



## **The Market power of Airports, Regulatory Issues and Competition between Airports<sup>1</sup>**

**by Bülent Hancioglu<sup>2</sup>**

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<sup>2</sup> Bulent Hancioglu was student at HUB and a member of the project “German Airport Performance” (GAP) at the Berlin School of Economics (FHW Berlin). Contact: email:[hancioglu@yahoo.com](mailto:hancioglu@yahoo.com)

### **Abstract**

In recent years there have been major changes to both airlines and airport industries, as a result of increased deregulation and greater competition between airports. This paper analyses competition between airports in this new situation.

First we describe the market power of airports and the rationales for the regulation of the prices of airport services. Secondly, we describe the traditional price regulation practices in the airport business and talked about their advantages and disadvantages. Thirdly, we focus on competition between airports and its effects on the aviation industry.

In the last section of the paper, we attempted to bring together the concepts of regulation and competition, and considered issues like whether competition between airports will make price regulation obsolete. One conclusion of my study is that when competition between airports exists, price monitoring approach will perform better in terms of total welfare than traditional price regulation. Moreover, we analyze the competition between Düsseldorf and Cologne/Bonn airports in a case study. If it is privatised in the next years as planned we claim that there is no need for regulating Cologne/Bonn airport charges

*Key Words:* Airport regulation, Market power of airports, Airport competition, Price monitoring approach in the airport industry

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[WWW.GAP-PROJEKT.DE](http://WWW.GAP-PROJEKT.DE)

Prof. Dr. Hans-Martin Niemeier  
Hochschule Bremen  
Werderstr. 73  
28199 Bremen

Prof. Dr. Jürgen Müller  
FHW Berlin  
Badensche Str. 50-51  
10825 Berlin

Prof. Dr. Hansjochen Ehmer  
Internationale Fachhochschule Bad Honnef  
Mühlheimer Str. 38  
53604 Bad Honnef

### 1. Introduction

Airports have an important function in the aviation system. To define it as simple as possible, airports take part in the process of transporting passengers and freight from one place to another. This way, they increase the wealth of the regions they are located in, by providing new employment possibilities and bringing more tourists to their regions. Until 1980's, airports were regarded as natural monopolies in their role of providing the required infrastructure for passengers and airlines. However, they were not seen as active providers and they were not believed to have the ability to alter the level of the demand for airport services. But after the 1980's, with the deregulation of the airline market which aimed to promote more economic development of the aviation industry, airlines started to search for new ways to reduce their costs. At those times, they also pressured airports to reduce the charges of the aviation services they offered. And since most of the public airports were operating inefficiently and public authorities did not want to support financially the loss making ones any more, commercialization and privatization of airports seemed to be a solution to make airports more efficient. If airports were more market oriented, they would be able to improve their cost efficiency, service quality and maximize their profits. The UK, Australia, New Zealand and Canada were pioneers in the airport privatization process and the first privatized airports in the world were the three London airports<sup>3</sup> and BAA's (British Airports Authority) Scottish airports (Gillen and Niemeier, 2006).

But can airports still be considered natural monopolies after these privatization processes? In other words, should airports be regulated to curb their monopoly profits? The answer to these questions was generally positive at the end of 1980's but then different views arose claiming that airports were not natural monopolies anymore. There were also changes in the regulation of private airports and more incentive based regulation practices became more popular. Later on, competition between airports gained more attention especially after the emergence of Low Cost Carriers (LCCs) and the increase in the ability of airlines to switch their flights from one airport to another. But how does competition work in the airport business in essence and can we think of competition as a substitute for the price regulation of airports?

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<sup>3</sup> These three London airports were Heathrow, Stansted and Gatwick which are operated by BAA under common ownership.

I started this paper by talking about the sources of the market power of airports, whether airports need to be regulated or not, what types of airport price regulation are common throughout the world and what are their advantages and disadvantages. Further, I focused on the issue of competition between airports, gave information about how airports compete with one other, explained the strengths and weaknesses of airport competition and talked about the effect of airport competition on the price monitoring approach. Lastly, I finished my paper by examining the strength of competition between Düsseldorf and Cologne/Bonn airports in Germany and commented on the need for regulation at these airports as a result of competition they face and their reduced market power.

### **2. The Market Power of Airports**

The main reason for regulating airports is their potential abuse of market power. To express it as simple as possible, by raising prices above costs they earn higher profits, but this increases airfares and as a result the consumption of air travel decreases. These high prices also result in a reduction of total welfare.

#### **2.1. Economic Costs of Inefficient Pricing**

This loss of welfare is explained through the existence of several unnecessary costs. The main economic cost of inefficient pricing is the deadweight loss resulting from prices that are higher than costs. According to basic microeconomic theory this deadweight loss depends on the elasticity of demand. And in order to observe the efficiency losses from the abusive use of market power, we have to know the shape and the slope of the demand curve. Nevertheless, even if we do not know the demand characteristic for airport services in detail, one way to reduce the efficiency costs would be the price discrimination by charging different prices for different users of airports.

There may also be some other potential efficiency costs of having market power. One of them is the lack of competitive pressures on firms. It may lead the airports to go on operating with the higher costs and not adopt innovative and cost saving strategies. Some airports also prefer to use their market power to increase their profits by reducing their staff and investment requirements, which reduces the total quality of airport services offered. Furthermore, airports with market power can try to keep potential competitors out of their businesses by lobbying the government and

investing in unnecessary additional capacity. In other words, they will use their market power to keep their privileges of being alone in the market.

