



**TOPIC 8**  
AVIATION AND AIRPORTS

## **COMPETITION IN THE EUROPEAN AIRLINE INDUSTRY?**

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### **Abstract**

After the introduction of the 'Third Package' European airlines are partly operating in a fully liberalised environment inside the EU, and partly in a fully regulated environment outside the EU. This paper analyses the competitive behaviour of the European airlines as well as the concentration tendencies in the EU airline industry.

## **PROBLEM DEFINITION**

Traditionally, the airline industry in the European Union was characterized by a high degree of State intervention, based on a system of bilateral market regulations. Only in 1987 did a political break-through occur toward a gradual liberalization of the air transport industry within the European Community. In that year, the First Package of measures was adopted, introducing new rules as to air fares, capacity-sharing and market access for scheduled services between the larger airports. The Second Package, which was adopted in 1990, enabled third and fourth freedom operations between almost all EU airports and resulted in an extension of fifth-freedom rights. In addition, capacity sharing between countries was liberalized further.

After the liberalization of air cargo services within the Community in 1991, the Third—and also the last—Package was adopted, which allowed the exercise of all freedom rights within the EU as of January 1, 1993. Only cabotage remains restricted until 1997.

The Third Package also put an end to capacity restrictions and in principle it allowed airline companies to set their own fares. Besides, the distinction became void between EU scheduled services (40% of passenger kilometers produced in the European market) and chartered services (the remaining 60 % according to Button et al. (1991). Charter companies will now more and more develop 'low budget' scheduled services, often in co-operation with traditional airlines.

By now it looks as if a period of intensifying market deregulation is followed by a period of extension of the internal air transport market. Early in 1995, Austria, Finland and Sweden joined the European Union. This expansion of the EU did not substantially affect European air transport policy, since these three countries as well as Norway and Iceland were part of the European Economic Area, where the Third Package of liberalization measures had already been accepted. Negotiations on trade issues are continuing with six other countries having 'Europe Agreements' with the EU. These six countries are Bulgaria, the Czech Republic, Hungaria, Poland, Rumania and Slovakia. In these negotiations air transport liberalization is discussed as well. It is considered possible that Slovenia and the three Baltic states will also join in these negotiations.

All in all, economic conditions for aviation within the EU have fundamentally changed, considering what was held possible some 10 years ago. The consecutive liberalization measures increasingly allowed airlines to make their own business decisions as to fares, route structure, and capacity. Against this background, we will analyse to which extent the European air transport sector has been showing the competitive behaviour aimed at.

## **AIRLINE COST CHARACTERISTICS**

### **Unexpected concentration in the US**

In an authoritative article, White (1979) presented a survey of all important studies concerning the cost characteristics of airlines. He concluded that "economies of scale are negligible or non-existent at the overall firm level". The persistence of this view is illustrated for example by Doganis (1990). The views of that time, however, were derived from cost functions specified according to the paradigm of "single output, multiple input". In that context, the transport services were regarded as a homogeneous commodity, whereas networks and the route structure were simply considered to be the mere sum total of all separate routes. Consequently, scale effects were at best observed at the level of the isolated route:

- average costs on a route fall as the aircraft capacity increases;
- given the aircraft capacity, average costs fall as the length of the route increases;
- given the capacity and the length of the route, average costs fall as the average level of occupancy rate increases.

At the level of the firm, however, scale economies were considered to be negligible. Therefore, after the deregulation of the American market the chances of market concentration and diminishing competition were considered to be unrealistic.

By now, these views from the early eighties have dramatically been superseded by actual developments: the American and Canadian airline industry became involved in a concentration process, which has not ended yet. Over the first nine months of 1993 the top six airlines in the US realized an unprecedented market share of 84.2% (Williams 1994). No doubt this level of concentration will increase even further when USAir, with a market share of close to 10%, is taken over.

### Changing views on cost characteristics

In the meantime, the views concerning the cost characteristics of airline companies have changed considerably. First of all, the concept of scale economies, which is based completely on the notion of a 'homogeneous product', proved to be absolutely inadequate in a sector providing strongly heterogeneous transport services. Apart from that, it has become clear that the market structure is not defined by costs alone, but that these cost characteristics emerge in close interaction with the demand side of the market. Furthermore, it was shown that, depending on the structure of the airlines network, the thresholds for market entrance can be influenced to a large extent.

