

Airport Entry and Exit: A European Analysis¹

by Christiane Müller-Rostin, Hans-Martin Niemeier, Plamena Ivanova , Jürgen Müller, Ignaz Hannak and Hansjochen Ehmer²

Paper No. __, Date: July 2008

¹ This paper originates from the research project GAP (German Airport Performance) supported by the Federal Ministry of Research and Technology of Germany. For further details see www.gap-projekt.de and <http://www.gars-online.de>. We thank Doug Andrew, Peter Forsyth, Karsten Fröhlich, David Gillen, Vanessa Kamp, Peter Morrell as well as David Starkie for their helpful comments. This paper was presented at the 2007 World Conference of Air Transport Research Society at UC-Berkeley, California, USA, 21-24 June, 2007.

² The authors of this paper represent three institutions partners within the GAP project. Christiane Müller-Rostin and Hans-Martin Niemeier from University of Applied Sciences in Bremen; Plamena Ivanova and Jürgen Müller from Berlin School of Economics and HUB in Berlin; Ignaz Hannak and Hansjochen Ehmer from the International University of Applied Sciences Bad Honnef – Bonn.

Abstract

The airport industry in Europe has undergone a lot of changes in the last decades due to commercialization, privatization, regulatory changes and the effects of liberalized aviation markets. The nature and scope of airport competition has gained interest. In this paper we analyze a key aspect of competition. Have there been significant market entries and exits in the airport industry in Europe? How do entries and exits in the airport industry compare to those in other competitive industries in particular to the downstream airline industry? After a review of the literature on entry and exits in other industries, we analyze entry and exit in the European airport sector from 1995 to 2005. Out of 25 countries analyzed entries and (or) exits occurred in 14 countries which usually have a well developed air transport market.

Key words: Airport Competition, Market Entry and Exit, Barriers to Entry, Imperfect Competition

1. Introduction

There have been many changes in recent years in both the airline and the airport industries in Europe and abroad. Following the example of the United States, the air transport markets in Europe have been almost completely deregulated and liberalized as once state-owned carriers have been privatized and markets opened. The airport industry has also undergone a number of changes, albeit at a slower pace than the airline industry. Airport privatizations became important in Europe in the 1990s and after a brief lull early in the year 2000, a number of airports especially in Eastern Europe have been privatized during the last couple of years. Competition amongst former monopoly players in the airport business has increased, but from a rather low level. Due to better connectivity through high-speed rail infrastructure as well as the expansion of hub structures by major carriers, many airports have had to actively compete both for airlines as well as ultimately for passengers. Put differently, the rate of substitutability amongst major airports has risen, but to what degree is not known.

In addition, the major airports are not alone in competing for flying customers. The emergence of the low cost carrier (LCC) phenomenon has led to an increase in passenger traffic at many smaller secondary airports. If confronted with a choice, many leisure passengers put up with a longer drive if it means they can avoid paying the premium for flying through a major airport which might be more conveniently located. This has diverted both aviation and non-aviation revenues from large airports to smaller secondary ones. Increasingly, regions with smaller military or general aviation airports have actively lobbied for LCC traffic which is seen as a vehicle for promoting regional economic development. The rate of entry of new secondary airports has therefore increased during the last 10 years, but at what rate and in which regional markets, remains to be seen.

These changes have been interpreted by some authors as an indication that the airport industry is tending to become a competitive industry. The so-called “new view on airport regulation” (Gillen et al, 2001; Tretheway, 2001) argues that airports are no longer natural monopolies and that more competition would be preferable to traditional regulation. This paper is written more in the old more skeptical tradition that airports are monopolistic bottlenecks: either regional natural monopolies or legal monopolies due to planning and other restrictions (Niemeier, 2002). The skepticism does not stem from the belief that airports are natural monopolies once and for all. Changes in demand and supply of course might eventually lead to a competitive industry structure. Nor is the skepticism rooted in a distrust of competition. Of course, perfect and perhaps even less intense competition is superior to regulation. Rather, the skepticism is based on the belief that despite these recent changes, competition is still rather mild and not sufficient to prevent airports from abusing their market power (Forsyth, 2006). We would like to stress that this is our opinion as there is little empirical evidence on the intensity of competition among airports.

As airport competition is a rather complex phenomenon, we prefer in this paper to analyze two specific, but very prominent aspects of competition: market entry and exit. While these have been well researched for other industries, this is not the case with the airport industry. We confine our analysis to Europe both for historical reasons and because in the light of the changes in governance structure and the density of economic activity Europe seems to be the first continent where airport competition might work and where we could observe airports entering and exiting the market. Historically, during the Second World War and the subsequent Cold War, an extraordinary number of military airfields were built which can be relatively easily converted into commercial airports. This eases entry for a potential entrant who compares the sunk costs of entry

with the present value of post-entry profits. The commercialization (and increase in privatization) of European airports, together with continued growth, especially through LCCs has increased incentives for entry.³

Our research aims to analyze the following research questions:

- 1) Have there been significant market entries and exits in the airport industry in Europe?
- 2) If yes, can we observe specific characteristics of these entries and exits? How does the corporate structure of the new entrants compare to that of the incumbents? What type of airport usually exits the market?
- 3) How do entries and exits in the airport industry compare to those in other competitive industries in particular to the downstream airline industry?
- 4) Have entries forced incumbent airports to cut costs and lower prices? Have they become more efficient than airports in a market without entries?

In this paper we focus on the first three questions. For the purpose of our analysis, we have selected a period from 1995 to 2005. This period was partially determined by lack of data, but it covers a long phase of boom and recession which should contribute to entries and exits.

To begin with, we will outline the major changes in governance structure of European airports. This gives us not only the background but also an overview of certain factors such as licensing, price regulation and partial privatization which might influence entry and exit. In section 3 we will then outline the theory of entry and exit in relation to the intensity of competition in the airport industry in order to gain an understanding what could happen in the airport industry. In section 4, we will summarize the literature on entry and exits in other industries. This gives us a kind of benchmark for entry and exit in the airport industry which is examined in section 5 on a country-by-country basis. We close with a summary of our main findings and an outlook for further research.

2. Brief overview of the European airport landscape

In this section we give a brief overview of major changes in the regulatory environment of airports and outline the possible implications for entry and exit. Airports are part of the transport infrastructure and are seen as public utilities. With the privatization of public utilities in the UK public ownership of airports started to be questioned and the privatization of the British Airports Authority (BAA) in 1987 led other European countries to follow suit. Following privatization, BAA airports, like other British public utilities, were regulated by a price cap regime. Some European countries followed the UK in this respect as well. We start with an outline of privatization followed by the today's trends in airport regulation.

2.1. Privatization trends

In 1987 the British government privatized the three London BAA airports Heathrow, Gatwick and Stansted together with the BAA's Scottish airports: Today the majority of UK airports are fully privatized (Graham, 2004). Though BAA's performance and its rising share prices were widely seen as a success, making it a kind of role model for the privatization of airports, most European governments were rather reluctant to privatize their airports as fast as it had occurred in

³ While in this respect Australia might be a better object of study its airports tend to be regional monopolies as a result of the country's population density (Australian Productivity Commission, 2002).

the UK and in particular to give up control completely. In the 1990s a number of European airports were partially privatized: Vienna (27 per cent) in 1992, Copenhagen (25 per cent) in 1994, Athens (45 per cent) in 1996, Düsseldorf (50 per cent), Rome (45.5 per cent) and Naples (65 per cent) in 1997, Skavsta Stockholm (90 per cent), Florence (39 per cent), Turin (41 per cent), Hamburg (36 per cent) and Zurich (50 per cent) in 2000 and finally Fraport (29 per cent) in 2001. The crises in aviation from 2001 onwards stopped this trend almost completely and only recently Brussels, Budapest, Lübeck, Malta and Paris were partially privatized. Among the non-British airports, only Brussels, Copenhagen, Malta and Vienna (50 per cent plus 10 per cent employee foundation) are majority privately owned.⁴ No major airport in Continental Europe has been fully privatized without any ownership restrictions (Gillen and Niemeier, 2006).

According to Gillen and Niemeier (2006) privatization on the European Continent has not changed the nature of the industry as it has in the UK, but it has made airports in mainland Europe more profit-oriented. The typical private airport in Europe is a partially privatized airport which tries to pursue a wide range of objectives, in addition to profits, such as regional development, job creation and tourism growth.

This pattern of ownership certainly has implications for entry and exit as it influences motivation and behavior. The airport industry has unquestionably become more business oriented so that airports are looking for new profitable business opportunities. This holds true for the minority of private airports, but also for public airports which have reorganized themselves and became more business oriented as have their public owners. Municipalities see business opportunities in airports and in addition, see airports as an instrument for regional development. Both motives have been at work in Germany and France (Gillen and Niemeier, 2006).

Privatization has also created a market in airport business assets. Lately financial investors are looking for business opportunities in the airport industry – something which was unheard of prior to privatization. The capital market in airport assets has two implications for entry and exit in the airport industry. Firstly, profit opportunities should be sought out so that in this respect the airport industry (slowly) becomes more like an ordinary industry. If profitable, new airports should be built.⁵ Secondly, the capital market is revaluing old stranded assets. Airfields and unprofitable airports which have been in public hands and not kept open might come on the market after being written off and revalued by the market.

⁴ Bratislava would have been included in this list if its acquisition by Vienna Airport had not been stopped by a change in government of the Slovak Republic.