It is also evident that higher prices will affect other industries which are directly related to airports, airlines and passengers such as the tourism industry. We can also think about the distributional effects of market power. Higher prices of airport services will not affect the total economic surplus as long as the consumers and producers are the citizens of the same country, but we should take into consideration that airport business is a rather international one and it is really hard to measure the change in the total economic surplus of a country resulting from higher prices.

### **2.2. Barriers to Entry**

According to the basic microeconomic theory, when the prices charged by a firm are higher than its efficient costs of production, the firm is said to have market power. Barriers to entry and the availability of close substitutes affect the level of market power. When we consider the case of airports, natural monopoly characteristics and environmental regulations of airports can be named as the potential barriers to entry. A firm is said to be a natural monopoly when it can produce its goods or services more efficiently with lower costs and it is the sole firm in the market. Some researchers claim that airports have natural monopoly characteristics and these characteristics arise as a result of economies of scale, economies of scope, network benefits and investment requirements. If airports are in fact natural monopolies, this will affect their industry structure, performance and efficient pricing of the services provided by airports in turn. When we look from the supply side, we can identify some natural monopoly characteristics of airports even if we do not know exactly the supply curve of the airports. In the following, I will describe the barriers to entry in the airport industry.

#### **2.2.1. Indivisibility of Airport Investment**

An investment is said to be indivisible when it is economically more efficient to undertake investments in large blocks. Land and runways seem to be the most important sources of indivisibility in the airport business since the costs of finding a large area of land to construct an airport especially in larger cities is very high. Largely for this reason, most secondary city airports are located in less convenient areas than the already existing airports. Another barrier to entry for secondary airports

may be regulatory and environmental constraints. Other potential indivisible investments are the construction of runways, instruments landing systems, lights and terminal navigation systems. On the other hand, the construction of terminals and aprons in a new airport do not seem to be significant indivisible investments since it is relatively easy to increase the capacity of terminals and aprons. Moreover, due to the existence of high number of old unused military airports, a potential competitor may enter by increasing the capacity of a domestic airport rather than building a new airport. In this case, when we consider the indivisibility of airport investment, we should take into account how extensive the existing facilities are.

### **2.2.2. Economies of Scale**

According to Baumol et. al. (1982), the concept of economies of scale is significant for industries where high fixed costs are present. An incumbent firm can use economies of scale as a barrier to entry since it can operate with excess capacity and produce at lower costs than the potential entrant. When we consider the case of airports, we see that airports have strong economies of scale in runway investments but there exist also diseconomies of scale in other parts of airport investments like terminal facilities (Betancor and Renderio 1999). Economies of scale depend mainly on the passenger numbers. Some researchers like Doganis (1992) and Salazar de la Cruz (1999)<sup>4</sup> claim that airports get the full benefits of economies of scale when they have about 3-3.5 million passengers per annum. On the other hand, Salazar de la Cruz (1999) claims that airports may have decreasing returns to scale and increasing average costs if they have more than 12,5 million passengers per annum. And they seem to have constant returns to scale if they have between 3.5 and 12.5 million passengers per annum. Even though these results may not be true for all airports, they may at least provide a benchmark for considering economies of scale of airports.

### **2.2.3. Sunk Costs**

According to basic microeconomic theory, sunk costs refer to those costs that cannot be recovered once made. These sunk costs are generally related to the firm specific investments which cannot be sold near costs to other firms unless they are doing the same business. In the airport business, the building of runways, taxiways and apron facilities are regarded as sunk investments, as it is hard to recoup them

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<sup>4</sup> As referred in Productivity Commission (2002)

unless the airport can create a viable passenger traffic. These potential sunk costs will affect the risk of the new airport investments and also the willingness of the potential airport to undertake a new airport investment in a negative way.

### **2.2.4. Economies of Scope**

Economies of scope will exist for an airport when it is less costly and more efficient for one firm to offer a group of services than for different firms to offer the airport services separately. Economies of scope can derive mainly from the provision of aeronautical services in the airport case. For instance, when some of the airport services like the provision of runways, taxiways and aprons are provided by the same operator, we can claim the airport business to experience economies of scope. In addition, when different types of air traffic use the same runway, economies of scope can again show their benefits in terms of lowered operating costs. Lastly an airport may experience some economies of scope while providing non-aeronautical activities, yet this is not likely to bring much cost benefits to our firm compared to the high economies of scope resulting from aeronautical activities.

### **2.2.5. Network Benefits**

Up to now, I looked to characteristics of airports from the supply side and suggested that some features of airports make them natural monopolies but there may be other factors which enable an airport to use its market power. To understand these factors, we should also take into consideration the overall level of demand for an airport. And in fact, we can talk about economies of scale on the demand side. When airlines and passengers use only one airport in a city rather than dividing their activities over different airports, there will be benefits to both of them. This way, airlines can use larger aircrafts, so passengers transferring will not need to travel between airports in a city. Moreover, there will be a higher preference to use the larger airport in a city as the amount of interconnecting traffic of the larger airport increases. And even if there exists no interconnecting traffic at an airport, it will be better for an airline to use just one airport in a city, otherwise it will have to bear significant replication costs of services like the provision of infrastructure, route development, repositioning aircraft, staffing and administration across airports and so on. In this case, it may be even welfare reducing to have more than one airport in a city if there is no congestion in the incumbent. Airlines are also not expected to move to another airport unless the

latter offers charges which are significantly lower. In addition, network benefits are considered to be more important in terms of creating a barrier to entry since it is not always very easy to expand capacity of airports given the land unavailability and environmental considerations. For instance there are some regulations like planning restrictions in or near large cities, noise restrictions and environmental legislations that can be regarded as potential barriers to entry to the airport business.

In short, natural monopoly characteristics of airports and some regulatory constraints result in significant barriers to entry in the airport business. When these natural monopoly characteristics are combined with the demand side preferences, this increases market power of incumbent airports even more.