The heterogeneity of the transport services has stood out only since the first half of the eighties, as a result of the 'multi-product' specification of a flexible cost function. The production cost advantages that are connected with the different route structures are an exponent of this. Hub and Spoke (H&S) networks, when compared to Fully Connected (FC) networks, have the advantages of the combined production of transport services with different origins or destinations within one network. This results in what Berechman (1993) termed 'network economies'. The essence of this notion is in the economies of scope, which can result in a specific network structure, ie a H&S network combined with other cost advantages and in close interaction with the demand side of the market. This can be further illustrated by Figure 1.

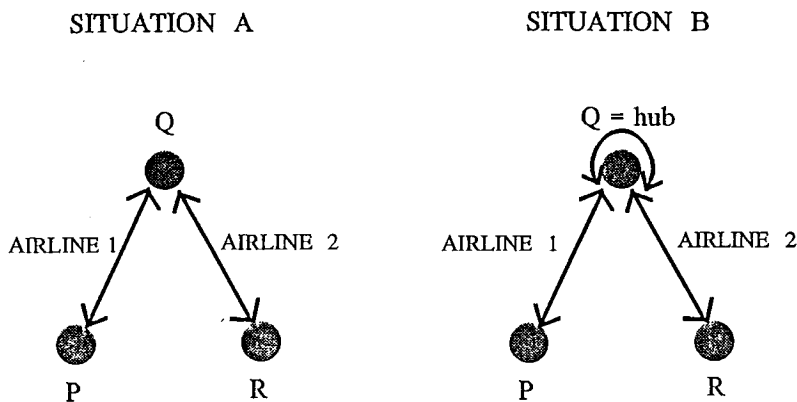


Figure 1 Two network concepts

In situation A, three cities are served by two separate airline companies, each offering a daily return flight between one of the two pairs of cities. In situation B, co-operation and co-ordination of the schedules between these two companies have resulted in connecting flights through the rudimentary hub Q, without having caused any changes to the network. In this case, the number of passengers on both routes will increase, provided that the direct travel time by overland public

transport surpasses total travel time by air, including the extra time needed for start and landing, an extra transfer in Q, an extra detour, and a considerable waiting time. If this condition is met, a self-reinforcing effect may come about in the travel-time competition, as the flight frequency may be increased due to the extra passengers. The resulting waiting-time reduction will invoke a second-order effect on the demand for air transport, especially among time-sensitive business travellers.

The economies of scope in this network integration may be recognized as follows. Each of the two airline companies is transformed into a 'multi-product' company: along the PQ-line, two services are produced simultaneously: transport between P and Q, as well as part of the transport service between P and R. A third transport service is concluded in Q: PQR. Along the QR-line, an identical simultaneous production is started: QR and part of PQR. Herewith we have indicated the essence of scope economies: simultaneous production results in lower average costs than does the separate production of individual products or services.

The average costs of the two co-operating or merged companies will decrease, due to two route-specific cost characteristics. The occupancy rates will rise structurally and, apart from a higher frequency, also the use of larger aircraft may be considered, which may lead to the emergence of economies of aircraft-size.

Returning to Figure 1: if the two airline companies merge and further expand their network from the hub Q, the economies of scope in the network will increase in a non-linear way with the number of spokes. From the above it may be concluded that the decreasing average costs of an H&S network with an increasing number of spokes are based on economies of scope and economies of aircraft-size, in a strong interaction with the demand.

### **Access thresholds and contestability**

The third characteristic of a H&S network is the erosion of 'contestability' (Baumol, 1982) on the isolated spoke-routes. Berechman et al. (1994) show that, if a new entrant on the market intends to start a direct scheduled service on route PR (cf. Figure 1), the incumbent carrier can use its H&S network as a deterrence against this new market entrant. This way, the incumbent can maintain its dominant market position. As a result of this, the 'contestability' of the airline markets increasingly crumbles away. Since entering or exiting a fully contestable market is assumed to be easy and quick, and without any sunk costs, this condition no longer holds. In a different respect also, the contestability of aviation markets has increasingly been eroded. The assumption of consumer mobility in their choice of an airline can hardly be maintained since the introduction of 'frequent flyer programmes' (FFP). Other entrance and exit barriers, like the availability of slots on vital airports, have extensively been analysed elsewhere.

