



A note on airline alliances

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Abstract

A recent trend in aviation markets is the emergence of airline alliances. One could argue that the emergence of alliances is a continuation of the process of concentration and consolidation that was first characterized by the emergence of hub-and-spoke networks. The international aviation market is still subject to regulation, and airlines may only have the opportunity to extend their networks to foreign countries by entering an alliance agreement with a foreign airline. But also in fully liberalized aviation markets, airlines are likely to enter alliance agreements. The literature shows that passengers are likely to be better off if airlines enter alliance agreements. © 2001 Elsevier Science Ltd. All rights reserved.

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1. Introduction

The deregulation of US aviation markets in the late 1970s was followed by a rapid increase of the number of carriers and a major restructuring of airline networks. The rapid increase in the number of competitors was however followed by a just as rapid decrease. Through bankruptcies or mergers the number of carriers has decreased from around 40 immediately after deregulation, to six or seven in 1994 (Berechman et al., 1994). This concentration and the formation of fortress hubs led to concern over the (potential abuse of) market power of carriers.

Despite concentration, fares have decreased in real terms since deregulation (Levine and Winston, 1995). The decline in fares from 1976 to 1985 still represented a savings of \$811 billion US to passengers in 1986 (Kahn, 1988). The, in the words of Borenstein (1992), “disciplining effect of (potential) competition” was, however, unevenly distributed geographically. On routes starting or terminating at a hub, the number of competitors may have actually decreased since deregulation. On long haul, connecting flights, competition has clearly intensified (Kahn, 1988). The same holds true for routes between the hubs. Prices on spoke routes are significantly higher than prices on other routes (Borenstein, 1992). This can be due to the exploitation of market power; lack of competition

allows airlines to create fortress hubs and raise fares without the threat of entry (Levine and Winston, 1989). Market power is, however, certainly not the only cause of differences in fares between the market types. Spiller (1989) shows in a theoretical model that transfer passengers can pay a lower fare per mile than passengers originating or ending at a hub. Brueckner et al. (1992) find empirical evidence for the hypothesis that “forces leading to higher traffic densities on the spokes of a network reduce fares in the various markets it serves”. Brueckner and Spiller (1994) find that trip length and traffic densities have a significant negative effect on fares; the latter statement is consistent with the existence of economies of density. Fares in a market between two cities are low if the densities on the spokes connecting the cities are high and longer trips have higher fares.

To summarize the discussion so far, although some passengers may be worse off in the sense that they pay higher fares since deregulation, on average fares have decreased since deregulation. The higher fares paid by a fraction of passengers may not be due to exploitation of market power, but may be just as well due to economic effects. Although in some markets the prices may be high due to exploitation of market power or network effects, on average, prices have declined in real terms and passengers seem to be better off by the airlines’ adoption of hub-and-spoke networks.

In recent years, airline alliances have received a lot of attention. As was the case with hub-and-spoke networks earlier, alliances are reasons for concern in the press.

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Again, the fear is that concentration on e.g. Atlantic “gateway-to-gateway” markets leads to reduced competition and higher fares. But this reasoning neglects indirect competition on these Atlantic markets. One can fly directly from Amsterdam to Boston on a KLM/Northwest flight or via Brussels on a Sabena/American/Delta flight. Fares in the latter case may be considerably lower, with the penalty of an indirect flight. Passengers with a high willingness-to-pay will pay a higher fare, but because these passengers usually prefer a high frequency these flights may not be filled to the capacity. Then it pays for the airline to offer cheaper seats to the passengers who are more sensitive to the fare than to the travel time. Similarly, passengers traveling to “non-gateway” airports benefit from the linking of networks and joint pricing by alliance partners; travel time is lower and fares can be lower; e.g. Brueckner (forthcoming) and Brueckner and Whalen (forthcoming).

Although the literature on alliances is limited, it seems that alliances can result in benefits for passengers (better connectivity, lower fares for transfer flights), as well as in negative effects (higher direct fares). Next to the potential dangers of alliances, also in the popular press the potential benefits are recognized. When KLM pulled out of the Alitalia–KLM alliance because of uncertainty concerning privatization of Alitalia and Malpensa’s future,¹ one of the questions asked in the press, besides the question why the alliance failed, was what the future would bring for the individual airlines. In the remainder of this paper it is discussed when (or why) airlines are likely to enter an alliance agreement, and whether such an agreement is desirable from the passengers’ objective.

2. Airline alliances

2.1. Introduction

In practice there are hundreds of alliances in various forms, ranging from agreements only for specific routes to full mergers. In case of a merger, carriers coordinate their activities and complete control is in the hands of a single board. Mergers were an important aspect of the consolidation of the US internal aviation market and are also frequently mentioned for European airlines (e.g. Alitalia–KLM and at a later stage British Airways–KLM), but in the “inter-continental arena”, unidirectional or cross-equity holdings are more important due to differences in legislation and differences in the management style.² Such alliances are obviously not as far reaching as

full mergers and not as important, measured in the number of agreements. Other forms of alliances can involve coordination of flight schedules, loyalty programs and code-sharing.³ Code-sharing allows carriers to sell seats on each other’s flights using the carriers’ own designator codes. This can be done through joint pricing of capacity or by allowing a carrier to buy and resell some of the other airline’s capacity.