### **2.3. Price Elasticity of Demand**

The demand for a good is price elastic when a one percent change in the price of the good results in more than one percent change in the quantity of the good demanded. Otherwise, the demand is called inelastic. We can also assess the market power of a firm by examining its elasticity of the demand curve. High demand elasticity is a sign of competition in the market and low elasticity may signal that our firm has a significant market power. As the proportion of airport charges constitute a small part of airfares and airline costs suggest low price sensitivity, the demand for airport services is thought to be relatively inelastic, which shows again the market power of airports. Nevertheless, modal substitution, airport substitution and the supply responses coming from the other input providers may change the elasticity of the demand for airport services, but it is very difficult to measure their effects. Comparing the market power of airports with other airports can also give us an idea about the strength of the market power an airport has.

Until now, I have only presented the factors that increase market power of airports and those characteristics that may make them natural monopolies. Due to all types of cost inefficiencies hidden in airport activity that reduce welfare, it may be desirable to impose a price regulation that promotes efficient aeronautical prices that airports can charge. This would bring economic benefits to the whole society. But it is also important to understand whether such an efficient regulation exists or not. This will be the goal of the following chapters.

## **3. Price Regulation of Airports**



Even though we are not sure about this claim today, airports have traditionally been perceived as natural monopolies and they have been subject to price regulation, meaning they cannot fully exercise their market power and airport customers are protected from higher prices.

The objectives of airport price regulation have usually been to efficiently structure airport charges, avoid monopoly rents, solve environmental and capacity problems airports face. Price regulation typically requires cost efficiency and encourages free market entry. It should also provide incentives for investment.

The following subchapters are dedicated to the description of different types of price regulation: rate of return regulation, cost of service regulation, price cap regulation, trigger regulation and self-regulation.

### **3.1. Rate of Return Regulation**

Rate of return regulation has been historically used for the regulation of privately owned electric, telecommunication and pipeline companies. According to this type of regulation, a firm can set its prices on its own as long as the overall corporate rate of return on the shareholders capital investment does not exceed a “fair” rate of return<sup>5</sup>. This requirement will force firms not to set prices far above economic costs and it will prevent to exploit its monopolistic power. One dispute regarding the rate of return regulation is how to determine a fair rate of return. This rate is often set according to the debt-equity ratio of the firm, yet the underlying risks of the industry financial performance and the amount of return required to attract and sustain new investment are not taken into account in the determination process. A second source of the debate is the measurement of the capital investment made by the firms. In some countries it is allowed to measure capital investment in replacement costs while some of them take only the historical costs into account.

Most of the airports in Germany are subject to the rate of return regulation since airports are allowed to raise their prices to earn a normal rate of return when their costs increase. But according to Niemeier (2002), this regulation of German airports causes inefficient allocation of resources. The rate of return regulation causes the firms to choose inefficient inputs in their production processes (Sherman, 1989). If the rate of return that is allowed is above the cost of capital, than the firm will have an incentive to expand the capital base and increase its profits. The German type of rate

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<sup>5</sup> Based on Tretheway (2001)

of return regulation sets incentives for airports to invest unnecessarily high to get more profits which results in excess capacity and excess investments in terminals.

The rate of return regulation may also cause inefficient price structures. When an airport is subject to the rate of return regulation, it will not have an incentive to adopt peak pricing but “rather lower the price of capital intensive peak demand in order to justify more capital assets, and charge a monopoly price at off-peak times to realize profit that greater capital will justify”<sup>6</sup>. So it is expected that there will not be a time related price differentiation at German airports.

Niemeier (2002) examines the negative consequences of the rate of return regulation applied for German airports and asserts that the rate of return regulation results in high level of charges, gold plating, lack of productive efficiency, inefficient structure of charges, misallocation of capacity and lack of quality monitoring. In conclusion, he proposes a radical shift to a new regulatory system such as price cap for German airports. Lastly, according to Tretheway (2001), the rate of return regulation is complex, unresponsive and expensive for airports, since whenever an airport operator wants to raise one of its fees, they must prepare a detailed regulatory application.

### **3.2. Cost of Service Regulation**

This form of regulation has been used for airlines, rail and other transportation carriers historically and according to this type of regulation, regulators should approve every price change of the regulated company. If the company can show that its costs have increased, then the regulator will approve the price change. Regulatory economists often believe the cost of service regulation results in inefficient operations by carriers, as it is expensive and unresponsive to changing market conditions.

### **3.3. Price Cap Regulation**

In the past decades, new regulatory approaches to improve the efficiency of the regulatory policies emerged and price cap regulation is the most widely adopted of them. According to the price cap regulation, prices are allowed to increase up to a cap that represents an acceptable profit margin. Over time it can change according to the inflation rate less a provision of efficiency gain which the firm is expected to have. It is usually expressed as CPI-X or RPI-X (for UK) where CPI stands for

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<sup>6</sup> Sherman, 1989, p.241

consumer price index and RPI for retail price index for the UK. X shows the efficiency gains. The main idea behind the price cap regulation is that most firms increase their efficiency over time and therefore their prices should rise by less than inflation. In the simplest version of the price caps, regulator does not know anything except imposing a price cap and the firm knows better than the regulator about its demand and cost curves. The firm tries to maximize its expected profits subject to the price cap using his superior knowledge. Price cap regulation tries to act like a competitive market in which producers do not have the ability to influence prices and they can increase their profits only by decreasing their costs. If the cap is set at the economically correct level, this will give right incentives to the firms to behave efficiently. Price cap regulation will also give firms the ability to price discriminate, which will increase economic efficiency. However, Sibley (2000) notes that regulators should abstain from opportunistic behavior so that the attractive properties of the price cap regulation are not distorted.