All in all, it has to be accepted that contestability conditions constantly change and until now resulted in a decreasing contestability.

The conviction of constantly contestable airline markets, however, has directly influenced the process of concentration in the US airline industry. As stated by Bailey (1981), one of the advocates of the contestability theory: "The new policies (regulatory and antitrust policy) are based on the theory that (...) aviation markets are, in the absence of regulatory intervention, naturally contestable." It was felt that, even if there are considerable economies of scope and of aircraft size in the ever expanding H&S networks, that would not necessarily have to mean that the resulting concentration tendencies are alarming. Even in the extreme case of monopoly, it could still be maintained that, in a contestable market, the threat of possible new entrants would adequately condition the monopolist to a sufficiently competitive market behaviour. Over the past few years, however, the chances of this to happen on the individual routes have rapidly dwindled.

Summarising, it can be contended that H&S networks have been decisive in the changing market structure since the deregulation in aviation in the US. These drastically changed views on the economies of scale and scope and the competitive behaviour in aviation, is recognized in the comment made by Kahn (1988): "We advocates of deregulation were misled by the apparent lack

of evidence of economies of scale—the principal explanation of the differences in costs among carriers appeared to be differences in their route structure, (...).”

## AIR TRANSPORT IN THE EUROPEAN UNION

Against the background of these new views concerning the market structure in a deregulated environment, aviation has to be considered in the context of the almost fully liberalized European Union. Which tendencies of competition and concentration can be observed in European aviation in the past few years. First we will discuss the way in which airlines in the EU have reacted so far to the liberalized environment. After that we will deal with the adjustments to the networks, and the tendency to concentrate.

### Fare competition

The extent to which fare competition may be expected in a liberalized internal EU aviation market cannot be studied entirely isolated from the situation of European aviation since the mid-1980s. During this period of liberalization, an increasing overcapacity caused ever deteriorating results for the European airline companies. For instance, AEA (1994) mentioned the continuously decreasing average occupancy rate for the European market, from 56.7% in the mid-eighties to 48.6% in 1991. Since then, a slight recovery has resulted in the level of 50.9% in 1993.

During the period of 1990-1992, the aggregated losses of the AEA airlines amounted to 3.5 billion ECU, and also in 1993 these companies, with the exceptions of BA and KLM, were still in the red.

This development explains the aloofness of EU carriers to get involved in price wars. Cost reductions were preferred over lower fares. In general, the fares structure in the EU during the 1990s has remained reasonably stable. A clear downward pressure on average results, however, cannot be denied. This could mainly be accounted to the increasing popularity of promotional fares, as is shown in Table 1.

Table 1 Passengers shares by fare category

Share of passengers	1990	1991	1992	1993
on fully flexible fares (C)	39%	37%	33%	29%
on discount fares	61%	63%	67%	71%

Source: AEA (1994).

Coupled with the occupancy rates as presented, this largely explains the financial results of European airline companies as described earlier.

Apart from the diluted average results and the shifts towards promotional fares, we can also observe intensified activities as to fares in the liberalized markets. This is connected with the fact that most larger firms painstakingly try to remain the market leader as to prices in their domestic markets. The national airlines will almost certainly adjust to the lower fares on those routes where an increased competition emerges as a result of new entrants in their market. Table 2 illustrates this for a number of routes with more than two companies compared to routes with just two companies involved.

Reduced fares have probably occurred especially on routes with more than two carriers. When coupled with the overcapacity we described, these markets are in danger of a serious yield dilution. The only way to control such a development is by selectively applying reduced rates for a limited number of seats and during a short period of time. This requires a well-balanced yield management system. Yet, apart from these extra activities in the area of fares, we still have to conclude that, over a period of over two years of absolute freedom of fares, not one single EU company was inspired to start an extensive fare competition in the European market.