⁵ It should be noted that the airport industry is far from being a normal industry. Profit is only one of many factors motivating airport management which certainly limits the applicability of entry-exit models.

2.2. Regulatory trends and their impacts on entry and exit

In Europe airport charges have traditionally been regulated on a rate of return or cost plus and a single till basis. The charges should generate just enough revenue to cover total costs including the depreciation of capital and a normal rate of return on capital for the whole airports. The structure of charges should reflect the cost of its parts.

However, UK price cap regulation has also been copied by some European authorities. In 2000 the price cap for Hamburg Airport was the first one to be set on a dual till in Europe because regulation should be confined to the monopolistic bottleneck and incentives for developing the non-aviation business should not be lessened (Niemeier, 2002). In 2001 Malta airport followed suit with a dual till price cap and most recently Budapest airport adopted a dual till price cap for the period 2006 (Gillen and Niemeier, 2006).

Cost-based regulation and price cap regulation set different incentives for airport management. Unlike cost-based regulation, price caps do not regulate profits but instead set incentives for cost reduction and revenue generation. The gains from cost reduction and additional revenues can be kept by the regulated airport within the regulation period and might then be passed on to the users via lower charges in the next period. Cost-based regulation sets the incentives in the opposite direction. It leads to high costs, gold plating and to price structures which do not increase passenger throughput.

Regulation might influence entry and exit in various ways. Firstly, price regulation in general prevents an airport from charging monopoly prices. This might lead to fewer entries than in an unregulated industry in which airports could set Cournot prices⁶ and in which the profitability becomes known to all potential market participants. Secondly, cost plus regulation might be attractive for new investors who prefer a good and safe return with an easy living; otherwise a cost plus regulated industry offers only limited profitability. For existing airport operators, cost plus regulation sets no incentives to open up new airports, but they might be driven by other motives, such as building empires and expanding their market power. Thirdly, price cap regulation should offer a relatively higher profitability and lead to higher entry rates than a cost plus regime. In addition, price cap regulation gives existing airport operators incentives to open up new airports.

In short, the diversity of different regulatory systems with their implications for incentives should lead to different patterns of entry and exit in Europe, given that other things are equal.

3. Theoretical background: the theory of entry and exit with a view to the airport industry

In this section we do not intend to review the existing literature on entry and exit. The objective of this chapter is to use the theory as a heuristic tool for discovering and analyzing potential market entry and exit behavior in the airport industry. The theory gives us a tool to determine what could happen, not necessarily what has happened. The theory also provides us with a framework to assess the effects.

One limitation of the heuristic power of the market entry and exit theory should be stated, however, right at the beginning. The theory assumes rational behavior on the part of the firms, namely that they maximize profits. Airports are typically endowed with a much richer motivational structure. Some are run as public utilities trying to maximize welfare; others are run to maximize the regional impact of an airport. Creating jobs, securing rents for special groups, attracting tourists and political motives are further examples. Even for the fully privatized

⁶ Of course, Cournot prices and monopoly do not necessarily imply higher profitability.

airports Starkie (2006) doubts the simple profit maximizing assumption and argues that empire building and revenue maximizing behavior are relevant motives of airport management.

We start with a definition of entry and exit, briefly review the role of entry and exit for competition, look at barriers to entry and entry-detering strategies in the airport industry and finally examine the effects of entry there.

3.1. Definition and forms of airport entry or exit:

Besanko et al (2003) state that a firm enters the market, when “it starts production” and that it exits the market when “it stops production” (p. 298). We apply this definition to the airport industry. In our definition, an airport first enters the market when it is opened for commercial civil aviation activities (scheduled and charter flights). Hence, an airport exit occurs when commercial aviation activities at the airport cease. Here we define the production of an airport as its connection to commercial aviation and all the airport activities that are related to commercial flights.⁷

Entry and exit can take many different forms. An entrant may be a brand new firm as in the case of Don Quijote International Airport which is supposed to enter the Spanish airport market near Madrid in the near future (see chapter 6 and appendix). An entrant may also be an established firm that is diversifying into a new product market. An example is the acquisition of the regional airport of Hahn airport by Fraport. Exits occur if a firm simply folds up operations or exits a particular market segment. An example of the first form would be the case of Kiel Airport in Germany which has not been served by airlines since 2006. Airports might also give up particular markets (e.g. the charter market) – however, we do not include this form of exit within our analysis.

3.2. Role of entry and exit for competition

The ease of entry and exit is perhaps the most important condition for effective competition. Curtis Eaton (1987, p. 156) summarizes this well by writing that “entry –and its opposite, exit - have long been seen to be the driving forces in the neoclassical theory of competitive markets. Long-run equilibrium in such a market requires that no potential entrant finds entry profitable, and that no established firm finds exit profitable. There is very little more to the theory of equilibrium in a competitive market than this simple yet powerful story of no-entry and no-exit.” Furthermore, in order to have effective competition entry must be timely, likely and sufficient, as Church and Ware (2000, p. 116) state. While we do not think that the model of perfect competition can be applied to the airport industry in any way, the model nevertheless gives us an understanding that entry and exit matter for competition and welfare. In Cournot models of oligopoly, market entry decreases above normal profits by lowering market prices and reducing single firm output. In general, (see below the discussion on excessive entry) the beneficial effects of competition in terms of economic welfare and pareto efficiency can only be expected with low entry and exit barriers.⁸

Entry is also important for dynamic concepts of competition along the lines of Schumpeter and the Austrian School of Economics. Geroski (1991) differentiates between imitative and innovative entry. The former reduces excessive profit rates and leads to a new equilibrium while the latter occurs when a firm finds new and cheaper ways to produce the services. Innovative entry brings the industry into disequilibrium, which forces the incumbents to react and adopt superior techniques leading the industry to a new equilibrium with lower prices, better quality

⁷ We do not include freight or General Aviation activities within our analysis, since this would go beyond the scope of our research

⁸ Entry is also important for dynamic concepts of competition along the lines of Schumpeter and the Austrian School of Economics. See Geroski (1991).

and higher welfare (Lipczynski et al, 2005, pp. 308-309). Typical examples for such dynamic competitive processes are those in the computer and information industries where technical change is ever present. At first sight airports might be less subject to technological change, but this might be misleading as new automated baggage handling systems or electronic based car parking systems can possibly create substantive cost cuttings and new revenue streams.

3.3. Entry barriers and their relevance to the airport industry

According to Bain (1956), barriers to entry enable incumbents to earn abnormal profits without attracting entry. In general, a profit maximizing potential entrant compares the sunk costs of entry with the present value of the post-entry profit stream. The first factor in this calculation, sunk costs of entry, may range from investment in specialized assets to government licenses. They occur when the new firm stops production and exits the market. Sunk costs differ from industry to industry and in general the airport industry is regarded as having relatively high sunk costs (see section 3.3.1). The second factor, post entry profits, will depend on demand and cost conditions as well as the nature of post entry competition factors which can be influenced by the strategy of the incumbent.

While industrial organization theory has not agreed on a common system of classifying barriers entry, it has nevertheless given us some useful schemes for analysis. Following Lipczynski et al (2005) we distinguish between structural, strategic, and legal barriers to entry.

3.3.1. Structural barriers

Structural barriers to entry are related to the technical aspects of production. Unlike strategic barriers, the incumbent has no direct control over these factors. In relation to airports we discuss three types⁹ of structural entry barriers: sunk costs and economies of scale and scope, absolute cost advantage, and network effect on the demand side.

Sunk costs and economies of scale and scope

Economies of scale have been seen as an important factor, perhaps even the most prominent factor for airports. Airports may well be considered natural monopolies if the demand curve intersects the long run average cost curve in its decreasing part and because part of the fixed costs of airports are sunk. Unfortunately there are discrepancies regarding the exact form of the long run average cost function. Estimates therefore differ substantially concerning the level at which economies of scale are exhausted. Average costs might decline up to a level of between three and 12.5 or even up to 90 million passengers, depending on the sample of airports and analysis performed. Hubs might even experience diseconomies of scale (Kamp et al, 2007).

Economies of scope occur when it is less costly to produce different services jointly than separately. To our knowledge there are no estimates on the strength of economies of scope in the airport industry. It is plausible that economies of scope might arise from the use of runways for scheduled, charter and cargo traffic as well as from jointly offering non aeronautical services (Australian Productivity Commission, 2002, p. 102).

Since the demand for air transport services is still low in many small regional European markets, incumbent airports might enjoy a natural monopoly position which, together with sunk costs, would make entry for newcomers unprofitable. The expected strong growth in air traffic volumes in Europe may change this in the coming decades. Usually market entry involves the building of a runway system and terminal facilities. These are specialized investments which cannot be

⁹ Natural product differentiation does not seem to be of any relevance for airports since they have not established a brand name. Advertising costs are relatively low compared to consumer markets like cereals or beer.

recovered when exiting the market. Only a relatively small fraction of airport investments, such as office space, can be used in alternative ways.¹⁰

However, Starkie (2005) argues that Europe might be different because of a substantial number of former military airfields built during the Cold War era, which are not utilized by the military anymore and could easily be converted into civil aviation airports. The opening of such airports might involve less fixed and sunk costs than those involved in the construction of an airport built on a green field. However, military airfields are usually not located in densely populated areas. Therefore, their location is inferior to that of main airports and in most regions public entities would have to invest in transport infrastructure to improve access to these airports. Since planning processes and infrastructure policies differ between the European Member States, one would expect different outcomes depending on the region.

