

IMPACT OF LOW COST OPERATION IN THE DEVELOPMENT OF AIRPORTS AND LOCAL ECONOMIES¹

Rosário Macário^{1,2}
José M. Viegas^{1,2}
Vasco Reis¹

¹ CESUR, Instituto Superior Técnico, Universidade Técnica de Lisboa, Portugal

² TIS. PT, Consultores em Transportes, Inovação e Sistemas, s.a.

1 Abstract

In a matter of a couple of decades, the segment of the low cost companies grew from a few companies operating in Great Britain to several tens operating all over European Union. Nowadays, a dense network of connections links a large number of cities, ranging from the bigger metropolis down to very few populated regions, with relatively affordable prices. Populations enjoy from unprecedented mobility and isolated regions profited from the access to other regions without even perceiving that the current benefits they have developed at the cost of some market casualties. Many of the original low cost companies have meanwhile gone bankrupt along with some of the already established ones.

The growth of the low cost segment has definitively changed the air transport landscape in Europe and in the future more changes are expected, similar to what occurred in the United States. Although the impact of these dynamics has been thoroughly researched, from an institutional point of view they remain fairly unknown. This paper presents a part of the results and findings of a research study prepared for the European Parliament, focused on the impacts in the development of the airports and local economies. The purpose of the overall study was to evaluate and assess the consequences of the growing low cost airline sector for transport infrastructure and passenger flows in Europe and to advise the European Parliament on the need for future actions.

2 Introduction

The Low Cost Airlines (LCA) phenomenon started in the US and it proved to be a robust service concept from the financial and operational view point. Despite the homogeneous designation usually used to define this service, we can observe in the literature that a significant diversification of business models exist (Windle R., et al, 1996; Doganis R., 2001; Calder S., 2002; Lawton T. 2002; Francis G.

¹ Based in following study and publication Rosário MACÁRIO, Vasco REIS, José VIEGAS, Hilde MEERSMAN, Feliciano MONTEIRO, Eddy van de VOORDE, Thierry VANELSLANDER, Peter MACKENZIE-WILLIAMS, Henning SCHMIDT, IP/B/TRAN/IC/2006-185, PE 397.234, December 2007, "THE CONSEQUENCES OF THE GROWING EUROPEAN LOW-COST AIRLINE SECTOR", available at <http://www.europarl.europa.eu/activities/expert/eStudies.do?language=EN>.

et al., 2004; among others) that require a detailed observation in order to understand the dynamics and potential of this recently emerged market.

Some core characteristics seem to be common to the majority of the LCA business models. These are: high aircraft utilization; internet booking; use of secondary airports; minimum cabin crew; lower wage scales; lower rates of unionization among employees; one class of seating; short ground turn around times; no cargo carried; very simple fare structures and price strategies; adoption of strict yield management techniques; e-ticketing; often no seat allocation (for faster boarding); no frills, e.g. passenger having to pay for food and beverages; no connections; point to point services. It is worth noting that the increased competition in the aviation sector led the so called “legacy” airlines to adopt some of these characteristics of the low cost in an attempt to better survive in this new deregulated environment.

From the economic view point Figure 1 below illustrates the cost advantage that generally applies to all low cost models. Traditionally, airlines optimised their revenues by segmenting the supply. The lower tariffs were defined in function of both unit costs and potential competition; the upper tariffs in function of the travellers’ willingness to pay. As the unit costs were very high, the lower tariffs were above the lower areas of the demand curve, and as a result a considerable part of the market was prevented from flying. This part of the market corresponds to clients with a very low willingness to pay.

The LCAs business model targeted precisely that market (central graph in Figure 1), through very low fares (right hand side of the graph). As a result, a significant share of the market was suddenly able to travel. This explains the success of the LCA concept, which was to offer low fares and with it conquer the market that was previously economically excluded from flying. A precondition for success was that low fares could only be sustainable if there was a low cost operation. So, in fact the low cost is a condition for the strategy followed and not the strategy itself, so the most correct designation for these services should be Low Fare Airlines, instead of Low Cost Airlines.

According to a McKinsey (2002) study a low cost configuration can save up to 57% costs through operational and managerial features. The traditional airlines have been reducing costs, but they continue to lag far behind the LCAs. As a result, they continue to target a smaller market share, corresponding to the passengers with a high willingness to pay. Additionally, they have been witnessing a reduction in the lower areas of their demand curve to the LCAs.

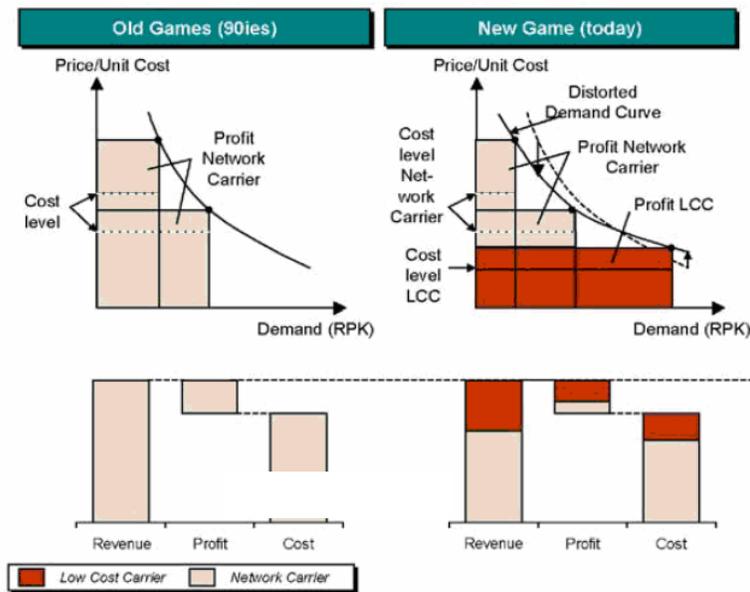


Figure 1: Economic model for low cost model (Franke, 2004)

By observing the different continents and the reports on how the respective low cost airline models evolved we understood that some factors acted as a catalyst for the spread of low cost. These are: regulatory framework; degree of entrepreneurship; density of population and relative wealth; travelling culture; airport availability; adherence to internet facilities. A strong relation exists between the intensity of these factors and the development of local societies which is a determinant for the position of the different countries and continents in the market development life cycle of low cost airlines. **Error! Reference source not found.** synthesises a comparison between the life cycle evolutions of these services across the world.

Table 1: Life cycle for market development of low cost airlines (source: Francis et al, 2006)

Life cycle stages	USA	CANADA	Europe					New Zealand	Rest of the world
			UK	Mainland	East	Asia	Australia		
1. Innovation	■	■	■	■	■	■	■	■	
2. Proliferation	■	■	■	■			■	■	
3. Consolidation	■	■	■						
4. 2 nd phase of entrants	■								
5. Consolidation	■								
6. Market maturity	■								

It is consensual that deregulation has been an indispensable precursor to the introduction of low cost airlines in all geographical contexts but it is also consensual between analysts that by itself this is far from being sufficient to foster their evolution along the life cycle indicated in Table 1, otherwise the uneven spread of this model around the world would not be justified. Besides, another relevant phenomenon associated with the evolution of low cost models is the competitive pressure that by their simple existence is put on the “legacy” airlines that tend to adopt cost cutting strategies driving the aviation sector to a very likely consolidation of the low cost model market with traditional “legacy” airlines.

After this brief introduction to the low cost concept and its diversified materialisation in the different parts of the world, the next chapters will address our understanding of the consequences of growth of Low Cost Airlines (LCA) for transport infrastructure and passenger flows in Europe. Chapter two starts by discussing the LCA concept and the different ways it developed across the world. Chapters three and four address the current LCA market and its trends. Chapter five addresses the effects on Airports. Chapter six addresses the overall economic and social impacts resulting from the existence and development of LCA.