**Table 2** Fares changes and competitors on a route

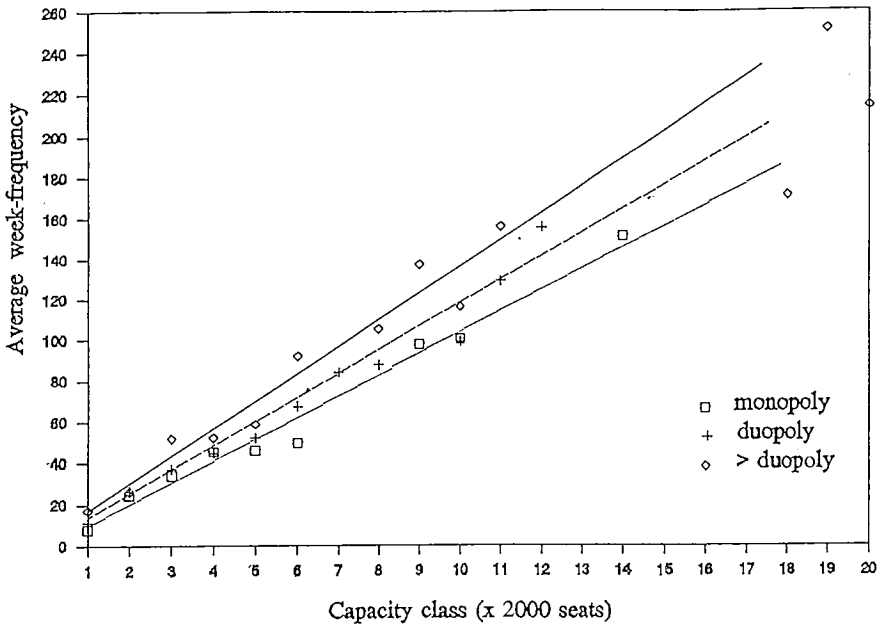
City-pairs	Average number of fare changes per airline, 1994, until 31 August	Number of carriers	
		3rd/4th freedom	5th/6th freedom
3 or more carriers			
London-Paris	33	5	1
London-Amsterdam	34	5	
London-Frankfurt	28	5	3
Brussels-London	29	5	
Geneva-London	34	2	1
2 carriers only			
Madrid-Stockholm	10	2	
Berlin-Vienna	14	2	
Lisbon-Rome	4	2	
Amsterdam-Barcelona	8	2	
Milan-Paris	4	2	

Source: Airline Business, November 1994.

**Frequency competition**

Liberalization has resulted in the abolition of most of the scheduling co-ordination and capacity-sharing in pool agreements between airline companies operating on the same route. This emphasizes the importance of frequencies as a means of competition. Taking into account the S-shaped functional relation between the frequency share and the market share on a route (Gelerman et al. 1973), it is of paramount importance that a company provides at least the same flight frequency on a route as does its competitor.

The importance of frequency competition in the internal EU market is also shown in Figures 2 and 3.



**Figure 2** Average frequency per week per route-density class for city-pairs within the EU, including Norway and Sweden ( Source: ABC, 1994)

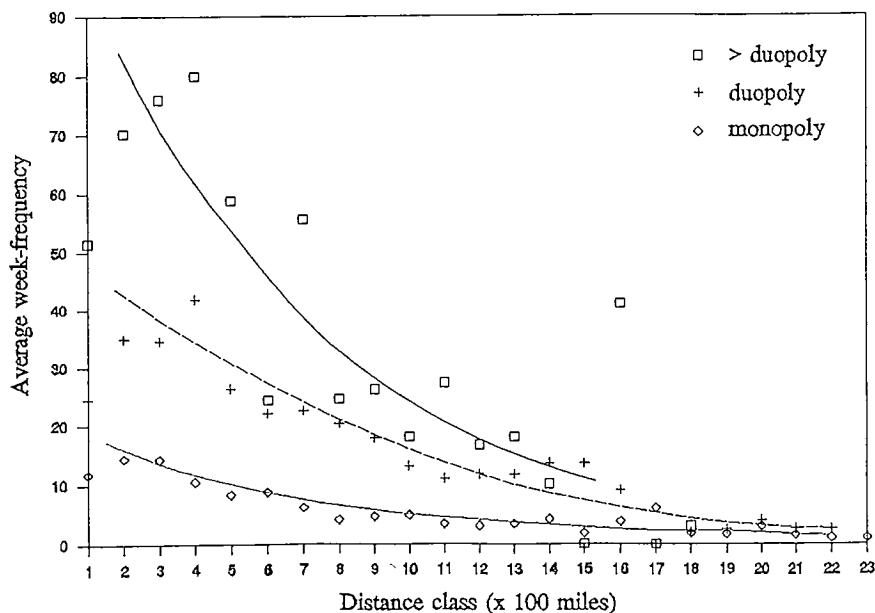


Figure 3 Average frequency per week per distance class for city-pairs within the EU, including Norway and Sweden (Source: ABC, 1994)

If the number of carriers on a route increases, the average frequency per week also increases, both per capacity class and per distance class. Therefore, if as a result of the removal of constraints to market entrance the number of competitors on a route increases, there is a danger of overcapacity. In order to neutralize the effects of frequency competition on the market share, all competitors in principle adjust to the highest frequency offered, especially on the higher density routes and the shorter distances.