2.2. Benefits of alliances

The incentives for an airline to enter an alliance are similar to the incentives for a carrier to adopt a hub-and-spoke network. Three important factors mentioned in the literature explaining the emergence of hub-and-spoke networks are cost factors, demand factors and entry deterrence. By deleting a number of direct connections in the network, the passengers are forced to fly indirectly to their destination. Although this increases flight time, the frequency of flights may also be higher; see e.g. Brueckner and Zhang (1999). Because the number of direct connections is reduced in hub-and-spoke networks, densities in the remaining (spoke) markets are higher. Economies of density may then reduce the average cost per passenger. Moreover, the fixed costs of operating a route can be spread over more passengers; in the presence of density economies, operating costs are likely to be lower if the airline opts for a hub-and-spoke network. Moreover, it may be necessary for the airline to use larger aircraft on some routes in a hub-and-spoke network, because the densities on these routes have risen to such a level that the aircraft used on these routes are simply not large enough. Levine and Winston (1985) show that economies of scope (economies of vehicle size) can indeed warrant adoption of a hub-and-spoke network.⁴ Hence, if there are economies of density and economies of scope, a hub-and-spoke network allows for considerable cost savings. For empirical evidence on the existence of economies of density, see for example, Brueckner et al. (1992), Caves et al. (1984) and Kumbhakar (1990). By entering into an (international) alliance, airlines can increase market densities and simultaneously reduce fixed costs in the markets with a code-sharing agreement. Just as with hub-and-spoke networks, an airline can reduce its operating costs by entering an alliance.

Levine (1987) observes that competition on a hubbing airline’s spoke market is low. New entry to and from other hubs seems to be limited to “thick” markets.

¹ Milan Malpensa was meant to be a hub for the alliance and crucial to the alliance’s strategy, but it was uncertain whether it could be developed as such due to e.g. environmental legislation.

² Note, however, that cultural differences and differences in management style are also mentioned as a cause for the failure of the KLM–Alitalia alliance.

³ These arrangements can of course also be included in mergers and equity holdings.

⁴ In a hub-and-spoke network, an airline faces the joint costs of transporting passengers in direct and indirect markets; although the markets may be different, they are served using the same aircraft (“production process”). If the joint costs decrease with aircraft size (“scale of production”), economies of scope are incurred.

Authors frequently observe in the literature that airlines may “dominate” an airport and that competition may be limited. “Barriers to contestability”, such as frequent flyer programs, computer reservation systems or incentive commissions certainly are a cause for the lack of competition. These factors can give incumbent airlines an advantage over new entrants, thereby reducing the entrant’s profit generating potential.⁵ Combined with the relatively lower cost in a hub-and-spoke network, this gives “hubbing airlines” an advantage over new entrants.⁶ It is found in the literature that a hub-and-spoke strategy can indeed be used to deter entry or that hubbing airlines have little incentive to invade each other’s markets. Oum et al. (1995) find that hub-and-spoke networks may be useful in deterring entry. Competition only seems to take place for traffic between hub cities and connecting traffic (inter-hub competition). An incumbent airline can channel traffic from many origins on a spoke market: thus, leaving an entrant with a small market share. Zhang (1996) finds that invading a competitor’s local markets may reduce the entrant’s profit in his original hub-and-spoke network. Similarly, Pels (2000) finds that if density economies are relatively large, an (US or European) airline will not enter new (European or US) markets if it is not allowed to enter an alliance agreement, because in this case revenues are too low to compensate for the higher fixed costs. Code-sharing agreements reduce competition in the markets subject to the agreement and increases the market share of the partners. Due to network effects, the airlines may also be able to increase their market share in the remaining (spoke) markets.

Eventhough the US and European (E.U.) markets are now liberalized, most inter-continental routes are still subject to regulation. If a European or US airline wishes to expand its network with foreign destinations so as to increase its revenues and also increase its opportunities to exploit density economies, an alliance may be the only option if the airlines are considering trans-Atlantic destinations. But even in a fully deregulated aviation market (European, North American or transatlantic) it may be a good option for the airlines to enter an alliance agreement. As already discussed, the US deregulation was followed by a concentration on the aviation market. And although the European market is inherently different,⁷ European airlines also restructured their networks (schedules) and are considering different forms of alliances with other European airlines; the KLM-Alitalia and KLM-BA examples have already been mentioned.

⁵ Note that the benefits arising from computer reservation systems and commissions to travel agents may be limited by legislation.

⁶ Note that it is very expensive to enter an entire aviation network and that entry usually takes place at a market level.

⁷ For example, there are different national governments and the average travel distance is shorter so that there is more competition from other modes and route densities are lower.