Price cap regulation has many advantages over the traditional rate of return regulation. First of all it costs less for both the regulator and the firm that is being regulated. Moreover there is a high degree of flexibility in the operations of the regulated firm. Additionally the incentives for efficiency and innovation are higher with respect to the rate of return regulation. It will be advantageous for the firm if it can reduce its costs since the regulator will not force the firm to reduce its prices as a result of its lower costs until the end of the five year period. And if there is a new capital investment, the regulator will allow our firm to increase its price more than the yearly inflation rate to cover its investment costs for a certain period.

One can admit that the price cap regulation does a good job in terms of reflecting the relative scarcity of the airport infrastructure as new investment in airport infrastructure will be necessary sooner or later. From this view, the question of whether price cap regulation causes underinvestment arises. According to Vickers and Yarrow (1988), price cap regulation may cause underinvestment and the decision to invest or not will change depending on the credibility of regulatory authorities and whether they will really allow the firms to earn a fair amount of return at the end of the review period or not.

### **3.4. Trigger Regulation**

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This regulation type is based on a threat of regulatory intervention in case of a practice of unfairly high prices by the monopolists. There will be no regulatory intervention until protests from airlines are received and it is decided that airports require a response by the regulatory authorities. This concept is like “behaving themselves” as airports know that unreasonable price increases will not be allowed by the regulatory bodies. This trigger regulation gives many advantages to both firms and regulators. None of them will face the costs of regulatory procedures unless there is a regulatory response.

One of the most important forms of trigger regulation is price monitoring. The most important difference between the price-cap and the price monitoring seems to be the latter’s flexibility experienced by airport managers in their operations. With price monitoring external events which can impact firm costs are taken into account. That is, if firms increase their prices as a response to adverse supply shocks, the regulators do not penalize them. However, a firm may be penalized if it does not pass on the benefits of unexpected positive supply shocks to consumers. But for this mechanism to work efficiently, it is necessary to have a clear criterion for good or poor performance that is also consistent with the incentives for efficiency (Forsyth, 2004).

### **3.5. Self Regulation**

This type of regulation is seen as the most flexible and the least costly regulatory mechanism. According to this type, the airport is required to agree to a set of standards which are also acceptable for consumers. Given that airports operate within these standards, there will be no dispute between airlines and airports for the price changes and no pressure for a regulatory regime. The challenge here is to find the standards which are considered acceptable by customers and provide flexibility for the firms at the same time. Airport pricing guidelines by ICAO and ACI are potential examples of codes that can be used for self regulation and they are very powerful that they have become convention throughout the world. An airport which deviates from these rules will be the target of pressures from airlines so that it will continue to be compliant worldwide with the principles.

It is clear from my arguments up to now that airports have market power and if private airports are left unregulated, the prices charged by airports can be well above its costs. This conclusion seems to be valid mainly for countries like Australia where airports are separated by large distances from each others any there does not exists

competition between airports at all. But in most of the European countries where the population density is higher than Australia, there exist privatized airports with overlapping catchments areas and the threats of airlines to switch to another airport can be rather effective. This countervailing power of airlines may prevent airports from charging excessively higher prices with respect to their costs. In the next section of this paper, I will define the concept of competition between airports and then ask the question of whether competition between airports can be considered as an alternative to the price regulation of airports by preventing monopoly rents and achieving efficient production at the same time without inducing the costs of regulation.

### **4. Competition between Airports**

#### **4.1. Sources of Airport Competition**

According to Tretheway and Kincaid (2006), the following types of competition between airports are possible:

- Competition for serving a shared local market. If two or more airports are not far away from each other and serve common customers or they have at least overlapping catchment areas, competition may occur between them in order to get a higher share of airlines using this airport. One of the most important examples is the development of secondary airports in most cities due to the growth of Low Cost Carriers (LCCs). Since LCCs in particular prefer to fly to secondary airports as a result of the generally lower airport charges offered there, a secondary airport in a given city gets the opportunity to compete with the major airport located in the same city.
- Competition for connecting traffic. For many major airports or hubs (an airport which is a base for an airline's operations<sup>7</sup>), connecting traffic is the main component of the total traffic served by the airports which accounts for more than half of the total passenger numbers for the main hubs. For instance Amsterdam airport, one of the main hubs in Europe, can be named as one of them where connecting traffic accounts for a very important part of the total traffic. If a passenger from Los Angeles in the US wants to fly to Mauritius in the Indian Ocean, he can choose to travel via a hub in Europe like Frankfurt, Paris, London, or via hubs in Asia like Singapore, Hong Kong and Kuala

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<sup>7</sup> <http://en.wikipedia.org/wiki/Hub>

Lumpur or via Dubai in the Middle East. Even though airports compete for being a hub, they cannot have a substantial influence on the decision of airlines to base their operations at them other than providing the sufficient runways, taxiways, aprons and the terminal capacity. In most of the cases, the hubs are already used and sometimes even operated by airlines due to historical reasons and moreover airlines tend to base their operations to their major capital city airports.

- Competition for cargo traffic. There is a high degree of competition in the cargo traffic market since it is price sensitive and cargo operators have the ability of shifting their routes easily. For instance, when the capacity at Amsterdam airport is limited and the air cargo prices for a direct service from Tokyo to Amsterdam are high, a cargo operator can switch its base to Brussels, Frankfurt, Paris or Liege airports. For this reason, airports consider much of their cargo traffic as being open to relatively strong competition from other airports.
- Destination competition. Since airports are also part of the holiday packages offered by tour operators, they can compete with each other for destination traffic. The attractiveness of the destination will be affected by the quality, cost and the scope of service offered at an airport. When an airport offers more frequent air services, this will influence the overall attractiveness of the airport in a positive way. Two types of cases where destination competition can occur are the convention and cruise market lines.
- Other types of competition. Airports also face competition from outside airport suppliers of non-aeronautical services like retail, food etc. and of other modes of transport like ICE, Eurostar, TGV.