In this respect, the changes of the routes served are a first indication of the frequency competition that could result due to new entrants. However, Table 3 shows that the dynamics in the route network since the introduction of the Third Package have not been very impressive.

Table 3 European route network dynamics

	Fifth freedom	Seventh freedom	Cabotage
Routes flown prior to 1993	12	0	1
Routes opened after 1-1-1993	+32	+19	+12
Routes closed	-12	-4	-8
Routes still operative, April 1995	32	15	5

Source: AEA (1995).

The most striking freedom in the Third Package, the seventh freedom, was hardly used at all. Apart from holiday flights by Luxair from airports in the northeastern part of France, this concerns especially regional operations by Deutsche BA and TAT, under BA's name. Fifth freedom routes were started in larger numbers, but the turnover on these routes is considerable. Only Finnair

appears to aim at developing a hub in Stockholm. The viability of cabotage routes also turns out to be extremely limited.

Taking into account the fact that the numbers in Figure 3 have to be contrasted against a total number of about 1,000 routes that are served within the EU by AEA carriers from EU member states, it is justified to conclude that the route dynamics so far have remained extremely limited, and that as a result of the increasing number of carriers per route, hardly any frequency competition has emerged.

In this context we should also bear in mind that the restrictions on cabotage, that have remained valid after the introduction of the Third Package, constitute a limitation of this frequency competition. New entrants will mainly focus on the highest density routes, so frequency competition will first emerge there. Table 4 shows, however, that 17 out of the 25 highest density routes in the EU are domestic routes. Until April of 1997, these routes are protected against direct competition. The other side of the picture therefore is that the level of competition on these routes will be structurally lower: the average value on the Hirschman-Herfindahl Index (HHI) for the domestic routes amounts to 7,362, whereas for the eight international highest density routes in the EU this value amounts to 4,727.

With a view to the above, we have to conclude that neither fares nor frequencies have resulted in intensified competition in the internal EU air transport market during the more than 2 years of far-reaching liberalization of this market.

**Table 4 Competition on the 25 highest density routes in the EU (Source: ABC 1994)**

25 highest density routes intra EU + Norway and Sweden (seats per week, July 1994)					
NR	TOT CAP	CITYPAIR	DOMINT	CARRIERS	HHI
1	76,974	LHR—CDG	INT	3	3,358
2	75,728	MAD—BCN	DOM	4	7,354
3	71,044	NCE—ORY	DOM	3	5,513
4	54,454	FCO—LIN	DOM	1	10,000
5	45,309	DUB—LHR	INT	2	5,513
6	41,713	AMS—LHR	INT	3	3,434
7	41,014	LHR—EDI	DOM	2	5,338
8	39,975	LHR—GLA	DOM	2	5,338
9	37,416	MRS—ORY	DOM	2	9,232
10	36,738	FRA—TXL	DOM	1	10,000
11	36,364	ATH—SKG	DOM	3	8,346
12	35,364	BRU—LHR	INT	3	3,402
13	32,524	HAM—FRA	DOM	1	10,000
14	32,516	MUC—DUS	DOM	3	4,136
15	31,090	LHR—FRA	INT	3	3,545
16	30,912	TXL—MUC	DOM	3	4,721
17	30,062	ORY—TLS	DOM	2	9,608
18	28,878	BCN—PMI	DOM	2	8,698
19	28,260	BRU—CDG	INT	2	5,050
20	27,408	BFS—LHR	DOM	2	5,338
21	27,290	CDG—LIN	INT	2	5,008
22	27,094	SVG—FBU	DOM	2	6,152
23	26,808	BGO—FBU	DOM	3	5,382
24	25,164	FBU—CPH	INT	3	8,504
25	23,640	LHR—MAN	DOM	1	10,000