Absolute cost advantage

An incumbent might have lower long-run average costs than a new entrant due to a superior production technology, patents and exclusive ownership of inputs or cheaper access to financing sources. How relevant these factors are for airports is still a rather unexplored field. A superior location plus subsidies might be relevant (Forsyth, 2006), but prima facie many of the other factors, such as patents, which might work in other industries, are most likely of less relevance for airports. Airports with a history of being managed as private or public monopolies probably have cost disadvantages vis-à-vis privately managed airports due to managerial slack and investments in gold plated facilities. This would create opportunities for a new entrant which is managed like a low cost firm, much like LCCs in the downstream airline industries.

Positive network effects-hub operations at established airports

There are multiple benefits for airlines to concentrate their operations at one airport since this creates economies of density due to higher frequencies, larger aircraft and joint usage of common facilities such as lounges. Since part of these costs, such as building up hub operations, are sunk costs for the airlines, lock-in effects might occur and switching costs would probably be substantial. Although there are no estimates on positive network effects, their impact as an entry barrier should not be overlooked. It may be that such positive network effects “create a more significant barrier to entry than do airport supply characteristics” (Australian Productivity Commission, 2002, p. 105).

3.3.2. Strategic barriers

Strategic barriers to entry stem from the strategy an incumbent chooses to deter entry. While an entrant asks himself if entry is possible and profitable, the incumbent must ask himself if a deterrence strategy is possible and profitable. As Hüscherlath (2005) summarizes “the incumbent can act in a way that raises rivals’ cost and/or reduces rivals revenues” (p. 9). There are different ways to achieve the two above mentioned strategies, such as strategic product differentiation by branding, vertical integration etc.¹¹ We think that the following strategies might be applied by incumbent airports although there appears to be no empirical evidence so far for the first two strategies.

Excess capacity

In many oligopolistic industries existing firms hold excessive capacity, signaling potential entrants that they can easily expand output at relatively low costs (Besanko et al, 2003). This

¹⁰ There is some evidence that the opportunity cost of airport land is not zero. See Australian Productivity Commission (2002, p. 102, pp. 401-410).

¹¹ For an overview with special references to the airline industry see Hüscherlath (2005); for general definitions of strategic barriers to entry, see for example Besanko et al (2003)

might well be a rational strategy for airports since it provides a basis for a credible commitment to reduce post-entry prices of a new entrant. Short run marginal costs are low, investment costs are sunk and in many European non-hub markets it may well take several years before demand actually outstrips capacity. However, the problem of over-excessive investments exists. Over-excessive investments can be caused by cost plus regulation because it sets incentives to underprice peaks and to produce too capital-intensively (Niemeier, 2004).

Limit pricing

The incumbent airport might have a cost advantage, due to economies of scale for example, and might not set a monopoly price but instead limit the price to a level that does not induce market entry. Limit pricing is a strategy which is applied before entrance and it gives rise to the question of whether airports react to plans to build a new airport by lowering the airport charges or by credibly committing themselves to lower post-entry charges.

Predatory pricing

Predatory pricing is generally a rational strategy applied by incumbent airports after the entry of a new airport. Lowering charges below short run marginal costs, driving out the new entrant and then raising charges to recoup the initial losses is a strategy which may well work for incumbent airports, since they usually have market power as well as deep pockets. The legal risks are limited since predation is hard to prove in court. However, while there have been a number of cases in the airline industry, to our knowledge no airport has ever been accused of applying predatory pricing (cf. Forsyth et al., 2005). The notable exception to this rule is BAA's pricing of Stansted airport below marginal costs to compete against Luton airport (Starkie, 2004).

Raising rivals costs

An incumbent can try to raise structural and legal entry barriers to deter entry. The high fixed-cost nature of airports could make it profitable to engage in such strategies. Furthermore, the incumbent airport is usually well connected with authorities and might therefore lobby for high quality standards for new airport services or tough environmental and planning restrictions.

3.3.3. Legal barriers

Legal barriers can be very effective entry barriers. This is true for all industries, and the airport industry is no exception in this respect. However, some typical forms of legal barriers, such as patents and tax policies, do not appear to be very relevant in the airport industry since airports do not hold patents and new entrants operate under the same tax laws as existing airports. However, the following three types of legal barriers are of strong relevance for the airport industry.

Monopoly rights

The state can grant an existing airport a monopoly by not permitting other airports to be built and to be operated either in the in the close vicinity or in the country. In the case of a natural monopoly this might be efficient, as one airport operates with lower average costs than two airports do and there is still sufficient capacity even at peak times. Granting monopoly rights can be a legitimate policy, but it does not have to be. If demand is strong enough and no economies of scale and scope can be reaped, an industry structure with two or even more airports can be sustained. In such a case granting monopoly rights to one airport might lead to inefficiencies and prevent effective competition from working. Starkie and Thompson (1985) were critical towards granting BAA a monopoly in the London region and the Office of Fair Trading (2007) has now taken up the case again. Malina (2007) also argues that some regional public authorities in Germany have misused their power through joint ownership of airports. Within privatization processes the objective of the finance ministry very often is to maximize the sale price by granting a monopoly to the new owner. In the case of Berlin, a small regional airport operator was not allowed to operate low cost flights for technical reasons although it was technical feasible. This delayed market entry for a long period.

Planning and environmental restrictions

The construction of a new airport, as well as the conversion of a military airport into a commercial airport is subject to planning and environmental restrictions. As with the case of granting monopoly rights, there are cases in which planning and environmental restrictions are either welfare enhancing or welfare reducing. The decision to allow the entry of a new airport should be based on a cost-benefit analysis due to the environmental and safety externalities of a new airport. Since demand is strong in metropolitan areas such as London, Berlin and Paris, negative externalities (noise, pollution etc.) are also high relative to rural areas. Prima facie it might be rational to extend an airport in a densely populated area instead of permitting the construction of a new airport. Unfortunately, however, these decisions are typically not based on a cost-benefit also (Niemeier 2001; for examples of varying quality see, Mishan, 1970; and Main et al., 2003). On the other hand, planning restrictions are sometimes used where an environmental instrument such as a Pigou tax or certificates internalizing the negative externality would be superior. Furthermore, restrictions might reflect not so much environmental concerns but rather the intention to shelter the incumbent airports which sometimes may, as in the case of the regional airport Kassel, lobby against a new airport as purportedly useless in economic and environmental terms.

Bilateral Air Service Agreements (ASAs)

Bilateral air service agreements limit the take-off and landing points for the air carriers in the two countries involved. Such a legal restriction is specific to the airline and aviation industry and may lead to first mover gains for large airports as well as structural barriers to entry in the form of positive network effect. However, in most European states bilateral agreements have become less restrictive and do not limit the number of destinations anymore. (Gillen et al, 2000).

3.3.4. *Effects of entry*

As outlined above, the possibility of entry into regional airport markets should lead to reactions of the incumbent to deter entry. However, if entry is successful we **normally** expect the following reactions:

- Entry might drive down airport charges in markets with new entrants (example of cheaper secondary LCC airports)
- Increased price differentiation by incumbent airports to compete with new entrant(s)
- Reductions in access time for citizens
- Greater choice of airports and differentiated products
- Incumbent airports might be forced to reduce X-inefficiencies and to cut costs
- Incumbent airports might see their profit levels decrease if traffic is diverted to the new airport(s)

In general - and this underlies much of the demand for reform towards a more competitive airport industry - more competitors lead to more competition with lower prices and costs and hence to an increase in welfare. However, this reasoning assumes constant returns to scale which might not be appropriate for small markets with up to 3 million passengers and medium sized market with up to 12 million passengers in which the incumbent airport benefits from economies of scale and scope (see section 3.1. above). With economies of scale, entry will increase the average costs of each airport and might lead to unnecessary duplication of fixed costs. This effect might counteract the effect of price competition and strike the balance towards a net welfare loss (see Church and Ware, 2000, p. 249). The welfare effects of entry must therefore be analyzed on a case to case basis.

4. Entry and exit in other industries

The aim of this section is to portray entry and exit patterns in other industries and to deduce similarities and differences in regard to entry and exit in the airport industry. The airline industry is highlighted separately due to its significance for and interdependence with the airport industry.

4.1. Entry and exit evidence in other industries

Over the course of the last 40 years, numerous academic studies have examined entry and exit patterns, barriers to entry and exit, and incumbent reactions to entry and exit in a wide range of industries and different countries. Entry and, to a certain extent, exit play a crucial role in most industries since they lead to changes in market structure, prices and competitive behavior amongst firms. However, entry is often not easily achieved – the majority of markets are not fully contestable and often entrants encounter substantial entry barriers, both structural and behavioral, upon attempting to successfully enter a specific market. In their meta-analysis of empirical studies on entry and exit, Siegfried and Evans (1994) found considerable empirical support for

the existence of absolute cost barriers (most often sunk costs in machinery, buildings and other specific equipment (Kessides, 1990)) and some empirical evidence of an entry-detering effect of multiplant incumbent operations (due to incumbent cost advantages). In addition, aggressive advertising by incumbents also had a negative effect on entry. Here established firms were able to further strengthen their reputation and brand name. There is little empirical evidence, however, to support the common notion of economies of scale, limit pricing and investment in excess capacity limiting entry. Highly concentrated industries often experience little entry – here the risk of collusion amongst incumbents and hence retaliation upon entry is too high. Market concentration could therefore be considered an entry barrier in certain sectors.