3 LCA concept

There is no single best definition of a low-cost airline (LCA) also known as a low fare, no-frills or discount airline². The term originated within the airline industry for airlines with low operating costs or with costs lower than their competitors. Through popular media the term has since referred to any carrier with low ticket prices and limited services regardless of their operating costs. The concept originated in the United States with Southwest Airlines, which began service in 1971. It was copied afterwards and in the early 1990s spread to Europe and subsequently to the rest of the world. In Europe the trend started in 1991, when the Irish company Ryanair, previously a traditional carrier, transformed itself into an LCA³. It was followed by other LCAs in the UK (e.g. easyJet in 1995) and then continental Europe.

It is now generally accepted that a low-cost airline offers low fares and eliminates most traditional additional passenger services. The business design is mainly characterised by one or more of the following key elements: a simple product, low operating costs, and the specific positioning. Table 2 summarises the characteristics of the LCA concept indicating typical practices of the LCA business model.

² The European air transport market can be sub-divided in four business models: intercontinental carriers, regional and small network carriers, low-cost carriers, charter companies.

³ Another Irish company, Aer Lingus, originally a flag carrier, also transformed itself into an LCA.

Table 2: Characteristics of the LCA-concept (Source: Macário R. et al., 2007)

Basic characteristics	Detailed characteristics
A simple product	<ul style="list-style-type: none"> • one passenger class / one cabin class • simple fare schemes with limited product differentiation • no frills, such as catering, lounges and frequent flyer programmes,... • no ticket repayment and rebooking
Low operational cost combined with high productivity	<ul style="list-style-type: none"> • single aircraft type reducing training and servicing costs as well as crew and maintenance costs • lower crew wage schedules due to a.o. low average seniority and performance linked wage structure, personnel performing multiple tasks (for instance flight attendants also cleaning the aircraft or working as gate agents) • outsourcing of all non flying jobs (i.e. ground handling, aircraft maintenance, call centres,...) • emphasis on direct sales of tickets, especially over the Internet (avoiding fees and commissions paid to travel agents and computer reservations systems) • the use of secondary airports with excellent slots, low landing fees, less congestion,... • simplified routes, emphasizing point-to-point transit instead of transfers at hubs (again enhancing aircraft utilization and eliminating disruption due to delayed passengers or luggage missing connecting flights) • high seat density • high utilisation of aircraft achieved through short flights and fast turnaround times (i.e. more block-hours/day means lower unit cost) • low rotation time^(*) of approximately 20 minutes • free seating encouraging passengers to board early and quickly
Specific positioning	<ul style="list-style-type: none"> • aggressive marketing campaigns • leisure travellers and price-conscious business travellers • stronger fuel hedging programs.

(*) The time the aircraft is parked on the ground on which engines are turned off.

Not every low-cost airline implements all of the aspects mentioned in Table 2. Some try to position themselves by allocated seating, while others operate more than one aircraft type, and others will have relatively high operating costs but lower fares. For example, Air Berlin in 2005 commenced UK domestic services as feeders to its German services out of Stansted, exploring the network effect, which is a rather uncommon feature in LCA business.

Francis et al. (2006) developed a typology, conceptually distinguishing among five broad types of what is known as low cost carriers:

- The Southwest copy-cats – Airlines that have been set up from scratch or those that have been remodelled by a private entrepreneur. This type is best represented by Ryanair or easyJet ;
- Subsidiaries – Airlines that have been set up as subsidiaries of “legacy” airlines aiming to compete and regain a share of the low-fare segment which was previously taken away from the established companies. Although formally autonomous they often keep elements of cross-subsidization. Examples are MetroJet (by US Airways), Snowflake by SAS, bmibaby by bmi, and originally Go by British Airways ;
- Cost cutters – Typically long established “legacy” airlines attempting to cut their operating costs sometimes only by reducing some of the frills once offered. A number of “legacy” companies have adopted this strategy either permanently or for some period of time. Examples are: BA and Aer Lingus shedding significant numbers of staff and rationalising their fleets; Air France and Iberia who have begun offering cheap one way tickets and charging passengers for their food;
- Diversified charter carriers. Low-cost subsidiaries developed by charter airlines. Examples are: Thomsonfly by Britannia; Hapag Lloyd Express by Hapag Lloyd; etc.
- State-subsidised companies competing on price. These are not true low cost carriers as such but they act in the market as if they were. They are financially supported by Government ownership or subsidies allowing them to offer low fares without the need to cover their long run average costs. Alitalia, Olympic Airlines, TAP Portugal, Iberia or Sabena are some examples of these type of companies.

3.1 Current LCA Market

According to a rough estimate of the Association of European Airlines (AEA), in 2006 ‘no-frills’ carriers accounted for just over a quarter of intra-European scheduled passengers. The sector continues to grow strongly - - and as it does so the business model is refined and adapted (AEA, 2007, p. 13)⁴.. Figure 2 provides that evidence referring to the supply of seats, three companies (Ryanair, EasyJet and Air Berlin) account for 75% of the no-frill total. They are each several times the size of any of the other companies and the development of the services of LCAs in Europe varies largely from one country to another. The phenomenon spread unevenly across Europe and Central Europe continues to attract substantial new service.

European LCAs have benefited from a very liberal legal framework and a number of favourable geopolitical factors, such as (MINTeL, 2006):

⁴ AEA’s annual review of the no-frills airlines indicates an increase in capacity (seats/week in the Summer timetable) of just over 20% in 2006 compared with 2005 (AEA, 2007, p. 13).

- The Single European Aviation Act, which guarantees Seventh⁵ and Eighth⁶ Freedom traffic rights to airlines;
- Underdeveloped air capacities in so-called ‘secondary cities’, such as Liverpool and ‘secondary countries’ of the air transport network⁷, such as Portugal, Ireland, etc;
- The enlargement of the European Union;
- Open-skies agreements with neighbouring non-EU countries, such as Morocco.

Weekly % share of Seats in Europe

‘No-frills’: 3.1 millions weekly seats

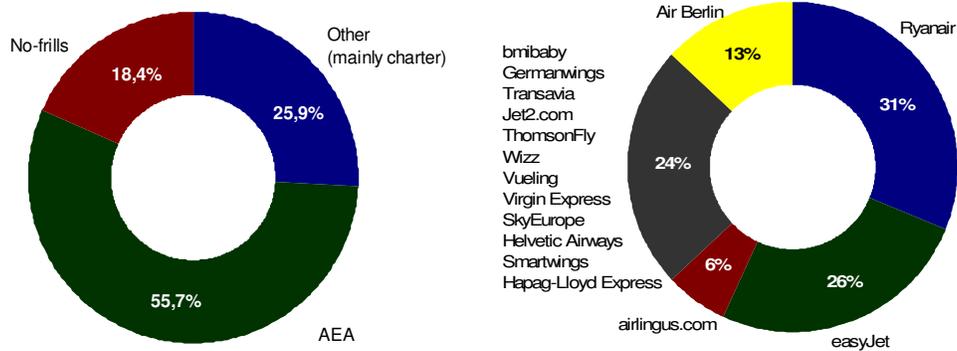


Figure 2: Weekly percentage share of seats in Europe, summer 2006 (AEA, Annual Report, 2006, own calculations)

So far most LCAs have tried to avoid mutual competition. Ryanair, for instance, concentrates on smaller markets and regional airports, while easyJet is focussing on bigger markets and primary airports. An important question is whether this behaviour or that potential overcapacity might result in a price war and/or a consolidation wave. Historical experience in the Air Transport business points to consolidation and the possible emergence of alliances, although this is an element so far not evident in the Low Cost (or No Frills, or Low Fare) market.

3.2 Trends in the LCA Market

This chapter is dedicated to the analysis of trends in the LCA market and how the different airlines are expected to develop in the coming years. The European LCA market continues to grow strongly, cf. Ryanair (+23%) and easyJet (+16%) in 2006. The flag carriers are slightly losing market share to the LCAs. The main question is whether the same growth rhythm and market share evolution will continue.