## NETWORK RESTRUCTURING IN THE EU

Deregulation of the US airline industry showed the competitive advantage of network restructuring. In this context it is interesting to find out the degree to which EU carriers have been able to adjust their networks in a liberalized market environment. We should realize that the massive shift from linear networks to H&S systems in the US can hardly be considered the obvious solution for Europe. Every national airline in Europe already operates in a radial network, from its home base, the national airport. Usually these are isolated third and fourth freedom routes, which hardly show any connectivity through the home base (De Wit and Veldhuis 1991). The well-known exceptions are the networks of the so-called sixth freedom airlines, using their home base as a hub for the transfer of passengers between European and intercontinental flights. Against this background, network adjustments within Europe can be realized at two levels (disregarding the network alliances on the intercontinental level):

- by increasing the number of city pairs served from a single hub, ie the traditional home base; and
- by developing a multiple-hub structure in Europe.

### Extension of the single hub network

Co-operation between carriers has increased in the internal market. Commercial alliances, financial stakes in other airlines and mergers are rapidly changing the structure of the aviation industry in the EU. A number of alliances are difficult to understand from the point of view of network synergy. For example, the alliances SAS—BMA, KLM—Martinair—Transavia, Air France—Air Inter, Lufthansa -Condor, consist more or less of stand-alone components. In the last three cases the main objective could be to safeguard a dominant position in the respective domestic markets.

An extension of city pair numbers in the existing network is actually intended by several alliances of national carriers and regional airlines in the EU. Examples are KLM—Air UK, BA—Brymon Air—Logan Air—Manx Airlines—City Flyer Express—GB Airways, Swissair—Crossair, Alitalia—Avianova, Lufthansa—Business Air, etc. Most of these examples try to increase the number of regional feeder services through the respective national airports.

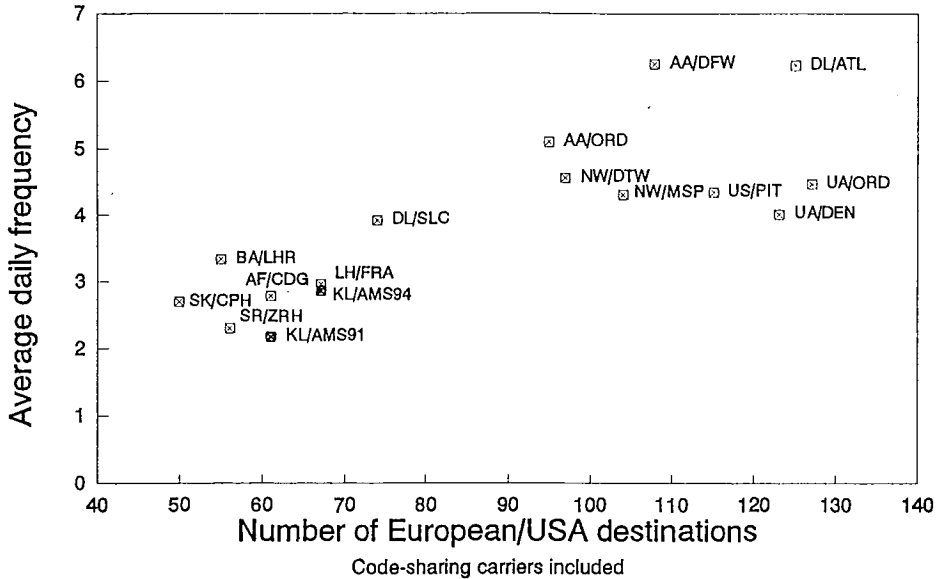
In these alliances network synergy is often further stimulated by a code-sharing agreement between the regional and national carrier. Effectivity of these code-sharing agreements depends on the intensity of co-operation. Beyhoff et al. (1995) show that code-sharing can be based on different arrangements, varying from free-sale agreements, blocked-space agreements, wet leases and franchising arrangements, to joint ventures. Especially the franchising formula is more and more used by the major airlines to transform regional carriers into transport co-makers in order to eliminate differences in product quality between the code-sharing partners. Franchising examples in the EU are the CityFlyer Express and Loganair flights on behalf of BA.