Ambiguous empirical results were found concerning the entry-detering effects of research and development investments by incumbents and product differentiation efforts. Innovative industries might actually attract entry by firms hoping to find a protective niche market from which they can later on expand into the mainstream industry. High profit rates in the past as well as positive market growth and demand induce entry; there are however exceptions to the rule, as an example from the airline industry shows. Joskow et al (1994) found that Southwest Airlines often enters on low profit routes between secondary airports.

When looking at entry barriers, it is also important to consider exit barriers and their influence on competitive behavior and market structure. Exit barriers have not been studied in as great detail as entry barriers, but here as well Siegfried and Evans (1994) found some interesting empirical evidence. The largest exit barriers are sunk costs in both tangible and intangible durable specific assets. The higher the investment of a firm in specific machinery and buildings, the more likely it is to stay in the market, even if it is unprofitable. Other exit barriers include managerial hesitation to exit and long term labor agreements with workers and suppliers. Exit is often induced by negative market growth and low or non-existent profits.

In general, a number of studies (Siegfried and Evans, 1994; Geroski, 1995; Dunne et al, 1989) have found that entry and exit rates are positively correlated with one another. Industries which show high rates of entry also exhibit high rates of exit and vice-versa. In addition, entrants and exiters were usually smaller than incumbent firms. Dunne et al (1989) found that established firms diversified into new product markets through the construction of new plants in order to be the most successful entrant in terms of growth and profits. However, across the board it took all surviving entrants at least a decade to achieve market size and growth of incumbents, which contradicts any notions of successful hit-and-run entry or short-run profitability.

Empirical evidence on incumbent reaction after entry is quite spotty. Although there is some evidence of limit pricing and predatory behavior in the airline industry, not many examples were found from other industries. In addition, evidence of quality and product adjustment was evident in the Brazilian airline industry after the entry of GOL (Müller-Rostin, 2005). Lin et al (1996) found that entry of LCCs (and especially of Southwest Airlines) into the US airline industry led to negative price effects with prices declining sharply. However it remains unclear whether this is always the case in other industries.

A number of empirical studies have studied entry and exit patterns in different industries and countries; some results are presented in the following paragraphs:

Orr (1974) and Masson and Shaanan (1987) looked at the Canadian three-digit manufacturing industry. Their findings show that capital requirements and high market concentration are the greatest barriers to entry in Canadian manufacturing. High concentration in Canada is possible due to weak anti-trust laws; therefore predation is more likely to occur. In addition, there is evidence that limit pricing was applied by incumbents to deter entry. Kessides (1990) and Dunne et al (1989) tested the four-digit US manufacturing industry on entry and exit patterns. Kessides (1990) found that a rise in demand led to market entry, sunk costs (especially in machines and specific equipment) were most likely to deter entry, and incumbents reacted more aggressively to

entry when the industry was concentrated and profitable. Dunne et al (1989) confirmed these results, also showing that entry and exit rates were positively correlated and that entrants and exiters were in general much smaller than incumbents. Diversifying firms entering through the construction of a new plant were the most successful and achieved the size of incumbents within a decade. In addition, they proved the existence of high and low entry (exit) sectors.¹²

Evidence from Germany (Schwalbach, 1987) shows that firms will enter the market if:

- profits in the market are higher than in other comparable markets,
- the market growth rate is positive and
- the accumulated know-how (in the case of diversifying firms) can be transferred profitably to the new market.

In Germany, entry barriers such as economies of scale, product differentiation and market risk reduce the incentive to enter. Incumbent reaction to deter entry will depend on the current structure of the market – if the market provides enough room for all firms, then entry-deterrence strategies are less likely to be adopted by incumbent firms. Jeong and Masson (1990) studied entry and exit patterns in a newly industrialized country – Korea – where government influence in economic processes is still high. Their findings show that in the Korean case, entry responded to high profits and high market growth. Entry barriers were economies of scale, product differentiation and capital requirements, however, entry deterrence strategies were never found. Costs of limit pricing as a deterrent were prohibitive.

Other, more general studies on entry and exit show that (free) entry is not always welfare increasing (Mankiw and Whinston, 1986). In homogenous markets, a social planner, regulating entry, might be more efficient, since this abolishes the negative effects (such as company failure or inefficiency) which might result from intensified price competition. Suzumura and Kiyono (1987) confirm these results, writing that an increase in competition does not always increase welfare and that in some cases a “second best” solution with a strong government regulating entry is more welfare efficient.

4.2. Entry and exit in the airline industry

The airport industry and the airline industry differ in one fundamental aspect: Whereas the airline industry is a highly mobile industry in which capital “on wings” can be moved back and forth very swiftly, the airport industry is inherently immobile and very capital intensive. Therefore, it is very well possible that entry and exit patterns in the airline and airport industry will differ greatly. Up until about 20 years ago, the airline industry was viewed by most economists as an example of a perfectly contestable market. Factors such as free entry and costless exit, access to the same production technologies, low or non-existent sunk costs and the threat of potential competition were all inherent to the airline industry. It was therefore concluded that the hit-and-run entry of a new carrier into a market or on to a specific route was possible since incumbents would not have the time to respond by cutting prices or increasing capacity. This constant threat of entry in turn would force incumbent airlines to price their product at average costs to prevent entry. However, evidence collected during the last 20 years has shown that there are many indications that the airline industry is not an example of a perfectly contestable market.

The aforementioned arguments regarding the contestability of the airline industry were brought forward before Congress in the late 1970s by advocates of the deregulation of the US airline market. Proponents of deregulation, such as Jordan (1970), Kahn (1977), White (1979), Baumol et al (1982) and others argued that the airline industry was not characterized by substantial entry

¹² High entry sectors: Apparel, lumber, furniture, printing, fabricated metals, nonelectrical machinery and instruments. Low entry sectors: Food processing, tobacco, paper, chemicals, rubber and plastics, stone and clay.

barriers such as high sunk costs or economies of scale and that deregulation of the market would strengthen competition amongst air carriers and allow for a reduction in fares as well as an increase in the quality of air services provided.

Today there are still a few economists who consider the airline market an example of a perfectly contestable market; however, opinions have changed considerably in the other direction (Morrison and Winston, 1987; Borenstein, 1992). Although it is true that economies of scale are relatively small, this does not hold for economies of scope and density. The airline industry displays large network economies: Adding an additional spoke to an already existing hub-and-spokes network is relatively easy and cheap, for example, and in turn leads to the strengthening of the hub. In addition, there are a number of entry and exit barriers in the airline industry and new entrants have to incur sunk costs upon entry as well. An example of these sunk costs would be the advertising costs and cutthroat prices a new entrant has to offer on his new route in order to capture market shares. Other barriers might include difficulties in obtaining gates and slots at congested airports, the favoring of large carriers by computer reservation systems (CRS), incumbent frequent flyer programs and other loyalty schemes as well as incumbent airline - travel agency commission structures. Incumbents might also enjoy certain brand image and perceived safety advantages. In addition, powerful CRS systems allow for quick and precise fare changes even if only the threat of entry exists. All these factors create significant entry hurdles which potential entrants must first overcome to successfully achieve entry into the market. In summary, this also refutes the traditional view of the airline market as being a *perfectly* contestable market. Numerous studies have looked at price and output effects of entry into and exit from the airline market. In addition, the competitive responses of incumbents to new entrants have been analyzed. Some of these findings are presented in the following paragraphs:

Hurdle et al (1989) studied 375 city pairs regarding entry and exit. The results of their econometric analysis suggested that below-average fares lead to market exit, whereas above-average fares do not necessarily correlate with entry. They found that airlines choose to enter on certain city pairs because these routes fit well into their overall network; a route's profitability in this case is rather secondary. In addition, their results show that fares increased after exit and decreased after entry. Total output (measured in RPM¹³) increased after entry and decreased after exit. However, the entry effect was larger than the exit effect, leading to the hypothesis that the impact of a carrier entering a monopoly or duopoly route is felt much more than the exit of a carrier from a single route. A further reason might be that an incumbent carrier may be forced to reduce prices significantly after entry; but will not be able – for image reasons – to increase prices after exit by more than 25 per cent. Incumbent reactions after entry were also analyzed in the aforementioned study: Incumbents tended to maintain or even increase output after entry of a new competitor and to lower prices with the intent of crowding out the new competitor. Predatory pricing behavior as well as price wars was also observed. Windle and Dresner (1999) confirm these results in an empirical study on competition between Delta Airlines and Vanguard out of Atlanta. They also found that incumbent airlines did not necessarily increase fares on non-competitive routes to offset losses on competitive routes; such behavior might have led to a reduction in demand and profit as well as possible legal action by the respective competition authority. They concluded that LCC entry should be facilitated by the regulator, which in turn would generate an overall positive welfare effect. Vowles' (2000) analysis of the US airline market strengthened the above arguments. He found that the presence of Southwest or any other LCC had the highest effect on incumbent fares. In addition, his findings show that routes to and from resort destinations in general showed lower fares, whereas routes to and from major airline hubs were generally higher. Schnell (2006) analyzed the importance of exit barriers in the European, Asian-Pacific and North American airline markets. With the help of his survey of top

¹³ Revenue passenger mile. Stands for one paying passenger flown one mile. A principal measure of airlines' passenger traffic.

airline managers, he concluded that exit barriers were quite prevalent in the airline industry. Exit barriers included public pressure to sustain routes (especially to remote regions), the fear of losing slots and market shares to competitors, and negative public image effects (both for the airline in question and for its managers). He suggests that policy makers should concentrate on alleviating the problems of slot allocation at major airports and abolishing entry barriers.