### **4.2. Limits to Airport Competition**

Even with all these sources of competition, we cannot think of airport competition as an atomistic one because there are always limits to it. In short, when we consider the degree of competition for each type of air traffic, I can claim that the degree of competition is strongest when regional airports compete with each other to attract LCC, short-haul and cargo traffic since LCCs and cargo operators prefer to use cheap regional airports which generally operate under their capacity. The potential for competition in terms of airport pricing is thought to be low especially for long haul and transfer passengers traffic unless one of the hub airports has a shorter runway or

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it is already congested. When we look at the history of the airport business, we can see that airports use only limited number of hubs and they are not willing to lose out their grandfather rights over airport slots by stopping to use an airport just for its higher prices.

Forsyth (2006a) states some of the most important factors that limit the competition between airports as:

- The oligopolistic character of airport competition. In many cities with multiple airports, the owners of the airports are the same (like the airports in London, Paris and Berlin) so that they do not compete with each other. And even if there are at least two airports belonging to different owners in a city, they may not compete with each other since their capacities are fixed and it is impossible for them to increase their capacity in the short term. Oligopolistic competition may occur between them, which is an imperfect competition and poses some more inefficiency problems. First of all, since they can handle only limited output, they will have no incentive to reduce their prices down to their costs. Tacit collusion can also be in practice. Airports can use their excess capacity to deter strategically secondary airports from entering to the market.
- Entry barriers and scale economies. Even if a new airport has the financial resources to build new facilities and enter the market, it may not be allowed to do so by legal entities. Environmental issues are also another type of main obstacles that deter an airport from entering to a market, and as a result it will be very difficult to build a new airport in the urban areas. Scale effect is important in the airport industry when we look from the cost side, so it will be difficult for small airports to reach these scale effects.
- Excess demand and congestion. Most of the major city airports face excess demand and congestion in turn. Under such circumstances, secondary airports may be appealing for the traffic that cannot be served by the incumbent. However, it is hard to classify this case contestable competition since the major airports will have no incentives to reduce their prices given they have extra demand.
- Regulation of competitors. Airports in many cities around the world are still owned by government or local communities. And when they are privately owned, they are generally subject to regulation. In this situation, the type of the regulation will affect the strength of competition between airports. For

instance, if an airport is regulated according to the cost-plus regulation, it will have no incentives to reduce its costs and maximize its profits. Even if it faces a competition from a secondary airport and is forced to lower its charges at least for some of its customer segments, it can choose to increase the prices it charges for other segments and try to avoid direct competition. This is just a simple example and to assess the type of regulation on competition, we should examine it case by case. But one thing is clear: a regulated airport will not respond to an action of a competitor in the same way as an unregulated airport.

- Subsidies given to airports. Many airports especially in Europe are subsidized in terms of accessing assets below the actual market price or allowing them to operate without requiring them to get commercial profits. There are also situations in which subsidies can be justified if the aim is to correct some externalities. For example, if the incumbent airport faces a high demand and the result is congestion, than a subsidy given to the secondary airport instead of higher charges at the incumbent to reduce the demand is welfare enhancing. In short, according to Forsyth (2006), even if we are not sure about the welfare effects of subsidies, they will affect the workings of competition and they should be taken into account when we assess competition between airports.

Barrett (2000) also listed some of the obstacles that prevented competition between airports before the deregulation process in the following headings. The first main group of obstacles consists of airline collusion, legal prohibition on new airlines, legal prevention of price competition between airports and already high market share of the existing airports. Another group of obstacles contains the control of hub airports by airlines and the third group of obstacles can be named as the lack of competencies of airport managers to manage an airport in the deregulated environment, low efficiency and the non-existence of independent corporation structure of airports.

In this chapter I have presented factors enhancing or reducing airport competition. But the main question I am interested in is whether competition between airports is strong enough to substitute regulation. In the next chapter I will try to answer this question.

### **5. Competition as a Substitute for Regulation**



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Since the deregulation practices in the aviation industry that started at the beginning of 1980's, airports have been subject to various price regulation forms to curb their market power. As already mentioned in chapter 3, the main groups of economic regulation can be listed as cost-based ones like the traditional rate of return regulation and more incentive based ones like the price-cap regulation. Economic regulation does a good job in keeping the charges of airports at low levels and curbing their market power, but on the other side, it has some drawbacks depending on the regulation type in practice. To be more specific, rate of return regulation does not give firms incentives to reduce their costs since the cost benefits are not allowed to be passed to firms as higher profits and as a result, firms will have an inclination to over invest in order to be allowed to charge higher prices. On the other hand, incentive based regulation practices like price-caps give firms incentives to reduce their costs, but they also result in underinvestment. The main reason for the various drawbacks of economic regulation in each case is the imperfect information of regulators about the dynamics of firms, especially about their actual costs. If regulators knew perfectly firms' costs, they would probably dictate them to charge the just the optimal prices so that there would not be deadweight losses. But since this is impossible in the real world, they should find more effective ways of regulation with the minimum costs. Based on these consequences, can also stopping to regulate firms be a solution for getting rid of the negative effects of regulation on firms' efficiency?