An increase in the number of city pairs can also be realized by improving the connectivity of the home base. This requires the transformation of the radial network served by the national carrier in Europe into a H&S system for European flights. This means that a national airport has to function as a traffic 'pump', through which consecutive waves of incoming and outgoing connecting flights are accommodated. Sabena and KLM have developed such Euro-hubs, at Brussels and at Amsterdam, respectively.

KLM's network changes illustrate this. In the period of 1992-1993 KLM's European network has been fundamentally rescheduled. Within a period of two years, the number of flights within Europe has increased by 20%, using more or less the same fleet. The effect of this intensified schedule is clearly shown in Figure 4, by looking at the shift of Schiphol's position from 1991 to 1994.

The connectivity of KLM's European flights has considerably increased during this period, through three daily banks. Since then, most aircraft and crews have been staying overnight at the outstations. The number of Euro-transfer passengers has increased from 0.6 million in 1991 to 1.4

million in 1993. In 1994 also, this market segment demonstrated the most rapid growth at Amsterdam airport. Besides, the synchronisation with intercontinental flights has resulted in a synergy between the Euro-Euro transfers and the Euro-ICA transfers, vice versa.



**Figure 4** Average frequency and numbers of destinations in Europe or the US domestic market served by the dominant carriers from their home bases

**A multiple-hub structure**

A fundamental different approach to generate network economies in the internal market is the creation of a multiple-hub structure within Europe. Different strategies can be followed.

One option has resulted from the new freedom of the Third Package: by developing fifth- and seventh-freedom operations from an airport abroad, elsewhere in the EU. Such an effort has been made during some months by Iberia at Schiphol Airport, for destinations in Scandinavia. Finnair is also developing such operations at Stockholm. A more or less comparable effort is the development of a sub-hub, through a regional subsidiary, as in the case of TAT for BA in Paris. However, Table 3 has already demonstrated the vulnerability of such operations, because of the dominant position of the national airlines in their domestic markets.

A second possible approach towards a multi-hub structure can be made through co-operation agreements between several national airlines. The realization of such co-operations through mergers or take-overs seems to be increasingly less obvious. So long as national airline companies are the obvious carriers to execute the nationally obtained landing rights on all non-EU routes, this constitutes a barrier to most transnational mergers in Europe, especially if smaller companies are involved, as was clearly shown by the Alcazar project which scanned the merger possibilities for SAS, Swissair and KLM.

In order to be able to cash in on the network economies of multiple-hub structures, the instrument of the merger increasingly seems to be substituted by gradual integration, from route-specific code sharing, via code sharing on route groups, to network-wide code sharing agreements and co-

operation agreements under a franchising formula. With increasing intensity, these forms of commercial co-operation can be coupled with financial stakes. The only co-operation with the largest possible minority stake that is emerging in Europe, is Swissair's 49% ownership of Sabena. The possibility for a European airline from a country that is completely excluded from European air transport market liberalization, to get a foothold within the EU in time, has undoubtedly been a major reason for this alliance. In principle, with this alliance a double-hub has been created, and one in which Brussels also functions as a Eurohub. The reason to work up to such an alliance will also become an urgent necessity for those companies operating from an eccentric and limited home market, as the alliance between SAS and Lufthansa demonstrates. Only then it will be possible to cover the full European market as a partner in one of the global air transport alliances.

## CONCLUDING REMARKS

Reviewing the above, it can be contended that the first steps towards a more concentrated European airline industry are being made in a liberalized market. It is however not obvious that major steps like transnational mergers between national carriers will follow soon. This would ignore the strong roots of national airlines as designated carriers in the framework of international regulatory policy outside the EU.

Also the step towards concentration through bankruptcies is not obvious on the short run as long as state aid is accepted in the EU. The refusal of the European Commission to accept the recommendation of the Committee of Wise Men to use the condition of 'once, but no more' when approving state-aid within the EU, is a bad omen in this context.

Against this background it is not surprising that McMullan (1994) does not expect a real shake-out of state-aiders in the European air transport sector to take place prior to 1997-1998, or at least not before the economic cycle is moving downward again. The longer it takes for this shake-out to happen, the sooner will multiple-hub structures become manifest through 'softer' forms of co-operation. Anyway, the economies of this network structure will inevitably also be activated in a liberalized EU air transport market.

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**TOPIC 8**

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