⁵ The Seventh Freedom is the right of an airline to carrying traffic between two countries outside its home country (e.g.: Alitalia operating between Paris and London, without serving Italy).

⁶ The Eighth Freedom is also called “cabotage” and is the right of an airline to carry domestic traffic in a foreign country as part of a service from/to its home country (e.g.: Austrian conveying people from Barcelona to Madrid, on a flight originated in Vienna).

⁷ That is countries without main hubs.

An analysis carried out by Deutsche Bank in May 2007 calculated that the low-cost market segment might have a volume growth of 15% per annum as a combination of share shift from other airline segments, GDP growth, and a very modestly rising propensity to travel. For flag carriers little or no volume growth should be expected in European short haul, beyond that of feeding into the long haul network. Currently this situation is aggravated with the prospects of continuation of the economic crisis affecting the majority of the world very likely until 2010. All of the major low-cost players are expected to have a disciplined capacity growth, i.e. below 15% p.a., except for Ryanair, which is increasing its capacity with more than 20% (Deutsche Bank, 2007, p. 5). The economic crisis might well represent a business opportunity for LCA market suggesting a more intensive shift of some business markets to LCA use. So far no concrete study was made to validate this presumption but given the past behaviour of the markets i

A second way to forecast future growth is a disaggregate one. By looking at the detailed investment strategies of companies like Ryanair, Air Berlin and easyJet, information on the number of aircraft ordered for and delivered during the following years can be collected (Table 3 and Figure 3). Linking this information to the hub strategy forecasts of the regional flows can be developed. A third alternative to forecast potential future traffic is based on a number of productivity indicators. Table 4 summarises for 2006 for some LCAs a number of those indicators: daily flights per aircraft, passengers per aircraft per day, employees per aircraft, and passengers per employee.

Table 3: Estimated number of aircraft and passengers carried by European LCAs until 2012

	2005	2006	2007 F	2008 E	2009 E	2010 E	2011 E	2012 E
Number of aircraft								
easyJet	108	120	143	160	177	194	211	228
Ryanair	87	113	132	152	172	192	212	225
others	152	181	221	260	302	347	395	458
Total	347	414	495	572	651	733	818	910
Passengers (millions)								
easyJet	28	34	38	42	46	51	55	60
Ryanair	31	41	48	55	62	69	76	81
others	45	56	67	79	92	106	122	141
Total	105	130	152	176	201	227	253	282
note: F - forecast; E - estimate								

Notes: F – forecasted; E – estimated

Source: Lopes (2005), airlines websites, authors calculations

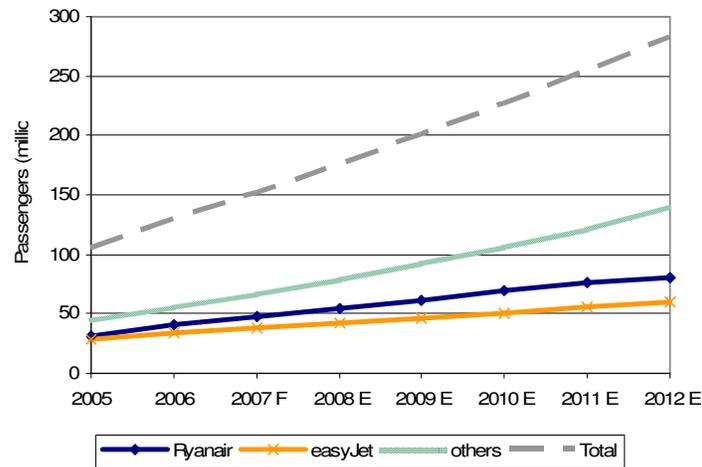


Figure 3: Estimated number of aircraft and passengers carried by European LCAs until 2012 (Lopes, 2005), airlines websites, authors calculations)

Table 4: Some productivity indicators (2006)

Airline	Daily flights / aircraft	Passengers / aircraft / day	Employees / aircraft	Passengers / employee
Ryanair	6.25	925	29.2	11,571
easyJet	6.3	763	34.9	7,986
Flybe	7.5	419	47.2	3,235
Transavia.com	2.9	518	54.2	3,486
Norwegian	8.0	699	32.5	7,846
Hapag-Lloyd Express	n.a.	700	n.a.	n.a.
Sterling	5.0	457	49.1	3,396
Wizzair	7.0	913	51.1	6,522
Sky Europe	3.7	462	53.1	3,176
Myair.com	4.8	603	38.0	5,789
Sverigeflyg	7.0	183	8.3	8,000

Note: we preferred not to calculate productivity indicators for Air Berlin, with reference to Note 1 of table 5 page 19 (i.e. the fact that the number of aircrafts and the number of employees include dba)

Source: own calculations based on ELFAA data and websites airlines.

The differences in productivity figures of the LCAs are due to different scales of activity, different types of product (e.g. the type of airports used), and different networks. Assuming that in the near future the LCAs will keep similar productivity figures, multiplying those figures with a number of new aircraft added to the network, gives an indication, although optimistic, of the growth in absolute figures.

It should be clear that the current economic activity supports additional growth of the LCAs, but at the same time there is a risk that some inputs will become much more expensive, resulting in a slow down in this growth. The current full order books of the main aircraft manufacturers, Airbus and Boeing, have shifted negotiation positions resulting in higher purchase prices and lease costs. A similar reasoning applies to pilots. Ryanair, for instance, no longer charges pilots for aircraft type rating training. At the same time some airports and airways are becoming congested which increases the costs for the airlines. These evolutions may reduce the future growth of LCA activities.

According to MINTeL(2006) the market share of LCAs in Europe in terms of available seats per week went down in many markets in 2006, which is interpreted as a sign of a certain market maturity level, although no consensus exist around this interpretation. There is the potentially increasing competition from conventional carriers on city pairs, with a good example in the price reaction of Brussels Airlines to the entry of easyJet on the Brussels-Geneva route. With increased competition there is a possibility, as in any competitive market, with short-term excess capacity, but the airline industry tends to correct such imbalances quickly.

An overview of the bankruptcies, mergers and take-overs that occurred in the LCA sector in 2006 is given in Table 5 below. It illustrates that for some companies (e.g. Air Berlin) the expanding market share can at least partly be explained by taking over other carriers.

Table 5: LCAs bankruptcies or mergers in Europe

Year	Airline	Country	Event
1999	AB Airlines	UK	Bankruptcy
	Color Air	Norway	Bankruptcy
	Debonair	UK	Bankruptcy
2002	GO	UK	Bankruptcy
2003	Air Lib	France	Bankruptcy
	Buzz	UK	Merger with Ryanair
	Goodjet	Sweden	Bankruptcy
2004	Air Polinia	Poland	Bankruptcy
	Basic Air	Netherlands	Merger with Transavia
	Duo Airways	UK	Bankruptcy
	Flying Finn	Finland	Bankruptcy
	Germania Express	Germany	Merged with dba
	GetJet	Poland	Bankruptcy
	Jetgreen	Ireland	Bankruptcy
	Skynet Airlines	UK	Bankruptcy
	V-Bird	Netherlands	Bankruptcy
	VolareWeb	Italy	Bankruptcy
2005	Air Andalucia	Spain	Bankruptcy
	Eujet	Ireland	Bankruptcy
	Intersky	Austria	Bankruptcy
	Maersk Air	Denmark	Merged with Sterling
2006	Air Tourquoise	France	Bankruptcy
	Air Wales	UK	Bankruptcy
	Budget Air	Ireland	Bankruptcy
	dba	Germany	Merged with Air Berlin
	Flywest	France	Bankruptcy
	HiFly/ Air Luxor	Portugal	Bankruptcy
	MyTravelite	UK	Reintegrated into MyTravel Airways
	Snalskiusten	Sweden	Bankruptcy
2007	LTU	Germany	Merged with Air Berlin

Source: Mintel, 2006

4 Airports

4.1 Business Model

At the end of the millennium, in Europe, there were around 200 airports with an annual throughput below 1 million passengers. These have the potential for greater traffic levels, although in many cases investment in additional terminal facilities would be needed in order to realise the capacity inherent in the runway. The large majority record financial losses and are publicly owned, being maintained with state or regional subsidies (Caves, 1999). The problem is that airports have significant levels of fixed costs, and in these airports the revenues (both from aeronautical charges and from retail and other sources) are not enough to cover these costs. Studies demonstrate however that the unit costs of these (smaller) airports reduce significantly as traffic reaches the threshold of 1.5 million work load units (WLU⁸) per year, and this effect continues to an upper limit of 3 millions WLU. per year⁹. As a result, many of them have been attempting to attract LCAs, aiming to increase revenues. However, LCAs have considerably different demands from traditional airlines.