Forsyth (2006a) believes that strong competition between airports can be a good substitute for regulation because even if competition cannot drive prices to marginal costs, airports will be more efficient and this gained efficiency will outweigh the deadweight loss caused by the higher prices when the airports are not regulated. However, this conclusion is irrelevant for regulators if the efficiency of airports is not their priority and they prefer to focus on curbing the deadweight losses resulting from higher prices instead. Forsyth assumes that efficiency is the objective of regulators and examines the strength of competition to regulate the charges of airports separately for different cases:

- Competition between regional airports. Urban fringe or regional airports may compete with each other to handle charter or low costs traffic. Airlines also have a high amount of bargaining power on these airports compared to the central city airports and they can always exert pressure on them with threat of switching their flights to elsewhere. Thus, the market power of urban fringe

and regional airports are diminished by the pressure on them to keep their prices near to their costs. There are many small public airports that are not regulated because they try to attract more passengers to their regions, or because they are not believed to have significant market power. They serve mainly to low cost carriers and the competitive pressures coming from the other regional or urban fringe airports act as a substitute of price regulation.

- Competition between distant city airports. When there is only one airport in a city, which is the case for many cities around the world, it serves both to less time sensitive passengers like the passengers of LCC's and leisure travelers and also to more time sensitive passengers like the passengers of full-service carriers. Since these airports have a significant proportion of time sensitive passengers, competition is not considered an effective tool to regulate their prices. On the other hand, if these airports are located near each other like in the case of Düsseldorf and Cologne/Bonn airports, competition may be strong enough to regulate their prices without a need of formal price regulation.
- Competition in multiple airport cities. At first glance, these airports seem to be good potential competitors due to their overlapping catchment areas and Malina (2007) claimed that the price regulation would be obsolete for Berlin airports if they were owned by different owners. In contrast, Forsyth (2006a) has different views about that issue. He assumes that even if these airports in multi-airport cities do not collude with each other under separate ownership, competition between them will not be strong enough to replace economic regulation. This is due to the fact that most of the largest airports in multi-airport cities are already congested and they do not want to compete with second or third airports in their cities by lowering their prices since they do not have the extra capacity to handle the potential additional traffic. Secondly, most of the secondary airports in multi-airport cities have unattractive locations compared to the major ones according to passengers and airlines.

I share the same views as Forsyth (2006a) that only competition between regional airports and between city airports located in countries with a high density of population may be considered as an alternative to the price regulation of airports, nevertheless it is better to examine the issue of competition as a substitute for regulation case by case basis. For this reason, I will examine the competition between Düsseldorf and Cologne/Bonn airports in the next chapter.

## **6. Case Study: Analyzing the Strength of Competition between Düsseldorf (DUS) and Cologne/Bonn (CGN) Airports**

Airport competition is thought to be strongest between regional airports. DUS and CGN are two regional airports in NordRhein-Westfalen (NRW), the largest Federal State of Germany and it seems to be a good case to examine the competition between them in detail. DUS is Germany's third largest airport in terms of passenger numbers and it is an international connecting point. DUS is the market leader in NRW since it has the highest passenger volume (16,6 million passengers in 2006) and it is the airport with the most destinations offered. Almost all the airports in Germany are linked to DUS and it also offers several long-haul flights to USA, Africa and Asia. It is hard to get the exact airline traffic shares from the traffic data since they are confidential, but Lufthansa is the main customer of DUS with nearly 4 million yearly passengers followed by LTU and Deutsche BA. Emirates and Delta airlines are also increasing the number of destinations from and to DUS day by day. The rising number of intercontinental flights is one of the factors that affect the growth of passenger volumes at DUS. Cologne/ Bonn airport (CGN) is the seventh largest airport in Germany according to the 2006 passenger numbers (nearly 10 million per year). CGN increased its passenger volume by more than 80% between the years 2003 and 2006. CGN managers explain this increase in their passenger volume with the change of their strategy to gain a higher share of LCC traffic and indeed their strategy paid off in terms of passenger numbers. Nowadays, CGN is the Number 1 in Germany in terms of the number of low cost destinations served and it comes the third in Europe after London Gatwick and Stansted. Germanwings and TUI fly, the famous LCCs of Germany, are planning to expand their operations at CGN by offering flights to more destinations. In the next years, the managers of CGN aim to make the airport the third largest one in Germany.

Transfer and intercontinental flights do not constitute a significant share of the traffic at CGN. On the other hand, cargo traffic accounts for an important share of the total traffic at CGN with a ratio of 40%. . When we look at the ownership structure of both airports, we can note that DUS is a partially privatized airport with 50% of its shares hold by a private company called Airport Partners GmbH , while CGN is 100% percent publicly owned one and 30,94% of CGN belongs to the federal government of Germany.

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After giving this information about DUS and CGN, I can start to examine the strength of competition between them in detail. Even though CGN is a public company, it is intended to be partially privatized in the next years so that when I make my comments, I assume that CGN is already at least partially privatized and then try to answer the question whether price regulation is necessary for CGN or not.

First of all, they compete directly for regional and short-haul passenger traffic. There were examples in the past that some airlines could not find available slots at DUS and thus they switched their flights to CGN. According to summer 2007 timetable, there are 135 destinations offered at CGN and 180 at DUS and what is more, 94 of them are common destinations so that passengers can choose to fly from one of these airports. However, even if I examined the change in the passenger numbers in all of the common routes offered in detail, the results might not give so much idea about the strength of competition between them since the routes offered and the total number of passengers served are exogenous factors for airports and they mainly depend on the choices of airlines. Even if an airport wants to offer services for more flights and attract more passengers, it cannot do so if airlines do not fly to new destinations from this airport or increase their frequencies for the already existing flights. For this reason, I will focus on getting an idea about the strength of competition between them from airlines' perspectives.