Other studies such as Götz (2002) focus more on the strategic behavior of airlines. They find that competition within the airline market is strong on some city pairs and virtually non-existent in some remoter regions. In addition, airlines often resort to predatory pricing as well as to collusion when faced with actual and potential competition. This intensifies and reinforces entry barriers for new competitors.

5. Evidence of entry and exit in the European airport industry

Of the 25 countries analyzed in this paper, entry and exit only took place in 13 countries (see below figure 1). Our findings show that in general, entry (and exit) was more predominant in already well developed airport markets and that most countries only exhibited one or a maximum of two entries (exits) between 1995 and 2005. The vast majority of new airports are planned in the developing markets of East Europe.

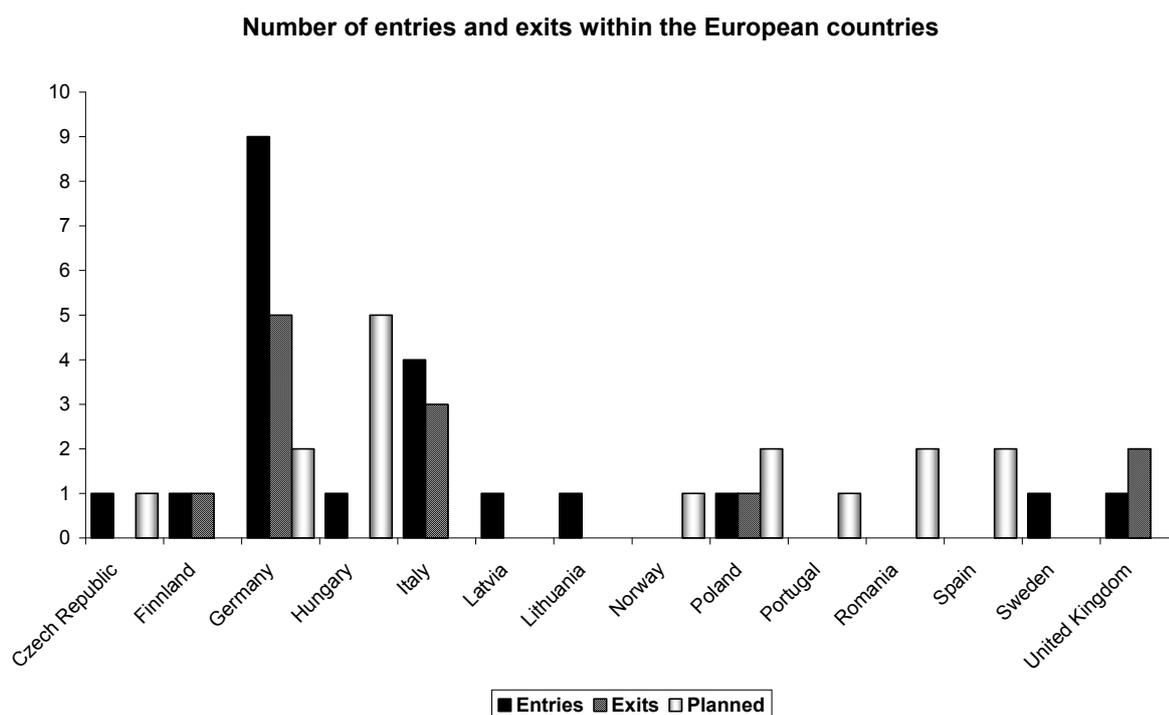


Figure 1 Airport Entries and Exits

Source: own research

5.1. Germany

Since the liberalization of the airline market and the de-regulatory trends in the aviation industry in Europe, airports in Germany have had to react to the changed competitive situation as well. Airports have had to react to new demands from airlines (for lower charges) as well as to new entrants (especially secondary airports) and have had to become both more efficient as well as more market-oriented. In order to avoid losing profits, many airports have expanded their non-

aviation activities to serve as a second source of revenue. Germany has a diverse airport structure. Airport ownership, for example, varies – some airports have been partially privatized whereas others are still completely under public ownership. Although overall airport policy is decided on a national level, airport regulation and management is delegated to the “Länder” (federal states). Currently there are 18 airports which have the status of international airports. Two of these airports (Munich and Frankfurt) are Lufthansa’s main hubs; Frankfurt-Hahn Airport and Cologne-Bonn Airport are mainly served by LCCs whereas airports such as Düsseldorf, Hamburg and Stuttgart cater mainly to business travelers while also feeding traffic into the two Lufthansa hubs. In addition, there are 41 regional airports in Germany, most of which are located quite close to one another with overlapping catchment areas (ADV, 2005). Airports in Germany might compete with one another on a number of levels: Firstly, hub competition (Frankfurt and Munich), secondly, spatial competition (especially amongst airports in the Ruhr area and in northeastern Germany with overlapping catchment areas) and thirdly, competition with surface transportation modes (only on ultra-short haul routes with less than 500 kilometers). According to Malina (2007) the airports Hamburg, Frankfurt, Munich, Stuttgart and Berlin Brandenburg have strong market power as airlines have no well located airports in these regions. Furthermore, moving hub operations would induce very high switching costs. In addition, none of the five airports mentioned above face strong competition from surface transportation modes, since they do not offer a lot of ultra-short haul flights. Five airports in Germany (Hannover, Nürnberg, Leipzig, Dresden and Bremen) possess modest market power while all other airports in Germany have little to no market power. Even though most airports in Germany already face some form of competition, there have been a number of entries into (but also some exits from) the German airport market during the last ten years (Behnen, 2004). This expansion in – what some consider unnecessary - capacity has been criticized by both airlines and analysts who feel that the construction of new civil aviation airports and/or the conversion of military airports into civil aviation airports are a waste of taxpayers’ money (Heymann, 2005). In Germany, we have mostly observed the conversion of military aerodromes into civil aviation airports.¹⁴ Only two airports have actually been built during the last 30 years (Paderborn-Lippstadt and Flughafen Münster-Osnabrück). Nine airports¹⁵ entered the market between 1995 and 2005, whereas five airports¹⁶ exited. Entries occurred mainly in northeastern Germany, where all new entrants have overlapping catchment areas with at least one other airport in the region. Additional entries occurred in the Ruhr area as well as southwestern Germany - areas with an already high concentration of airports. The majority of exits also occurred in these two areas, strengthening the argument that airports with strong overlapping catchment areas relative to demand tend to cannibalize one another.

¹⁴ Examples include Altenburg Nobitz, Rostock-Lage, Madgeburg, Nürnberg, Karlsruhe Baden Baden and Zweibrücken.

¹⁵ These were Nürnberg, Lübeck, Rostock-Laage, Altenburg Nobitz, Heringsdorf, Magdeburg, Zweibrücken, Karlsruhe/ Baden Baden and Schwerin-Parchim.

¹⁶ These were Kiel, Kassel-Calden, Mönchegladbach, Siegerland and Augsburg.