Mirroring the air services, LCAs' main airport demands are low charges, fast turn around times and simply constructed terminals (Barret, 2004). Moreover, they are not very concerned about passengers' comfort or in the quality of the airport related services, but are fundamentally concerned with cost minimisation. So they will only contract for the minimum level of services, as will also negotiate prices down to the minimum possible level. Commonly, they do not require business lounges, air bridges or baggage transfer services. They tend to use the aircraft parking stands adjacent to the terminal, so that passengers can walk directly to the aircraft. All these demands are translated into the airports' design and services. In order to offer low prices, low cost airports or terminals tend to have simple designs or be open spaces. The space per passenger tends to be smaller than in an airport or terminal meant for a traditional airline, in order to reduce the costs and consequently the comfort spending the minimum possible time. In terms of retail services, the LCAs' demands result in a reduced amount of retail activity, simply because building and operating commercial space in airports can be particularly expensive¹⁰ (Francis, 2003).

Each airport is different, reflecting a unique combination of diverse issues and aspects, including geographical location, historic traffic records, dimension, infrastructure conditions, etc. Therefore, no unique business model can be drawn for an airport that intends to attract LCAs. Nonetheless some common points can be identified.

⁸ Defined as 1 passenger or 100 kg of freight

⁹ ICAO found the average unit costs for airports of less than 300,000 WLU is around \$15, while for airport moving 300,000–2.5 million is of \$9.4, and for airports handling 2.5–25 million WLUs is around \$8 (Francis, 2004).

¹⁰ For example: security measures, nowadays they introduce considerable costs on building and running airport spaces.

First, due to the need to lower the aeronautical charges, the consequent financial return may not be enough. Airports will inevitably have to look for other non-aeronautical revenue sources, such as parking lots and advertising. However, this is not free of risk as retail activities, for example, may result in considerable costs.

Second, the airport's hinterland plays an important role on the airport's bargaining power and positioning. A location near a heavily populated region results in a considerably different position to a location in a rural area, and the same applies to an airport located in a predominantly industrial region or in a tourist region.

Third, the low cost market is at this stage in its European development highly volatile, with new companies constantly entering the market while others leave, and with non-profitable routes being quickly abandoned. So long term agreements and investments must be conveniently assessed to incorporate the risk of withdrawal.

Fourth, LCAs are different in terms of objectives, demands and even negotiation terms. Airports need to take this into consideration when attempting to attract an airline, as negotiating with one that takes a broad view and is open to mutual benefits is completely different to negotiating with a company that only seeks to maximise its own profits while holding out a constant threat to abandon service and move to another airport (Francis, 2003).

4.2 *Financing*

Most airports in Europe are still under public control. However, over the past twenty years there has been an increasing use of private capital in airport financing.

Perhaps the most important privatization was that of the UK's BAA in 1987, which began a continuously growing involvement of private capital in airports. Privatisation does not necessarily mean that an airport becomes more profitable in general. But it appears that, if all other factors relating to a given airport remain constant, private ownership enhances the good performance management of that airport and with it profitability. This qualification is necessary because privatisation may be accompanied by a new structure of regulation of aeronautical charges; it may also be the case that financing costs associated with the privatisation erode operating profits. Hence, privatisation does not by itself guarantee that an airport will become more profitable but it is more likely that existing potential profit sources, especially in non-core activities such as car parking or retail, are exploited to a higher degree (Oum, Yu, 2003).

The share of commercial revenues as a percentage of total revenues for selected airports in Europe is presented in table 10 and we can observe that while the average has declined somewhat, developments within the sample differ from significant decline of commercial revenue share to significant increases. There is currently no reliable research into the reasons for this development. Possible reasons for the increasing relative importance of aeronautical revenues are increasing traffic volumes and changes in the business environment, including the loss of intra-EU duty free business. There is as yet no definitive view as to whether passengers using low cost services are more or less likely to use airport retail facilities than passengers using full cost services.

Table 6: Comparison of European Airport operators' commercial revenue shares in 1998 and 2004, based on TRL data

Airport Company	Share of commercial revenue in total revenue 1998	Share of commercial revenue in total revenue 2004	Growth
Aéroports de Paris	55.8%	28.0%	-27.8%
Copenhagen	48.6%	25.3%	-23.3%
Amsterdam	41.4%	28.2%	-13.2%
Berlin Group	45.8%	33.2%	-12.6%
London-Gatwick	66.6%	55.4%	-11.2%
London-Heathrow	50.8%	47.2%	-3.6%
Manchester	34.0%	31.1%	-2.9%
Vienna	28.9%	27.6%	-1.3%
Swedish Airports Group	23.4%	25.0%	1.6%
Stockholm	22.3%	24.0%	1.7%
AENA (Spain)	28.7%	34.9%	6.2%
ANA (Portugal)	24.1%	31.8%	7.7%
Average	39.2%	32.6%	-6.6%

4.3 Capacity

Significant numbers of regional airports operate at less than optimum levels of runway throughput. In addition, there are a good number of disused former military airfields with potentially serviceable runways, which could in principle be converted for commercial use. However, the extent to which these runway resources can be tapped in order to relieve congestion at primary hubs is, in practice, limited. Surface access to regional airports and old military airfields is frequently poor, requiring significant funding for road improvements which may not be available. In addition, there have been cases where planning applications to develop former military airfields have been refused on environmental grounds, such as Bentwaters in the UK.

A number of previously disused or underused airports or airfields have been adopted by low cost carriers. Examples include Bydgoszcz in Poland and Rodez in France. It is difficult to generalise as to the extent to which the use of such airports relieves congestion at primary hubs or regional airports.

Examples include:

- It is reasonable to assume that the use of Hahn airport, a former military airfield, has made a small contribution to relieving congestion at Frankfurt-Main airport;
- It is likely that the use of Kaunas airport in Lithuania has diverted some traffic from the main airport at Vilnius, which is itself only a small regional airport;
- It is reasonable to assume that most of the traffic between London and Rodez in France (and to a number of other small French regional airports) is newly generated traffic, relating to expatriate property ownership, which would not previously have used air services.

The overall situation with respect to capacity is that Europe's larger hubs are congested, and suffer from significant delays in gaining permission to build additional infrastructure. Regional- and low-cost airports generally have actual or potential spare capacity, but the extent to which this can be used to meet excess demand at hub airports is limited by poor surface access and distance from the hub airports' catchment areas.