DUS ranks its competitors according to their importance starting with the distant hubs even though many other airports are located in the vicinity of DUS. Frankfurt, Paris CDG, Amsterdam and Brussels airports are the hubs that compete with DUS for the passengers flying to a wider range of routes and for longer distances, even though these hubs are 250 to 450 km away from DUS.

DUS is also a competitor of Munich airport which is 700 km away especially for the long-haul traffic but Munich airport has a big advantage over DUS that it is the secondary base of Lufthansa in Germany. Dortmund and Münster-Osnabrück airports which are around 50 km and 80 km away from DUS respectively can also be listed as the competitors of DUS especially for medium-haul traffic.

The managers of DUS think that their artificially restricted runway is the main obstacle that prevents DUS from competing with other airports. The recent years have proven the correctness of this statement since DUS has lost a significant proportion of its air traffic to Amsterdam, Brussels and Paris CDG airports due to their lack of capacity.

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For the leisure flights segment, Maastricht airport is seen as main competitor of CGN which is only 60 to 75 minutes drive minutes away. And for the regional traffic, CGN competes with other regional airports in NRW like Dortmund, Münster-Osnabrück and Paderbann-Lippstadt.

When I examine the competition in the long-haul traffic segment, I realize that Frankfurt Airport (FRA) competes with CGN and the high-speed train network which reduces the travel time between two airports just to 75 minutes increases the potential competition between them significantly. It is not plausible to say that CGN competes with Frankfurt airport especially for the international and intercontinental long-haul flights since Frankfurt airport is one of the main hubs in Europe and moreover it is the main base of Lufthansa in Germany. CGN managers tried to find a niche market in the long-haul traffic and they concentrated on attracting airlines which offer long-haul leisure flights. Frankfurt Hahn airport, whose 65% of total shares belongs to Fraport AG (the operator of FRA) also tries to compete with CGN through predatory pricing like offering free landing for the freighters between 05.00-23.00 if they are under 30 tonnes. What is more, Fraport AG subsidizes any losses faced by Frankfurt Hahn airport. This affects the allocation of traffic between CGN and Frankfurt-Hahn airport ineffectively by attracting more freighters to Hahn airport even though CGN has free capacity. Another competitor of CGN is Liege airport in Belgium which has been successful in being the hub location TNT recently, whose previous hub was CGN.

The catchment area of an airport is an important concept in airport economics as we have seen many times in the previous pages. DUS and CGN also have common catchment areas and their substitution coefficient which is mainly based on their common catchment areas is 0.75, a high amount according to Malina (2007). Moreover, I can list the following additional information about the catchment areas of CGN and DUS by looking at a survey done for DUS in 1998, which was also included in the Cranfield University (2002): 92,2% of total passengers that come to DUS originate from NRW; 5,8% of total passengers that come to DUS originate from other federal states in Germany; 2% of total passengers come from other countries, probably from Netherlands and Belgium.

DUS has an under-terminal S-Bahn network that provides a connection to the city centre and 16% of its total passengers use it. The managers of DUS think that nearly 18 million people live in their catchment area.

CGN believes that in its inner zone of catchment area, from which most of its short-haul flying and domestic passengers come, live 14 million potential passengers and

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CGN competes mainly with DUS to get a higher proportion of them. When two more outer zones are added to the catchment area of CGN, another 14 million can be included to the potential passengers of CGN. Moreover, when we include the cargo traffic, CGN's catchment area reaches even to Hamburg, Nürnberg and Frankfurt.

DUS is regulated according to revenue sharing agreements since December 2004 and in case of any disagreement between DUS, regulators and airlines, the charges of DUS are determined according to the cost based rules. On the other hand, CGN is subject to the cost-based rate of return regulation. The revenue sharing agreements are somewhat different from cost-based regulation forms and they can be thought as similar to the price cap regulation that does not have the CPI-X form. The experiences of DUS and FRA with the revenue sharing agreements up to now showed that their incentives to reduce their costs and attract more traffic were not so high since the level of charges were determined at high levels initially. Moreover, they can earn the same revenues irrespective of their outputs, so their incentives to increase the number of flights served is expected to be low (Gillen and Niemeir, 2006).

When we just consider the competition between CGN and DUS for specific types of air traffic like the medium haul, it is hard to say that this competition forces them to keep their prices at minimum levels even if we assume that they do not collude. LCCs and cargo operators play a significant role in the total aircraft movements at CGN, while DUS serves to a more broad range of airlines like full service carriers that do not use CGN at all and offer intercontinental flights. Cargo traffic is also not an important source of revenue for DUS. In short, I can say that even though there exists competition between them, they concentrate mainly on different air traffic segments and this reduces the strength of competition between them. In addition, they may lower their prices for the segments they compete and adjust the prices upwards in other segments to compensate for their losses resulting from this competition.

However, especially due to the high population density of NRW and nearby regions, CGN also competes with Dortmund, Münster-Osnabrück and Paderborn-Lippstac airports for the regional short-haul traffic, Masstricht airport for leisure traffic and Liege, Brussels, Paris and Frankfurt Hahn airports for cargo and freight traffic. So even if CGN colludes with DUS to keep its charges high for the common type of the traffic they serve, it will not be able to collude with all of the other airports that it competes. What is more, let us assume that CGN engages in a price competition with DUS by lowering its charges for the airlines serving to the short-haul passengers segment. Even in this case, it will not be a wise decision for CGN to

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increase its prices in other segments like cargo, LCC or long-haul leisure flights since cargo operators and airlines serving to these price insensitive segments care more about their costs. For example, according to the ADV data, the ratio of passengers served by low cost carriers at CGN was 68,2%, which makes it difficult for CGN to keep its charges substantially higher than marginal costs at this segment since LCCs are eager to reduce their costs by demanding lower charges from airports.