Size of German airports in million passengers per year

	< 1
	1 – 7,5
	7,5 - 25
	> 25

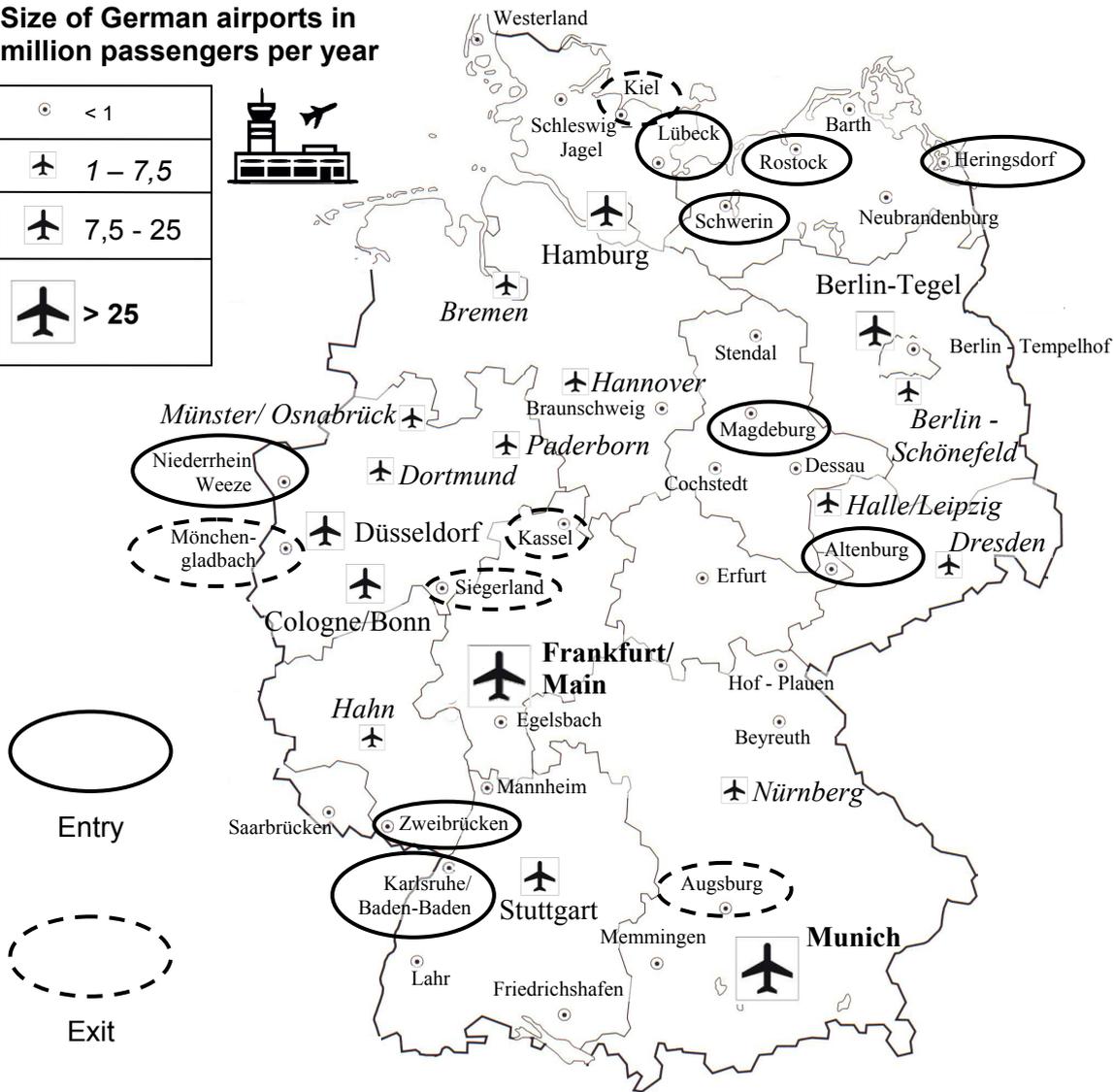


Figure 2: Entry and exit of German airports

Source: ADV (2005) and own research

In 1994 Düsseldorf Airport took over 70 per cent of the shares of Mönchengladbach Airport to alleviate capacity problems at Düsseldorf Airport.¹⁷ Although traffic figures rose substantially between 1996 (146,586) and 1999 (226,408), they decreased from 2000 onwards, reaching a low of 41,244 passengers in 2004; the year in which all scheduled and charter flights ceased to operate from Mönchengladbach Airport. The main problem at Mönchengladbach Airport is its short runway of 1,200 meters, which does not allow large aircraft to land (Düsseldorf, 2007; Düsseldorf-Mönchengladbach (2006). Rostock-Laage Airport is an example of a new entrant which chose the cargo market as its niche. Although passenger numbers significantly increased between 1995 (year of entry) and 2006, it is the cargo and airmail segments that have seen the highest growth rates (Flughafen Rostock-Laage (2006). This can be explained in part by the fact that Rostock-Laage competes for passengers with a number of other airports in the region – mainly Lübeck, Hamburg, Schwerin-Parchim and Heringsdorf airports.

¹⁷ Although Düsseldorf has two runways, it is only allowed to use one runway at a time due to political constraints and can therefore only operate at 60 per cent capacity.

Another strategy often used by new entrants is the construction of an aeroplex (an airport business park and/or shopping facilities) near the airport to increase non-aeronautical revenues and to lessen the dependence on generating aeronautical revenues to turn a profit. Both Zweibrücken Airport (entry in 1998) and Karlsruhe/Baden-Baden Airport (entry in 1997) have airport business parks; however, only Karlsruhe/Baden-Baden has seen a significant increase in passengers at its airport since its entry in 1997. Passenger figures at Zweibrücken have more or less stayed constant, which can be explained by the locational advantage which Karlsruhe/Baden-Baden enjoys in a region with above-average income per capita and a large agglomeration of major companies, for example Daimler-Chrysler, Porsche, etc.

The most favored strategy for new entrants, however, is the entry and positioning as a LCC destination and hub. Many smaller regional airports in economically underdeveloped regions hope to achieve economic growth (and lower unemployment rates) duplicating the success of Frankfurt-Hahn Airport. So far, only one new entrant, Airport Niederrhein-Weeze, has been able to establish itself successfully as an LCC hub. Since its entry in 2003, it has seen an increase in passenger numbers every year, and even the retreat of its home carrier WizzAir only had a minor impact on passenger figures.

In general, new entrants in the German airport market face a number of hurdles. Firstly, and most importantly, a large number of airports already exist in Germany, many of them with overlapping catchment areas and similar business models. Secondly, a number of smaller regional airports are located in areas with low population densities and below-average income per capita, which in turn lessens the demand for air transport services. In addition, infrastructure links (such as rail or highway access) to these smaller airports are usually quite limited, which in turn puts these airports at a competitive disadvantage in terms of accessibility. Thirdly, although most small airports hope to attract LCC services, the demands of these airlines are often not economically feasible for smaller airports. Despite these hurdles, many regional politicians in economically depressed regions actively lobby for expansion of old and construction of new airports, hoping to foster regional economic growth. These failed expectations have also led to five market exits during the last ten years. The case of Mönchengladbach airport was already mentioned above. In addition, Kiel, Siegerland, Augsburg and Kassel-Calden airports exited the market. Kiel exited the market in 2006 after Lufthansa's partner Cirrus gave up its last scheduled service from Kiel to Munich. The airport had already witnessed a decline in passenger figures during the last five years after the start of scheduled Ryanair services from Lübeck. In addition, it faced competition from Hamburg airport. Other airports which exited the market were Siegerland and Augsburg due to the cessation of regular scheduled services in 2003 and 2005 respectively (Siegerlandflughafen, 2006; Flughafen Augsburg, 2006).

Kassel-Calden Airport is an exceptional case. Here the airport was closed so the runway could be extended. It plans to re-enter in the near future. However, this has caused criticism from both airlines and neighboring airports. The airport density in the region is already quite high and both Dortmund and Paderborn/Lippstadt fear that the re-entry of Kassel-Calden will divert traffic away and cause all three airports to become unprofitable. Moreover, Frankfurt Main is only one hour away by train, which in turn poses the question of whether an airport is really necessary in Kassel (See Flughafen Kassel, 2006).

In addition, Memmingen Airport located in the wider Munich region offers scheduled flights since July of 2007.

5. 2. Italy

Italy has 48 commercial airports, of which 38 are under the ENAV management (Ente Nazionale di Assistenza al Volo, The Italian Company for Air Navigation Services), including some of the most important airports in Italy - Rome Fiumicino, Milan Malpensa and Linate, Catania, Palermo, Cagliari, Bergamo, Turin, Bologna, Venice, Naples and Florence. The two major Italian

airports (hubs) are Rome Fiumicino (over 30 million passengers in 2006) and Milan Malpensa (ADR, 2007).

Relative to other European countries, the Italian airport infrastructure is characterized by a lower average size of major international airports, a larger number of medium-sized airports and a wider dispersion of air traffic over the territory. The country has a polycentric airport network, where the traffic is unequally distributed among the airports of Roma and Milan. This creates possible playroom for competition among these airports. Italy has overcome a number of obstacles concerning several competition issues, regarding both the market for air transport services and for ground-handling services.

The Italian Antitrust Authority changed competition rules and regulations, prompting pro-competitive attitude among airports, as well as encouraging new market entrants (OECD, 1998). Italian airports too are facing strong traffic growth with limited opportunities to increase capacity. A wide variety of aerodrome operators, traditional and low-cost airlines and the full range of other aircraft operators are therefore working in partnership, with ENAC (Italian Civil Aviation Authority) to ensure full stakeholder involvement in the ongoing airport development projects.

In the period of examination, 1995-2005 three new entrants have come on the Italian airport market: Aosta (1996), Bolzano (1999) and Brescia (1999). At these airports traffic has grown strongly due to LCCs. Finally, some airports started international routes (e.g. Crotone in 2003 and Reggio Calabria in 2004). There are few cases of very small airports, which exited the market (at least temporarily). For instance, the airport of Taranto –Grottaglie entered in 2003 dealing with about 35.000 passengers but then stopped the flights one year later; the airport of Cuneo – Levaldigi temporarily stopped operation during 2005. Also, the airport of Tortoli (in Sardinia) had an average traffic of about 50.000 passengers in 2003 and then stopped flights.

5.3. The United Kingdom

In contrast to other European countries, most airports in the United Kingdom are not owned and managed by central or local government entities. Indeed, the UK government policy actively promotes and encourages private ownership of airports, and the majority of British airports are either partially or fully privatized.

There are over 50 airports with scheduled air services in the UK and over 20 airports with one million passengers or more per year. Many airports are located close to one another and compete with each other. Some airports handle primarily LCC traffic (e.g. London-Luton, Robin Hood Doncaster), others LCC as well as FSC/Charter carrier traffic (e.g. Birmingham, Manchester). Airports with very little LCC traffic are London-Heathrow, London-Gatwick and other smaller regional airports. During the last 20 years, the United Kingdom has seen the conversion of many former military aerodromes into civil aviation airports with many new airports entering the market and trying to attract LCC services. However, the question of profitability of these airports remains; with many airports offering just one flight per day, costs can hardly be covered. Starkie (2002), on the other hand argues that many of these smaller former military airports in the UK are quite profitable since they have low sunk costs, have been privatized and have diversified into different business areas such as General Aviation, cargo or airport business parks. A number of these airports have also seen exponential traffic growth as they have been able to attract LCC traffic whereas other airports, such as new entrant London City Airport, have been quite successful in attracting business flights or other niche markets. As in the case of Germany, airports in the UK compete with one another on different levels.¹⁸ Competition between the

¹⁸ These levels of competition might be:

- a) Hub competition London-Heathrow and London-Gatwick with Paris-Charles de Gaulle, Amsterdam-Schiphol and Frankfurt
- b) Major gateway competition between Manchester, London-Gatwick and London-Heathrow
- c) Competition between primary and secondary airports (Leeds with Doncaster, Humberside et al.)