4.4 Airport Charges

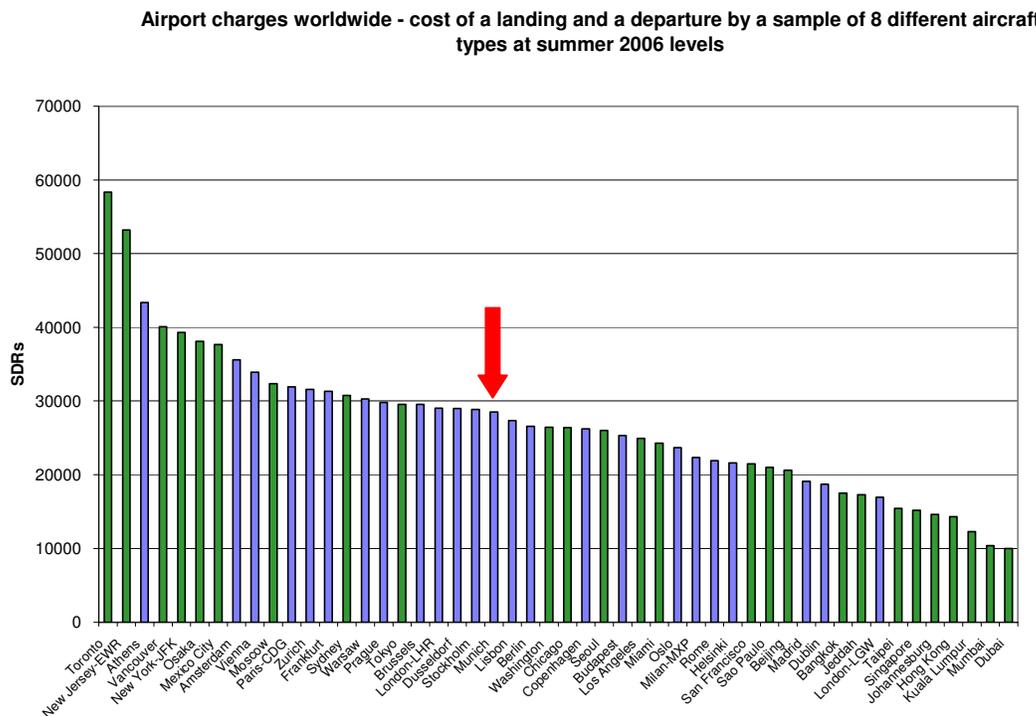
At present, airport charges in Europe are set according to a wide variety of national systems. Aeronautical charges at major international hubs at London Heathrow, Amsterdam, Paris Charles de Gaulle and Frankfurt are set under the terms of regulatory pricing systems, which allow charges to be set at levels which assist in the financing of future infrastructure needs. At some airports, such as Copenhagen, prices are set at levels agreed with airline users without any direct regulatory influence. At other airports, notably the Spanish, Italian and Portuguese airport systems, prices are adjusted annually but increases are subject to governmental approval and may not be subject to a specified regulatory formula.

At other, smaller airports, prices may change irregularly and infrequently. In the UK, prices at a number of regional airports have not changed significantly for a number of years, because of the competitive pressure on prices imposed by the price cap regulation applied to the main London airports and Manchester.

Although draft Directive 2007/0013 (COM (2006) 820, 24.1.2007) is intended to provide a framework which will set various requirements for transparency in setting airport charges, it is not intended to impose a unified pan-European pricing formula.

Charges at European airports vary widely. **Error! Reference source not found.** below illustrates the wide range of charge levels (TRL, 2006c). Charges at European airports are distributed widely across the range, with most sitting at or below the average.

Figure 4: Airport Charges Worldwide in comparison



4.5 Traffic diversion by regional airports away from major airports

It has been argued that the development of small airports serving low cost carriers may be financially damaging to larger hubs. In synthesis, no grounds were found for these concerns.

First, many large hubs are suffering from capacity constraints. This means that if, at the margins, some traffic is diverted to newly develop low cost airports, the capacity which is thereby released can be easily redeployed, most likely for international rather than regional services and thus reducing any potential opportunity cost from allocating the slot to a low cost airline. However, traffic diversion is itself unlikely, since low cost carriers are most likely to initiate services from a low cost airport from the outset, rather than operating from a hub and subsequently moving out.

Second, the development of low cost carrier services frequently results in traffic demand being newly generated, rather than diverting demand from existing services. This is because low cost airline pricing is often so low that it will create new demand for air travel. Even in cases where there is direct competition between low cost and full cost services on parallel routes (e.g. London Heathrow and Gatwick to Brussels in competition with London Stansted to Charleroi) there is little evidence of significant reductions in traffic flows on the full cost services. This is largely because full cost services tend to be operated at higher frequencies than low cost services, thus retaining a greater attractiveness for business travellers. There may be some revenue dilution for the full cost carriers, but this will tend to impact the carriers themselves rather than the airports.

Third, low cost carriers have, in a number of cases, created traffic flows on entirely new routes which were not previously served from hub airports. The French regional routes used by expatriate property owners which we mentioned previously are a good example of this phenomenon. Other examples include the newly created routes between the UK and the south of Spain (e.g. Girona) and Portugal (e.g. Faro). Both Girona and Faro were secondary airports served mainly with flights from the main national airports Madrid and Lisbon, respectively. The LCA exploited the tremendous potential of the British tourism market to south Europe, establishing direct routes.

5 Understanding the impacts of LCA growth

A systemic approach was taken to understand the impacts of the different variables entailed in the low-cost environment. The next sections give a comprehensive explanation of the relations and feed-back loops between identified variables.

5.1 Impacts on Prices

Up to now no exact and reliable cost functions of LCAs and conventional carriers have been produced. However, some cost indicators such as costs per seat-mile are available. A comparison with the cost figures of traditional carriers shows an important cost advantage for LCAs (see Figure 5).

This results in a totally different pricing structure and strategy. LCAs do not opt for a traditional seat management system, since they are not directed towards business travellers, and as such they attach less importance to the “spill rate”. Their pricing strategy is mainly one of increasing prices as the flight date approaches and as such the more passengers who are already booked.

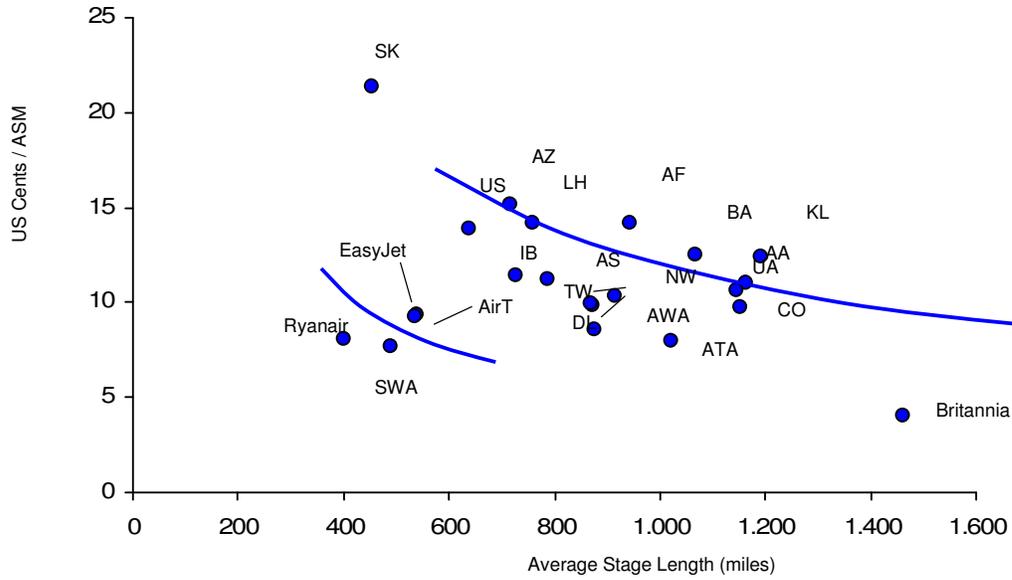


Figure 5: Costs in US Cents per ASM (Source: Booz Allen Hamilton, 2003)

The increase of the number of carriers on a route also has an impact on the fare as illustrated by Figure 6 where the presence of more than three carriers resulted in very significant fare reductions.