Button (1997) observes that mergers may not always be successful; overlapping networks offer less economies than interfacing networks. A transatlantic alliance partner or a European partner with a complementary network is therefore a convenient way to increase revenues and route densities, and in the long term, it may be that airlines can survive only if they enter alliance agreements, unless they develop different strategies, such as Southwest and Easy Jet.

In Conclusion, alliances offer airlines the ways to increase revenues and exploit density economies, and can be seen as a continuation of a process of concentration and consolidation in the aviation sector that was first characterized by the emergence of hub-and-spoke networks.

2.3. *Economic effects of airline alliances*

The questions raised concerning alliances are mostly about the anti-competitive effects. Other concerns are more emotional; for example, recent questions asked in the Dutch press in the light of the proposed KLM-BA merger were what this would mean for the Dutch passenger and whether the Dutch national airline should be sold to foreign companies.

Theoretical studies of airline alliances, acknowledge that prices in markets where former competitors have formed an alliance may be higher, but that this negative effect is likely to be balanced by lower prices on indirect, interlining markets. Brueckner (forthcoming) finds that airline alliances and codesharing agreements may be socially desirable: although the fare increases in the inter-hub market due to collusion, fares in the interline markets decrease due to cooperative pricing.⁸ The airline operates a hub-and-spoke network, and the increase in traffic in the markets affected by the alliance increases traffic density on the relevant spokes. This in turn lowers the marginal costs of operating these spokes, and also has an effect in the markets not affected by the codesharing agreement. On balance, the positive effects of the alliance outweigh the negative, anti-competitive effect. Park (1997) analyzes two forms of alliances; parallel alliances (i.e. collusive alliances) and complementary alliances. Complementary alliances lead to an increase in welfare while parallel alliances decrease welfare when markets are sufficiently large. Pels (2000) studies fully liberalized aviation markets, and finds that airlines are most likely to enter an alliance agreement. When the authorities, in a naive attempt to increase competition and protect the consumer, forbid the alliance, the airlines do not invade each other’s networks if density economies are relatively high. But in that case, consumer surplus can be higher if the airlines would enter an alliance: the policy to protect the consumer has an adverse effect.

⁸ An interline market is a market which requires a transfer and is serviced by both airlines.

Brueckner and Whalen (forthcoming) find no statistical evidence that the fares on trans-Atlantic gateway-to-gateway markets are increased by a code-sharing agreement on that market; there are no indications on anti-competitive behavior. This may be contributed to the competition from indirect routes between the same origin-destination pair, or due to lower operating costs. Interlining passengers on the other hand, clearly benefit from alliance agreements; under a codesharing scheme, the negative externalities from the uncoordinated (sub)fare determination are internalized;⁹ this reduces the fare and increases demand, and, due to economies of density, fares can decrease even further Brueckner and Whalen (forthcoming). Oum et al. (1996), using data for transpacific routes, find that a codesharing agreement between “non-leaders” increases the market leader’s equilibrium output and lowers the equilibrium price. Park and Zhang (2000) find that fares on alliance routes in North Atlantic markets decreased for two alliances. Market power increased on these routes; the fare decrease was mainly caused by a reduction in costs. Park and Zhang also find that consumer surplus tends to increase if an alliance is a complementary alliance. Consumer surplus decreases if the alliance is parallel (collusive) in nature. In general, passengers in the North Atlantic markets appeared to be better off due to the alliances in these markets.

3. Discussion

The US aviation markets after the deregulation were characterized by hub-and-spoke networks and concentration through mergers; hub-and-spoke networks and mergers/alliances allow carriers to exploit economies of density. According to the literature, passengers are, on average, better off due to the regulation, despite the fears of detrimental effects such as anti-competitive behavior. International alliances are a further opportunity for airlines to exploit density economies and increase revenues. The literature shows that in general, passengers are better off when airlines are allowed to form alliances. This does not mean that all alliances will have positive effects on consumer surplus. One of the major sources of the potential increase in consumer surplus are network effects; increased densities on different links and joint pricing of complementary links. These effects will be stronger if the alliance partners have complementary networks. Note that Button (1997) observes that mergers between US airlines were more successful as the partners had complementary networks.

⁹ Under the assumptions of the model, an increase in the (sub)fare of carrier A reduces demand and, as a result, the profitability of carrier B in the absence of an alliance.

The authorities have a role in protecting the consumer (next to safety issues, etc.). Although they are concerned by the potential anti-competitive behavior, they also should recognize the clear benefits of (international) alliances. While airlines such as KLM and Northwest may have complementary networks, for other (e.g. European) airlines it may be more difficult to predict the final result on consumer surplus. In such cases, and maybe also in Transatlantic markets, price cap regulation may be an option. Theoretical research will have to show whether this is a viable option, empirical research is necessary to determine the price elasticity and its distribution needed to determine the maximum price. In any case, successful alliances offer benefits to passengers and should be welcomed.

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