BAA-owned London airports is not yet strong enough, which has led the OFT to recommend splitting up the BAA airports to allow for more competition. A recent OFT market study showed that service quality at competing airports (such as Manchester and Liverpool airports) was often higher than the quality of service offered by the London's BAA airports (OFT, 2007).

Only one airport entry was observed in the timeframe under consideration. In 2004, Robin Hood Doncaster Airport entered the market and has so far proven to be quite successful with exponential traffic figures. The airport expects one million passengers in the financial year 2006/2007, a 20 per cent increase from 2005. Manchester initially opposed entry by Robin Hood Doncaster Airport since it feared intensified competition in the region (Manchester is the majority shareholder of Humberside Airport, which is in close proximity to Robin Hood Doncaster), but it was not successful in deterring entry. The entry of Robin Hood Doncaster Airport has also led to the expected exit of Sheffield City Airport which cannot compete with Robin Hood Doncaster due to its shorter runway that does not allow large aircraft to take-off and land at the airport.

Only one airport exit was ascertained for the UK. In 2005, all commercial flights ceased from Swansea Airport and have not been resumed to date. The airport is in need of a facility upgrade to be able to continue offering scheduled services. Development proposals include a new terminal

5.4. Spain

AENA (Aeropuerto Españoles y Navegación Aérea) was created as a public entity under Article 82 of the General Budget Act 4/1990 on June 29th, 1990 and manages 48 airports and five air navigation regional directorates corresponding to three Flight Information Regions. Airport development in Spain is centrally planned and controlled with some cross-subsidization of infrastructure expenditure between individual airports. However, only a minority of the airports within the system are actually profitable, so there is considerable cross-subsidization between AENA airports. In addition, AENAs 100 per cent subsidiary AENA Desarrollo Internacional S. A. participates in the management of 29 airports in seven different countries, mainly in Central and South America. Thus, there is no competition amongst airports in Spain.

No airport entries or exits have occurred. A reason for this might be the fact that per capita GNI in Spain is lower compared to other strong European economies such as the UK, Germany or France, which in turn generates lower demand for air services. In addition, inbound tourism traffic is much higher than outbound tourism traffic which would strengthen this argument. However, two private airports are currently being built in Ciudad Real and Castellón, and it remains to be seen whether they will generate sufficient demand, on both the airline and the passenger side.

Don Quijote International Airport is the first international airport in Spain which is being financed entirely through private investors. It will be located near Ciudad Real in Castilla-La Mancha; about 200 kilometers (45 minutes) south of Madrid and 45 minutes north of Córdoba by high speed train AVE. The high speed train terminal will be located within the passenger terminal itself. Construction of the airport started in 2004 and the inauguration of the airport is scheduled for 2007. Ciudad Real Airport will be operated by a Spanish division of Vienna Airport, which will own a 18.7 per cent stake in the project. According to Davy (2004) it will be the first international airport in Europe which will have been financed entirely through private investors.¹⁹ Due to its proximity as well as the planned high speed rail connection to Madrid, it might prove to be a serious competitor for Madrid-Barajas Airport. However, this depends on how many

d) Some competition with other surface modes such as rail and road (especially on short-haul domestic routes)

e) Spatial competition amongst airports with overlapping catchment areas (especially prevalent in the London area).

¹⁹The main investors are Inversiones Aeroportuarias del Centro S.A., CCM Corporación, Caja de Ahorros El Monte, Iberdrola, Aeropuerto de Ciudad Real, Grupo Isolux Corsán, Universidad de Castilla-La Mancha See Aeropuerto Don Quijote (2006): Quienes somos. At <http://www.donquijoteairport.com/index.htm>

airlines the airport will be able to attract. Madrid-Barajas has the superior location and the high speed train tickets should be more costly than the fare for the public transport link. On the other hand, Don Quijote International Airport might have a cost advantage and could be able to offer better service at lower charges for price-sensitive airlines.

Another international airport Aeropuerto de Castellón is being built in the province of Castellón near the city of Vilanova d'Alcolea. Castellón is the only province on the Spanish coast which does not yet have an international airport. The initial idea for an international airport in Castellón came up in 1996; the Sociedad Aeropuerto de Castellón was founded and construction of the new airport began in 2004. Fomento de Construcciones y Contratas, the second largest Spanish construction group, will build and operate the airport together with the Aeropuerto de Castellón Company, which is 100 per cent government owned (50 per cent by the Generalitat Valenciana and 50 per cent by the Government of Castellón). The airport will be privately run, though, and will not be subject to AENA tariffs. It is not yet clear, however, when the construction of the airport will be completed. Due to its proximity to the airport of Valencia and its location in a popular vacation region, the airport might prove to be a serious competitor for Valencia airport (and maybe even Barcelona-Reus), especially if low cost and charter carriers chose to operate from that airport.

5.5 Poland

Poland currently has 12 airports which offer scheduled services. Three of these airports (including Poland's largest airport, Warsaw Frederic Chopin Airport) are managed by the Polish Airport State Enterprise (PPL), which also holds minority and majority shares in the remaining nine airports. Airport charges are set by airport operators after consultation with users and must be approved by the Civil Aviation Office. Besides Warsaw Frederic Chopin Airport, the other airports are marginal players serving their respective regional markets. Warsaw Airport plays an important role in connecting Poland and Eastern Europe with the European Union and North America. Its major airport competitors in these markets are Prague and Vienna airports, which both offer better infrastructure and more connections. Competition with Vienna airport is intensified, since LOT and Austrian Airlines, which have their respective hubs at Warsaw and Vienna, are both in the Star Alliance and each airport is trying to establish itself as the number one hub for Central and Eastern Europe.

The other Polish airports mainly serve their local markets. WizzAir, Central Wings and Ryanair are the dominant players at Poland's regional airports offering point-to-point services mostly to Germany and the British Isles. In almost all cases, airports are regional monopolists. The only two exceptions are Warsaw and Lodz and Krakow and Katowice. In the first case Warsaw, due to its size and its great variety of destinations, blocks the development of Lodz Airport. The two biggest Polish cities are just 100 kilometers apart and are well connected by rail and highways. The second case is more interesting. Katowice and Krakow are the two most important cities in southern Poland. Katowice is the capital of the booming region of Silesia with over five millions inhabitants. The former Polish capital and Poland's third largest city Krakow, on the other hand, attracts a large influx of tourists. In this economically booming region the two most rapidly growing airports share the same market. The two cities are just 70 kilometers apart but due to the location of the airports (Katowice Airport is located 30 kilometers north of the city of Katowice, Krakow Airport 60 kilometers away from Katowice on the A4 motorway between Katowice and Krakow) both are attractive for business travelers traveling to the Silesian region. Both airports have their advantages. Krakow is by far better connected and during rush hour it is faster to reach from Katowice than Katowice Airport (this situation will change when the new A1 motorway connecting Katowice with Katowice Airport is opened in 2010). But compared with Katowice Airport, Krakow Airport has poorer infrastructure in terms of terminal capacity, parking spaces

and runway lengths. Furthermore, Katowice has the advantage of having WizzAir as its home carrier.

Until 2004 there was a regular service on the Warsaw – Poznan – Zielona Gora route. This service was cancelled at the end of 2004 and the airport of Zielona Gora was without scheduled services for two years. Passenger figures in Zielona Gora decreased from 4,409 in 2004 to 957 in 2005. The route Warsaw – Zielona Gora was re-instituted the beginning of 2006 as a PSO service.

A second airport for Warsaw is currently being built on the base of a former military airfield in Modlin 40 kilometers north of the Polish capital. This airport will be serving mainly LCCs, but it should also be able to attract charter and cargo operators. Completion of construction is expected for 2019, at which time the airport should also have a direct railway link connecting it to Warsaw. Another new airport is planned for southern Poland in the city of Lublin. Lublin (340,000 inhabitants) is the biggest Polish city without an airport. At the end of 2006 the local government decided to build a regional airport with a 1,800 meter runway and a terminal capacity for 500,000 passengers on the airfield of the helicopter manufacturer PZL Swidnik close to the city. It is possible that this location will be changed in favor of a completely new site 40 kilometers away from the city in Niedzwiada, where local facilities would allow for the construction of a larger airport with a longer runway. Construction would be finished in ten years

Four other airports are envisioned as well: In Sochaczewo, southwest of Warsaw, there are plans to build a new airport and then shift all operations from Warsaw Frederic Chopin to the new airport in the future. Other airports are planned in Bialystok in northeastern Poland, and in Radom and Kielce in central Poland; whether they will actually be built, however, remains to be seen.