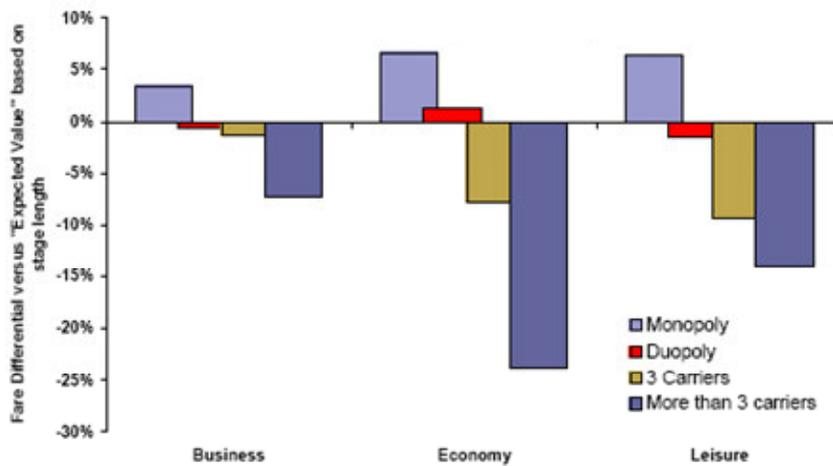


Figure 6: Impact of route competition impact on average fares, 2004

5.2 Impacts on the Environment

By the end of 2006 the European Commission had brought forward a proposal (COM(2006) 818 final) for legislation to include aviation greenhouse gas emissions into the EU Emission Trading Scheme

(ETS), in order to keep them at admissible levels and to prevent them from compromising EU's Kyoto Protocol targets. The current proposal foresees that as of 2011, emissions from all domestic and international flights between EU airports will be included in the EU' ETS; and one year later, from 2012, all international flights - from or to anywhere in the world - that arrive at or depart from an EU airport will also be covered. All air transport companies will be included regardless of their nationality (EU based or foreign¹¹).

As in other sectors, emissions are considered commodities that can be traded. The EC's studies aim for an initial allowance price ranging from €6 to €30 per ton of CO² emitted. Under the same rationale, the creation of an auctioning market is foreseen, where companies can trade emissions (to sell the non-spent allowances or to buy more if needed). Companies will be allowed to buy allowances to other sectors but will not be allowed to sell outside the air transport sector. Furthermore, this is an emissions cap scheme so companies cannot buy unlimited amounts of emissions. The sector will receive an initial quantity of allowances, which can then be increased through purchasing from the market.

The aviation sector in general (IATA, ICAO, etc) agrees to bring the sector into the EU ETS, but they are afraid that a badly designed plan would penalise airlines and further reduce their already sparse profits (Aviation Week, 2006). Regardless any scenarios we may draft, the EC's proposal is on the table for discussion and the aviation sector will have sooner or later to enter in the EC ETS. As a matter of fact, under the auspices of IATA, airlines are already working to achieve zero emissions within fifty years.

The LCA's business model appears to have an environmentally-friendly character. These companies pursuing cost minimisation have been reducing energy consumption and waste production to minimum levels, with positive benefits to the environment. Generally they operate modern fleets, based on the new generation of Boeing B737, or Airbus A319 or A320. These aircraft have lower energy consumption rates per passenger in their classes, and stay below all current noise limitations.

Furthermore, they often use regional airports with very low congestion levels. Holding times are minimal and fuel consumption is also reduced. These airports are normally located in less densely populated areas, where the noise impacts are not so severe. Finally, the low cost companies do not normally operate night flights. So the low cost companies, by flying with low noise aircrafts, serving areas with lower noise restrictions during day time, produce a very low noise impact. In addition, low cost companies have highly efficient operations. Aircrafts are on the ground for very short periods of time, which further reduces energy consumption. They also have more efficient seat configurations,

¹¹ Non-EU member states' airlines wishing to fly into EU will have to buy allowances to cover emissions for the entire route (both in EU and non-EU airspace). Unless the country of origin has already in use a scheme similar to the EU. It is precisely the obligation of buying allowances for the route when in non-EU airspace that is raising considerable objections from some countries, notably from the United States and Australia.

while traditional air transport companies carry in those aircraft around 160 passengers, low cost companies can load up to 190 passengers. Furthermore, low cost companies' load factors are usually higher than that of the traditional air transport companies, which means that each low cost company's aircraft transport more passengers than network carriers.

The combination of a more efficient seat configuration, with a higher load factor and new generation aircraft, results in very low levels of energy consumption per passenger. Finally, low cost companies have no frills. These companies do not offer drinks, meals, newspapers, and other gifts on board, which significantly reduces the amount of waste normally generated by traditional airlines.

Air transport is a major source of pollution and, as such, LCA activity is a real contributor of emissions. Moreover, like all air transport' fares also LCAs' fares currently do not incorporate environmental costs, which means that air transport is being subsidised by other sectors. If this is acceptable or not, it is a decision which should be subject to political decision making based on scientific reasoning. Yet, the impetus of limiting LCAs' activity, in order to reduce their environmental burden, should be taken with extreme caution as it would not only go directly against one of the EU's central beliefs: people's mobility, but it would also be very difficult to implement.

5.3 *Impact on Regional Economies*

Regions' social and economic development is directly linked with the mobility of people and freight. This has been an underlying reason for the Treaty of Rome foreseeing the implementation of the single European market. Although the accomplishment of those principles in the air transport sector has taken several decades to achieve, the benefits for Europe's peoples and economies are undeniable. The impacts on regional economies derived from air transport activity can be broken down into three main classes:

- Direct effects, which correspond to the increase in employment in activities directly related to air transport, such as: airlines; handling, maintenance and catering companies; airports; shopping within airports; or parking facilities. It is estimated that 1.000 jobs are created for every million passengers through an airport (York Aviation, 2004).
- Indirect effects, which correspond to the increase in employment and economic activity in the region as a result of the increase in flows of people, for tourism and business purposes;
- Catalytic effects, which correspond to the attraction and retention of incoming investment and the stimulation of tourism. The increase in commercial activity enhances a region's competitiveness by attracting leisure and business passengers, which ultimately leads to a sustainable growth in incomes and employment.

The LCA activity produces similar positive effects in the regions where they operate. As they have a significant share of passenger travel for leisure purposes, the main economic sector to benefit is normally tourism. LCA's business model leads these companies to choose regional airports, which are, in many cases, located in depressed and underdeveloped economic regions but with a strong potential for development. Moreover, these regions are commonly unknown for most populations, and by flying to them and advertising them in their websites LCAs improve regions' visibility. Thus, the benefits introduced by LCA activity are even more evident than the traditional air transport companies as they tend to fly to the well developed economic regions.

In addition, by offering low fares, LCAs induce air travel and, consequently, the number of people passing through the region, with inherent positive effects. Even in well developed regions when competing with the established companies, LCAs lead to an overall reduction in fare prices, which further induces air travel to the region.

Table 7: Benefits for Regional Economies from the LCA activities

Airport, Region	Main findings
Carcassone, France (a)	Passengers generated (2003): 253000; Direct income: 8.4 millions €; Indirect income: 135 millions €; Induced income: 272.4 millions €.
Cologne Bonn, Germany (b)	Taxes paid 91 millions €; Cost & productivity advantages for companies in region: 147.6 millions€; Average spent per incoming passenger: 285.42€.
Pisa, Italy (c)	Passengers generated (2003): 316000; Average spent per business incoming passenger: 431.40€. Average spent per tourism incoming passenger: 496.52€. Total economic impact of foreign passengers: 149.2 millions €.

Source : Ract Madoux Groupe Second Axe (2003) Rapport d'étude: impact socio-économique de la compagnie aérienne Ryanair dans la région et alentours de Carcassone.