CGN has also a significant amount of cargo turnover, which was around 698 tonnes last year and it was nearly ten times higher than the cargo turnaround at DUS. Cargo operators are also price sensitive and high-share of cargo traffic is a sign that cargo charges at CGN are near competitive levels. Moreover, the recent transfer of cargo operations of TNT and DHL from CGN to Liege and Leipzig airports and the gain of additional cargo traffic by CGN from FRA shows that there is a high degree of competition especially for the cargo traffic at CGN.

All in all, if CGN is privatized at least partially in the following years as planned, no price regulation seems to be good option both for the regulators and CGN since CGN does not have a significant amount of market power to be considered as natural monopoly and there is no need to incur additional amount of efficiency costs resulting from the economic regulation. The main reasons for the low market power of CGN are the low demand elasticity of the air traffic it serves and the presence of many competing airports nearby.

On the other hand, when I consider the general characteristics of the traffic that DUS serves, it is not so easy to conclude that no price regulation at DUS would be a plausible decision. First of all, as the managers of DUS have already declared, the artificially restricted runway capacity of DUS is the main obstacle that prevents it from competing effectively with other airports. Even if the competitors of DUS decrease their charges, DUS may not respond since it does not have the extra capacity to serve. Moreover, DUS faces competition from Frankfurt, Paris CDG, Amsterdam and even from Munich airports for long-haul and connecting traffic, but according to Forsyth (2006a), this type of airport competition is limited and long term. The competition with the hubs of Europe will not force DUS to lower its charges too much. And since most of these hubs are already capacity constrained, airlines are not willing to lose their grandfather rights of slots and switch their operations to other airports unless the differences in charges are enormous. In addition, there are significant investments of airlines at these capacity constrained airports so that they will not want to forgo them. In short, switching costs are too high when an airline

transfers its operations to another airport, and this truth reduces the strength of the competition between airports significantly.

When we look at the share of low-cost passengers and also cargo traffic at DUS, lower numbers compared to CGN shows that the market power of DUS is significantly higher than CGN. DUS competes mainly with CGN but also with Dortmund and Münster-Osnabrück airports for medium haul traffic. However, I cannot claim that this competition is strong enough to curb the market power of DUS in a significant way. If we consider the broader types of traffic that DUS serves in total, it seems to be better to go on with the existent revenue sharing agreements that limit the market power of DUS. And what is more, since revenue sharing agreements work better under airport competition, regulators of DUS can impose it weak sanctions so that DUS can operate more efficiently without the abuse of its market power. But if CGN is partially privatized in the future and DUS is left unregulated, I expect that CGN managers will have more incentives to act more aggressively with the aim of maximizing their profits. In this case, CGN will gain more and more traffic from DUS and DUS managers may claim that they should not also be subject to any price regulation as well. They will state that it will be difficult for them to compete with an unregulated airport. In this case, DUS can also gain the right of not being subject to any price regulation. But it is better to assess the importance of these possible claims of DUS after examining the changes in its profits in the near future when CGN is indeed partially privatized.

## 7. Conclusions

In this paper I analyzed the market power of airports, the potential efficiency effects of their market power, whether they are still natural monopolies or not and the reasons for the price regulation of airports. In the next part, I examined the price regulation of airports by explaining its objectives, whether they reached their objectives or not, the resulting effects of various price regulations practices that increase the total welfare and also their drawbacks that regulators want to abstain. I focused mainly on the rate of return regulation, price cap regulation and price monitoring approach since they are the most popular ones in the world today.

A relatively new issue in the airport business is the competition between airports and it has gained more attention in the densely populated countries like the UK and Germany as a result of the development of low cost carriers and the increasing usage of secondary airports in many cities. In economics, one way to get rid of the



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drawbacks of price regulation is though to be the presence of effective competition, but can airport competition act really as a substitute for price regulation? The aim of this paper was to try to answer this question and for this reason, I examined the airport competition issue in detail. Moreover, I analyzed the effects of airport competition on the price monitoring approach and claimed that price monitoring will perform better when strong competition between airports is present.

There are many types of airport competition like competition to serve a local shared market or competition for cargo traffic etc. and they have different characteristics. I started by explaining them and then talked about the limits to airport competition and the effects of competition on the efficiency of airports. Although airport competition is not an atomistic one, there exist types of it that can really limit the market power of airports. Competition between regional airports is one of them, but we should examine it on a case by case basis if we want proof that price regulation is obsolete for some specific airports. Therefore, I decided to analyze the competition between Düsseldorf (DUS) and Cologne/Bonn (CGN) airports and at the end, I claimed that there is no need for the price regulation of CGN. The reason for this conclusion is not only the competition it faces from DUS, but also the elastic air traffic demand it faces and the existence of other competing airports in its catchment area. Since CGN serves mainly to the low cost carriers and the cargo operators, which are highly price sensitive, it is not easy for CGN to increase its charges.

On the other hand, it is not so easy to claim that price regulation is obsolete for DUS since even if it faces some competition from CGN, they mainly provide infrastructure to the different air traffic segments. DUS serves mainly to full service airlines that also fly for long haul distances and their demand for airports is though to be more inelastic compared to the demand of the airlines using CGN. For this reason, it seems a better option to go with the existing price monitoring approach at DUS. Moreover, since it faces at least some degree of competition from CGN, price monitoring will work better at DUS.

Nowadays, CGN is publicly owned but it is planned to be privatized in the near future. When CGN is privatized, it will probably act more aggressively to get a higher share of air traffic and in this situation, the strength of the competition between DUS and CGN may increase enough to make price regulation obsolete. The analysis of this case is left for future studies.

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