5.6 Other Eastern European States

In general, very few entries and exits were observed in the Eastern European countries within this study. Airport entries occurred only in Bosnia and Herzegovina, the Czech Republic, Poland and Hungary. In all of these countries former military aerodromes were converted into civil aviation airports during the 1990s. In the case of Pardubice in the Czech Republic, the airport is still operated by the military. All other airports are run by the respective civil aviation authorities. In terms of competition with established airports, currently only Pardubice could develop into a threat for nearby Prague-Rozny airport, if it is able to attract sufficient LCC traffic. In addition, there are plans to convert two former military aerodromes in Serbia into civil aviation airport, but when this will actually occur is not yet known.

There are a number of factors that might explain the low rates of entry and exit in the airport industry in Eastern Europe, the major one being that the majority of Eastern European countries in this study were too small (in terms of both size and population) to be able to support more than one or two international airports. In addition, GDP and GNI levels in many of these countries are very low, which again adversely affects demand. Many airports in Eastern Europe are also still state-owned and operated and are often part of larger country-wide airport systems. Although a number of airports have been privatized in recent years, many governments are still reluctant to allow for more competition either by breaking up existing airport systems or by privatizing their individual airports.

5.7 Other countries

For all other countries²⁰ within this study, no evidence of entries or exits was recorded. However, there are a few findings we would like to highlight.

France did not experience any entries or exits between 1995 and 2005 which might be due to ample capacity at existing regional airports (Thompson, 2002). Currently, there are 113 airports in France which offer commercial services. Hub competition within France does not exist; however, Paris-Charles de Gaulle airport faces some competition from other European hubs like for example Amsterdam-Schiphol. Major regional airports do not compete with one another, since they are situated too far apart; the only exceptions are Nice and Marseille airports, which have overlapping catchment areas. Some smaller airports, however, actively compete with airports, such as Carcassonne Airport with Toulouse Airport and Bergerac Airport with Bordeaux Airport, for example, or, in the Paris area, Paris-Beauvais Airport with the other Parisian airports. These airports are mainly used by LCCs and have seen some exceptional growth in passenger figures during the last few years. Ryanair first started services into Paris-Beauvais Airport in 1997; since then it has actively expanded its network and has begun flying to many airports in both southern and southwestern France - both prime holiday regions, especially for English tourists. Some airports have seen passenger figures rise between 21 per cent (Poitiers Airport since 2001) and 97.5 per cent (Bergerac Airport since 2002) per year on average. Carcassonne, the region's biggest success story, has seen a 533 per cent increase in absolute passenger numbers since 1998, the first year of Ryanair services into this airport.²¹

In Portugal, there was also no evidence of airport entries or exits; however, there has been talk about building a new airport for Lisbon near Ota, 35 kilometers north of Lisbon. A master plan was devised 15 years ago, and Ota was chosen as the site for the new airport. Construction was to start in 2007; however, the current government has shelved the plans to build a new airport due to the high construction costs of 2.3 billion Euros and public budgetary constraints of the state.

In The Netherlands there was likewise no evidence of airport entries or exits. The airport market within The Netherlands is already saturated with Amsterdam-Schiphol being the main hub and a number of smaller airports offering charter and LCC flights. It is interesting to note, however, that in the case of The Netherlands there is also a large number of passengers which use airports located in northern and western Germany close to the Dutch border. Of special interest is the case of Niederrhein-Weeze Airport. The new entrant in the German Airport market is predominantly used by people of Dutch nationality.

6. Summary and agenda for further research

The theoretical review shows that entry and exit are crucial for intense competition. Economies of scale and scope combined with the sunk cost nature of airport assets might be very effective entry barriers if in the regional market the demand for air transport is low and does not come near a threshold of about 12 million passengers. Other structural barriers to entry might be effective as well. Absolute cost advantages in the form of superior location and subsidies as well as economies of density due to airline networks all favor large airports and might create significant barriers to entry although the extent of these barriers has not yet been quantified. An indication of their existence and importance is the entrance of former military airfields in Europe. Such entrants might be successful especially if they are managed as low cost firms without the typical gold plating of public facilities. Strategic barriers such as excess capacity,

²⁰ These include: Belgium, Bulgaria, Croatia, Estonia, Finland, France, Greece, Lithuania, Macedonia, Montenegro, Portugal, Serbia, Slovakia, Sweden, Switzerland, and the Netherlands.

²¹ In 1998, the first year of Ryanair services into Carcassonne, the airport handled 67,364 passengers. 426,798 passengers used the airport in 2006. Carcassonne airport expects 500,000 passengers to use its facilities in 2007.

limit pricing and predatory pricing could all be effective in the airport industry, but they do not seem to be very common. Incumbents can raise rivals' costs and create legal barriers to entry by making planning and permission processes more costly and by prohibiting other airports to be constructed and operated in the near vicinity.

In summary there could be a significant number of different barriers to entry and exit which could effectively limit such activity in the airport sector. In general the effects of entry in the airport industry are welfare enhancing as they lower airport charges, increase price differentiation of the incumbent airports and reduce their X-inefficiencies. In regional markets with decreasing average costs, however, new entrants might lead to unnecessary duplication of fixed costs and welfare losses.

Our empirical research supports the theoretical analysis. The airport industry is characterized by very low rates of entry and exit compared to other industries of similar size and structure. In the period of study the airline industry is characterized by the entrance of LCCs which leads to intense competition with sophisticated market entry and exit strategies of incumbents and new entrants. However, it would be misleading to expect such an active entry and exit behavior from airports as specific investments lead to high sunk costs relatively to the airline industry. Nevertheless the extreme low entry and exit rates indicate that the airport industry is characterized by substantial market entry and exit barriers. In the 25 countries analyzed, entries and (or) exits occurred in only ten countries.²² In addition, our findings show that in another two countries there might be entries in the form of new airports or converted military aerodromes within the next couple of years.²³ Entries (and exits) have occurred mainly in well developed air transport markets with Germany (nine entries, five exits), Italy (four entries, three exits) and the UK (one entry, two exits) leading the group with the majority of entries and exits. With regards to type and form of entry, most new entrants were military fields converted into civil aviation airports. In some cases in Germany (Schwerin-Parchim and Heringsdorf), existing General Aviation airports were opened for scheduled and charter traffic. In Germany, all new entrants are run and managed by public entities; in the UK we were able to observe the entry of privately run and managed airport (Robin Hood Doncaster Airport). With this exception no private airport entries have occurred so far.

In our analysis, we also found that very few airports were actually being built. The most notable exceptions to this, however, are the two Spanish airports which are being financed completely from private funds. In all other countries in which entries occurred, these were converted military aerodromes.

In terms of profitability, not much information could be obtained. The majority of entrants have only been in operation for less than five years – and very few publish financial data. A number of airports in Germany are subsidized by regional and state governments – however, increasing traffic rates at Niederrhein Weeze Airport, Karlsruhe/Baden-Baden Airport and Zweibrücken Airport are positive growth indicators and might lead to an increase in profitability in the future. One new entrant, however, has been extremely successful: Robin Hood Doncaster Airport. In its first year of operations (2005), the airport welcomed 840.000 passengers; it expects over one million passengers for the financial year 2006/2007.

Most new entrants do not yet actively compete with primary airports; however, this may be apt to change in the future as some of these airports manage to attract more airlines and passengers. Again, here as well there are some exceptions: Robin Hood Doncaster actively competes with Manchester for passengers in the holiday travel segment and the two Spanish airports, Don Quijote Airport and Castellón Airport, which are currently still under construction might very

²² Entries and exits occurred in: Germany, Italy, the UK, Poland, the Czech Republic, Finland, Hungary, Greece and Bosnia and Herzegovina.

²³ There are plans to convert former military fields into civil aviation airports in Serbia. In addition, a new airport is planned to open in Norway.

well prove to be dangerous competitors for Madrid-Barajas and Barcelona-Reus and Valencia respectively.

All new entrants have tried to position themselves within a certain segment in the market – either by establishing themselves as holiday- and LCC airports²⁴ or as cargo airports²⁵, however, if they will be successful with their respective strategies still remains to be seen.

Exiters usually left the market due to decreases in passenger numbers resulting mainly from the cessation of scheduled services. One airport (Kassel-Calden airport) has temporarily exited the market to construct a longer runway.

Our findings also show that there were very few entries and exits in Eastern European countries. This is due to a number of reasons: In general, air transport markets in Eastern Europe are a lot less developed than the air transport markets in their Western counterparts. In addition, many Eastern European countries within this study are very small, both in terms of population as well as geographical size. GDP and GNI rates are significantly lower, negatively influencing purchasing power and the demand for air transport services. Governments in Eastern Europe have focused more on privatizing their national airlines than on breaking up airport systems and making their airport markets more competitive. However, it will be interesting to follow the developments in Eastern Europe over the next couple of years as these countries integrate themselves into the common European market.

In the next steps of our research we will focus on the following points:

- What is the relative size of entry in terms of total and potential demand relative to existing capacity in each country? Has demand led to internal or external growth in the industry?
- How has the structure of the regional market been changed by entry and exit?
- What happens after entry? Does intensified competition between airports after entry have an influence on incumbent airport efficiency? Do costs and prices fall?
- Does the strong growth of air cargo lead to the emergence of specialized cargo airports and does this intensify competition with other nearby airports which offer both cargo and passenger services?

²⁴ Examples include Robin Hood Doncaster Airport, Niederrhein Weeze Airport and Lübeck Airport.

²⁵ Examples include Rostock-Laage (airmail hub) and Schwerin-Parchim (cargo airport).

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