Institut fir Verkehrswissenschaft und der Universitat zu Koln (2004) die regionalwirtschaftlichen des Low cost-Markets im Raum Koln/Bonn

S. Anna University of Pisa (2003)

As seen in Table 7 above, the benefits brought by LCA activity have been studied for several European regions. Commonly LCA search for non-served regional airports and, at least for the first years, airports are dependent upon a single source of passengers. Such situations give LCAs a comfortable bargaining power and, indeed these companies are well known for their aggressive negotiating nature. As local authorities seek the development of their regions, air transport is seen as a major driver for the achievement of that goal, and they are therefore willing to offer very advantageous conditions to the LCA. This has already led the European Commission to intervene, for

example at Charleroi airport (Belgium) where local authorities agreed to pay a fee per passenger landed.

5.4 *Safety and security*

There is no evidence that LCAs have lower standards of safety than traditional airlines. Many LCAs operate young fleets which, not only are equipped with the most up to date safety technologies but also require less maintenance, leading to cost reductions. Furthermore, LCAs have made efforts to overcome passengers' belief that low fares may result in lower investment in aircraft maintenance, in order to gain the confidence of those passengers that do not fly with them because of these concerns. Such efforts reveal LCAs' awareness of this stereotype and, as such, it is unlikely that they would take any action that might jeopardise their safety levels, as that could result in bankruptcy. In addition, the air transport sector in general dedicates significant efforts to the supervision and enforcement of reliable maintenance practices, and there is no evidence to support the need of any additional care with LCAs.

5.5 *Freedom of circulation of people*

One of the pillars of the European Union (EU) construction is the free circulation of citizens within the EU. The creation of the Single European market has been the achievement of that goal and peoples' mobility has been increasing ever since. The emergence of the LCA has led the EU's mobility towards a new stage. Two main drivers can be pointed out for this evolution: low fares and new destinations.

The LCAs entered the market offering substantial discounts, when compared with the incumbents. They have also changed the selling channels bypassing the traditional monopoly of the sales agents and started to sell directly to final customers either via Internet websites, or through call centres. As a result, people that either could not afford to travel or travelled using other modes of transport, shifted to these companies.

In Figure 2 already presented we can see that almost 60% of the passengers travelling with LCAs are new passengers and that around 40% have moved from the traditional airlines, which shows that LCAs have mainly created their market rather than competing with the traditional companies. Another conclusion is that almost half of the new passengers would not travel, were it not for the existence of LCA flights. This evidence leads to the conclusion that LCAs induce air travel as a considerable percentage of people that previously did not travel now do so.

The number of LCAs has been progressively growing since the EU air transport market liberalisation, albeit a significant number of them have meanwhile gone into bankruptcy. The increase in the number of LCAs has been accompanied by an increase of the number of destinations served, because their business model is based on bypassing the main airports and choosing either non-served destinations with a high potential of growing, or regional airports within main metropolitan areas. In any case, the amount of population served by LCA routes increases. The following picture presents the network of the nine most representative LCAs. The network is dense and covers almost entirely the EU's territory.

Summarising, taking into consideration that, firstly, LCAs have been reducing the cost of travel and, as such, inducing mobility; and, secondly, the number of destinations served has been growing, we can conclude that the LCAs have been promoting equity and reducing imbalances within EU, which ultimately leads to the conclusion that they are fostering the EU construction and promoting European peoples' integration and cohesion.

5.6 *Competition in the Air Transport Sector*

To understand the competitive nature of the air transport market it is necessary to look in detail at each route or city pair served. As LCAs operate on a point to point basis, the competition occurs at the same level. Moreover, many LCAs create their own routes, meaning that a growth in LCA supply does not necessarily entail an increase in competition.

Two main operating strategies may be identified in the LCA market: one consists of creating new markets, while in the other airlines opt to enter large, established markets with other airlines already operating. Ryanair, the largest European LCA, follows primarily the first strategy. The first step is to identify potential markets not explored so far. The targets are secondary airports possible to serve those markets. Then, the airline approaches local airports and authorities envisaging benefits either through fee reductions or fiscal incentives, which are generally achieved. Both of them are eager to attract airlines, the former to increase revenues; and the latter to induce social and economic development. If successful the route is established, otherwise it selects another regional airport or searches for other region.

Doganis (2006) presents a paradigmatic case of traffic generation. The city pair market was Manchester and Nice. In 1995, the route had 14.600 passengers (7.600 scheduled and 7.000 charter). In 1997 easyJet launched a service between Nice and Liverpool, nearby Manchester, and in the very first year of operations the airline carried 70.000, plus 10.000 flew between Manchester and Nice (all charter, as scheduled flight had been discontinued). Attracted by such a promising market British Airways re-entered the market. In 2003 the market had grown to 176.000 passengers.

The other strategy is being followed by the second largest European LCA, easyJet. This airline prefers to enter on large markets, which naturally are already being disputed by other companies. Conversely to the other strategy, easyJet has predominantly chosen routes with other rivals already operating, in only one route there was a single competitor, in all others they were one of three or more. In order to gain market share, easyJet competed with frequencies offering double and some times triple daily flights. Higher frequency means that customers have a higher degree of choice, which is important for the business passengers. The purpose is clear: to be an economical and sound alternative to traditional carriers (Air Transport Group, 2004). The target segments are both the leisure market offering low fares and making use of passengers' willingness to pay, and the business segment, by offering low fares and high frequencies. Indeed, easyJet has indicated that on some routes the business passengers' proportion reaches 50%, while Go indicated 30% (Mason, 2000 and Mason, 2002).

5.7 Competition and cooperation with other modes of transport

Evidence of competition between air transport services and other modes of transport exist in different situations. Sinha (2001) found a substantial increase in competition between air transport services and road and rail services, after the United States liberalisation¹². The two main United States' road companies were compelled to cut prices in order to reduce the shift of passenger to the LCAs. The rail company - Amtrak - had also to cut prices and introduced special deals for passengers. The same effects have been found in Australia. However, it is with the high speed train¹³ (HST) that the competition issues are more intense, because it is the only land transport solution that can directly compete in term of travel times. Past experience shows that for distance up to 500km, HST may be more competitive than air transport, mainly because it commonly offers city centre to city centre transport services, while many airports are in the outskirts, which implies extra transport time from/to the city centres. This competitive advantage is then progressively eroded until a threshold around 1,000km, above which air transport has no direct competitors (Givoni, 2006). In terms of time, evidences show that HST may compete for journeys up to 3 and half hours (Esplugas, 2005).

Speed is indeed the determinant factor for HST competing head to head with air transport, followed by tariffs. When the HST were first introduced in Europe, in the eighties, air tariffs were very high as the result of the regulatory regime. The HST services thus entered the market offering cheaper tariffs than air transport services, which has led some passengers to divert to rail services. Additionally, HST

¹² In 1978 with the Airline Deregulation Act

¹³ This study adopted the definition for high speed train given in the EU Directive 96/48: The high-speed advanced-technology trains shall be designed in such a way as to guarantee safe, uninterrupted travel: a speed of at least 250 km/h on the lines specially built for high speed, while enabling speeds of over 300 km/h to be reached in appropriate circumstances; or a speed of the order of 200 km/h on existing lines which have been or are to be specially upgraded; or the highest possible speed on other lines.

transport companies may compete in terms of frequency and quality of service. Commonly HST transport companies are in a position to offer higher frequencies than air transport services, which is especially important for the business travellers that favour the flexibility of service frequency. Other advantages include the railways' higher safety levels, punctuality and availability of city centre to city centre services. The following Figure 7 depicts the travellers' reason for preferring HST. In addition, trains are more spacious and comfortable than aircraft, which are another relevant advantage (Givoni, 2006).

