the "low cost effect" also relies on the dominance of a few secondary hubs so that they can also offer a high flight frequency.

promoting competition in the slot allocation process, the introduction of market principles, such as slot auctions, higher posted prices or the development of a secondary market for trading slots have been suggested in several studies (*Starkie (1998)*, *Sentance (2003)*, *Maldom (2003)*, *NERA (2004)*). In the U.S domestic market, the scenario is even worse because many airports have adopted lease and management practices that may effectively yield control over their airport facilities to incumbent airlines.

3.2 Airport competition

All airport services depend on airlines offering flights from their facilities, so airport competition involves rivalry to attract airline activities. That rivalry is shaped by the nature of competition between airlines, and all over the world, airlines are pursuing one of two strategies to compete. First, mainly major carriers follow the “network model”. This strategy involves the establishment of international alliances in order to offer an extensive network of routes through an efficient exploitation of connecting traffic. Second, the “low cost model” involves offering point-to-point services with low fares. Both competitive strategies require the development of a high scale of operations in one or several airports. Indeed, low cost airlines offer a high number of non-stop flights through secondary airports that are located near to big cities, while alliances feed their airport hubs through the connecting traffic that comes from short or medium-haul routes. This trend in the airline sector is likely to affect airport competition. In this way, we can outline two prominent forms of airport rivalry to attract airline services. Airports can either compete to attract low-cost carriers or strive to be the transfer hubs of international alliances.

Barret (2004) points out the following attraction factors for low cost airlines: low airport charges, quick turnaround time and check-in, single-storey airport terminals, no executive/business class lounges, good catering and shopping at airport and good facilities for ground transport. In terms of price competition, the large decline in airfares since the market entry of low-cost carriers has raised the share of airport charges in the price of an airline ticket. Low-cost airlines are, thus, likely to pay only a small fraction of the traditional airport charges. In some cases, airports must even offer subsidies to maintain low-cost services. In terms of non-price competition, passengers of low cost airlines require a simple airport product because they travel on point-to-point journeys.

Network airlines want quite a different facility. Airport managers must guarantee a significant amount of runway capacity to accommodate the banks of arriving and departing flights that operating a transfer hub requires. Airports also should assist airlines in the smooth

operation of the hub by offering them sufficient gates in close proximity to each other and well-located business lounges. Baggage transfer also needs to be efficient and connecting times reduced to the minimum. In many instances, airport charges levied on transfer passengers are also lower than on the rest of passengers.

As *Starkie* (2002) suggests, there are significant economies/network externalities that tie the individual airline to the hub airport and make it more difficult for rival airports to attract airlines and passengers through price or non-price competition. Indeed, both airlines and passengers gain from a concentration of air transfer services. Airlines gain from concentrating services at a transfer point because it permits the use of larger and more efficient aircraft at a higher utilization rate (i.e.; higher load factors). Passengers gain from increased frequency and network scope.

However, airline alliances do compete with each other over hubs, with the consequence that there is a degree of competition (although indirect) between the hub airports. In this way, transfer traffic can account for a sizeable proportion of the total traffic of a hub airport and this traffic is considered to be sensitive to different price/frequency combinations offered via different hubs. This is the case, for example, of the four leading European hubs (London, Amsterdam, Paris, and Frankfurt) that compete vigorously for the transfer traffic addressed to intercontinental destinations (*Lijesen et al.* (2001)).

Additionally, although airlines incur some sunk costs when moving their operating base (or splitting their operations over more than one airport location), the market power of a hub airport may be restricted where it is held by one airline (as in Europe) or few airlines (as in US). Indeed, there is often the possibility that such airline(s) could move all or part of its(their) operations to an alternative site. In Europe, Lufthansa has set Munich as a secondary hub, Alitalia is moving its operating base from Rome to Milan and British Airways has reduced services from its secondary hub, Gatwick. In the U.S., it is claimed the existence of an oversupply of hubs (*Boston Consulting Group* (2004)). To this regard, Delta has recently withdrawn all services from one of its main hubs, Dallas Fort Worth, and similar movements are expected to take place in the following years.

The emergence of these two forms of airport competition has important implications for the airport industry. Indeed, airports that do not succeed in becoming a transfer hub of network airlines or an operating base of low cost carriers can face serious difficulties in their development in later years. This is particularly true for regional airports that do not have a

sizeable catchment area to develop a dense network of point-to-point services. In this way, airline competition seem to favor concentration of traffic in a very few airports (*Boston Consulting Group* (2004)). In addition, demand segmentation can take place in the airport industry so that it is not clear the degree of competition that can arise in the future between hub airports of network carriers and operating bases of low cost carriers.

Certainly, airports located in the same urban area or airports that share the same hinterland are in the best position to compete with each other. This would be case for example for New York, Los Angeles, Tokyo, Sidney, London, Paris, Berlin or Milan. However, such competition is often restricted through the common ownership of the major airports within the same urban area.¹⁸ Additionally, airports organized as a group can prevent important efficiencies derived from such competition.

4 Concluding remarks

There is a diversity of airport ownership models across OECD countries. Indeed, airports can be managed as public-owned group networks or as an autonomous entity owned by national, regional or local governments, private firms, or a mix of both.

Airport financing mechanisms follow common trends across OECD countries. There is an important exception in U.S., where such mechanisms are very influenced by the particular arrangements between airport and airlines. However, the general principle in all the airports is the self-sufficiency of the system, which mainly depend on the ability of generate revenues from aeronautical charges and non-aeronautical incomes. Price regulation schemes are applied in the majority of airports through a great variety of forms, although the regimes are usually more formal when airports are privately owned or managed.

Access of airlines to airports, particularly to runways, is determined by international slot allocation procedures, such as "grandfather rights" or the "use it or lose it" rule. In addition, there are often clauses in favor of new entrants when new slots are available. The influence of these general principles is relatively less important in the case of U.S. airports, where domestic traffic predominates.

The lack of market mechanisms in the slot allocation process means that new entrants face many difficulties in developing a sufficient scale of operations to be competitive in all major

airports, which, in turn, tend to be congested. We can recall in this sense that the largest airlines can enjoy both demand and cost side advantages derived from airport dominance.

Finally, we want to remark that airline deregulation and airport commercialization have brought new opportunities for airport competition. Indeed, airports can compete to attract airline services. Price competition is especially relevant in the attraction of low cost carriers, whereas non-price competition (runway capacity, minimum-connecting times and so on) is particularly important in attracting network carriers. The increasing involvement of private operators in the airport management could also stimulated further competitive pressures in this industry. In addition to this, several airports can share an urban area or hinterland.

However, while airline competition opportunities seems to be improving in routes out of the major congested hubs, several features of the airport industry will probably limit the extent of airport competition. To this regard, it is worth noting that scale economies at low levels of traffic make difficult the profitability of the smallest regional airports. Additionally, airports are usually considered as major contributors of economic development and capacity expansions are associated with substantial indivisibilities. Thus, governments will likely maintain some influence on them. Indeed, in spite of the increasing role of private firms in the management of airports most of them are still owned and managed by public institutions. Furthermore, several national airport systems are run as a group network and neighboring airports do not necessarily compete since they are often owned by the same firm.

Privatization and decentralization of airport management arises as possible policy responses in an increasingly competitive environment. From our point of view, competition should be especially stronger when airports are managed on a separate basis

¹⁸ However, there are some examples of vigorous competition between airports located in the same urban area, as it happens in Brussels or Belfast. In London, Luton and City airports impose competitive pressures on BAA airports.

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