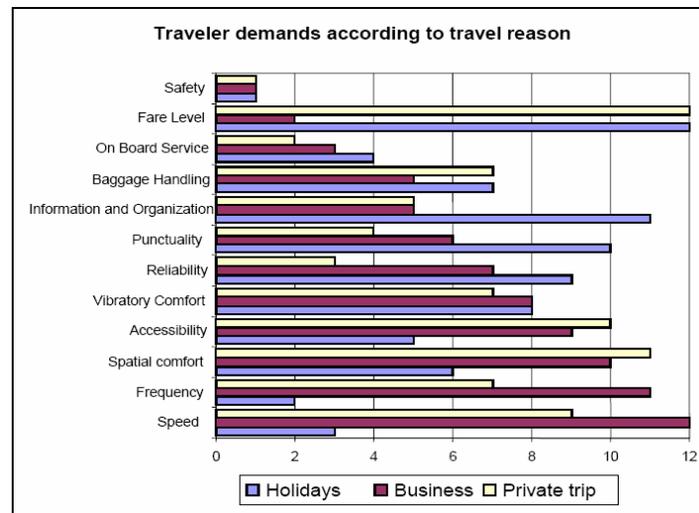


Figure 7: Traveler Demands according to travel reason (Source: Espulgas (2005))

However, there is considerable scope for other types of interaction besides competition. With the increasing congestion level in the European airspace, HST are progressively being considered as a viable alternative to the medium to short haul legs. So, instead of using air services, airlines are starting to use HST services, for example: Charles de Gaulle airport in Paris is directly served by the TGV network enabling Air France to compete, for instance, for passengers living in the Brussels region; likewise Brussels Airlines use the Thalys network to feed its flights at Brussels airport (luggage checked in at the Brussels-south station); or Frankfurt Airport is served by the ICE and Lufthansa sells tickets that include a rail leg. Moreover, there are regions served by HST but not so well by air links: in these cases HST may be used as alternative feeder services. Recently, an innovative service has been emerging, so-called as “system of airports”, where nearby airports are linked through HST (Espulgas, 2005). This case is too recent to take further conclusion but at the outset brings a new role to HST as a facilitator of an airport system.

So far, the discussion has been centred on the interaction between the traditional air transport companies and the HST, where there is a reasonable amount of available literature. However, in respect of the interaction between LCA and HST there is a major lack of research and studies. Nonetheless, some considerations may be identified. One of the HST's main competitive advantages

referred to previously concerns on their lower tariffs when comparing with air transport services. Naturally where LCAs compete in the same market this advantage no longer applies. Therefore, a shift to LCAs can be expected, if travel times are better than those of HST services. A recent study estimates the effect on the HST market share as a consequence of air tariff reductions (Figure 8). The study foresees considerable reductions in the HST market share as the consequence of the entry of LCAs into the market.

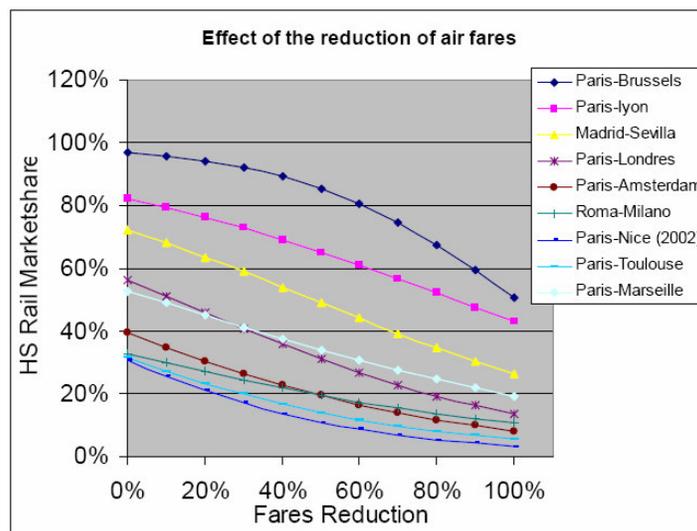


Figure 8: Rail marketshare predicted by the model corresponding to a reduction in Air Fares

Source: Espulgas (2005)

If this scenario comes true, it will be contrary to the current EU transport directives and, in particular, the objectives of the EU White Paper on Transport¹⁴, where an increase of the train modal share and a curb on the growth of air transport activity is foreseen. However, further studies are needed in order to clarify the actual nature of the interactions between LCAs and HSTs and the level of traffic diversion between services, if any. Only with a sound understanding of the market conditions should a potential intervention be considered.

Secondly, due to the nature of the LCA business model, it is very unlikely that they will initiate joint services with HST. This scenario would entail the need to develop a set of common services and systems, such as ticketing systems, coordination of schedules, which LCAs would be unlikely to consider given their business model.

¹⁴ COM(2001) 0379 - *European transport policy for 2010 : time to decide*

6 Conclusions

In function of the evidences collect we may conclude the EU aviation sector is moving in a favourable direction. The growth paths of the European airlines and airports are comparable to those of their international peers. As in the rest of the world, European Low Cost Airlines (LCAs) are growing at a higher rate than the rest of the business. There are clearly positive effects of European LCAs on tourism, regional development etc., with evident changes in travel and leisure habits. As an example, the lower cost of mobility is fostering the adoption of week-end houses in a country different from where residence is established. The negative effects (environmental, etc.), in turn, are still under control and so it is still possible to devise mitigation strategies. Moreover, LCAs can play an important role in stimulating technological and operational improvements in the air transport business.

Until now the developments in the EU aviation sector correspond with the expectations of EU policy. However, there is a consolidation trend towards a limited number of big LCAs that will have consequences on the market structure and the market behaviour with a possible risk of abuse of market power. It is very likely that LCAs will follow strategies of market domination similar to the network carriers. At the same time some airports and airways are subject to congestion, resulting in a shortage of good slots. It should be clear that those potential developments possibly will need quick (industrial-economic) preventive responses from EU authorities, so that regulation can pave the way to induce behaviour in line with sustainability objectives.

In some respects there is already a common European approach to airports, in respect of the application of State Aid rules. The implementation of the Single European Sky may also assist in achieving common levels of runway capacity, which currently varies widely across the Union, with many airports failing to achieve “best in class” levels of capacity for a given runway configuration. Beyond this, the scope for a common approach to airports is limited. In particular, the development of airports is closely linked to their respective hinterlands, and there is a need to retain sufficient degrees of freedom to accommodate local and regional interests and different decision making processes. However, there would be benefit in introducing a requirement for airports of over a certain size to produce and publish long-term master plans, so as to allow greater transparency as to airport development plans. It would also be beneficial to airline operators if airports were required to publish regular capacity situation updates, so as to alert airlines to imminent or future capacity constraints.

Intermodal competition can be a sector where benefits of LCAs may have an effect on other modes, in particular High Speed Rail, given the difference of fixed cost, among other elements. Given the activity on both sides, with HSR entering into an alliance for a frontal competition with LCAs, this interactive dynamic should be carefully observed.

Some of the initiative EU should engage are:

- To set a legislative framework common to LCAs and the conventional (or traditional) carriers where both can operate in an optimal way. This requires tools for design, monitoring and evaluation. Any solution where LCAs and conventional airlines run under different legislative framework will foster disruptive behaviour and unfair competition between these the two types of airlines.
- The further development of the Single European Sky;
- The protection of passengers rights;
- The greening of air transport operations, extensive to all agents engaged;
- The development of advanced concept, techniques and technologies to:
 - enhance Air Traffic Management
 - enhance Ground handling operations

In view of potential concentration of market power and of increasing variety of market strategies, both of LCAs and of traditional airlines, it is worth highlighting that in the course of time the two approaches will tend to present a distinction between short and long haul. In the short haul the two products will tend to maintain clear differentiation with only certain niche players (e.g. Brussels Airlines) moving in the direction of LCA approach, while in the long haul the level of uncertainty about the strategies followed is quite higher but it is likely that for flight exceeding 6 hours LCA and traditional approaches will be more convergent

Finally, the authors are of the opinion that two basic instruments are missing for a better assessment of the European air transport:

First of all, there is a need for a monitoring instrument of the European Low-Cost market based on data and research on the industrial-economic behaviour of all actors. Next, there is a strong need for a benchmarking instrument, not only for the European air transport market, but for the entire world. An observatory for LCA evolution and impact assessment would be recommended to encompass these instruments.

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