IATA ECONOMICS BRIEFING

THE ECONOMIC BENEFITS GENERATED BY ALLIANCES AND JOINT VENTURES

Summary

Alliances between airlines on international markets have become a dominant feature of the airline industry. Many customers demand a 'from anywhere to anywhere' service, which is impossible for one airline to supply efficiently, and there are significant economies of density that can be achieved by merging networks. Many city-pair markets would not support a viable regular service on local point to point traffic alone, and a means of channeling connecting traffic to generate sufficient traffic density is necessary. However, cross-border mergers, which would be typical in other industries, are prohibited for airlines in many jurisdictions. The evident need for network cooperation has led to a rapid expansion of alliance relationships, as a close substitute for mergers. More recently, airlines have set up joint ventures to serve specific markets which have made airline partners' revenue from the JV independent of the airline which actually flies the passenger. This 'metal neutrality' is significant in that it maximizes the opportunity for pro-competitive efficiency gains from density economies. There is now substantial evidence that existing alliance relationships have led to significant consumer benefit for passengers on interlining trips, both in terms of improved service and lower fares. Concerns about anti-competitive effects arising, for passengers flying hub to hub itineraries, where cooperating airlines' services overlap, should be lessened by the potential for metal-neutral JVs to generate pro-competitive efficiencies.

Background

Alliances between airlines on international markets have become a dominant feature of the airline industry. Many customers today, particularly those travelling on business, demand a seamless service on international markets 'from anywhere to anywhere'. However, no airline is able to efficiently provide such a service on its own aircraft, and few city-pairs can generate sufficient traffic to justify a daily non-stop service. In order to meet customer demands at an efficient cost, airlines have had to seek commercial partners to help them provide the network and service coverage required. Passengers have always been able to arrange an itinerary on two or more airlines, through the interlining mechanism managed by IATA. However, this arms-length cooperation did not allow the integration and efficiencies that were possible. Cross border mergers, which would be typical in other industries, are prohibited for airlines by anachronistic restrictions on foreign ownership. Nevertheless, since the early 1990s, the need for network cooperation led to a rapid expansion of alliance relationships, as a close substitute for mergers.

Northwest Airlines and KLM were the early innovators internationally, although domestic cooperation between regional and hub carriers had been commonplace for many years. Smaller alliances such as Qualiflyer have been and gone. Today there are three major alliances: the biggest is Star Alliance, followed by SkyTeam and oneworld. By the middle of 2011 these three alliances were providing over 80% of capacity across the Atlantic and Pacific and just under 80% between Europe and Asia. Traditional interline trips on nonaligned airlines have become much less important.

Airlines have entered into collaborative relationships with other airlines because that has been the only way to produce what many customers want, and realize greater efficiencies in operations. Prohibitions on full cross-border mergers between airlines prevent full integration of international airline services, but alliance relationships have allowed

substantial cooperation and integration, where antitrust immunity (ATI) has been granted by Governments. The consideration of immunity for an alliance can be divided into two parts: for collaboration to provide seamless services on markets between smaller cities, requiring an interline trip which crosses the networks of the alliance partners, and for non-stop travel between the alliance partners' hub cities, where overlapping services allow the trip to be taken with either airline. On these latter markets competition authorities are sometimes concerned that a potential lessening of competition might offset the consumer benefits that result from cooperation. ATI has often been granted with the precondition of an open-skies agreement being signed by the governments of the alliance partners, reducing the likelihood of a dominant position being developed on the international routes.

Alliances began as simple code share arrangements, which were little more than enhanced marketing agreements allowing an airline to sell a seat on flight operated by its code share partner. An important new development has been the emergence of even closer co-operation and integration of international services with the 'joint venture' (JV), where airlines agree to share revenues on an international route. An airline partner's revenue from such a JV is independent of which airline actually flies the passenger. This creates a service that is 'metal neutral' in the sense that the metal (aircraft) involved in providing the service is not relevant to determining an airline's revenue.

In fact KLM and Northwest Airlines were operating a JV in the early 1990s, but this form of integration has only recently been adopted in the other major alliances. Skyteam now runs a JV across the Atlantic, as do Star Alliance and oneworld. Following the Japan-US open skies agreement oneworld members American Airlines and Japan Airlines agreed a JV on their transpacific market. Star Alliance members ANA and United Continental started operating their own transpacific JV earlier this year. Other JVs have emerged recently between alliance members and non-aligned airlines, such as the Delta-Virgin Blue JV on markets between the US and Australia.

Despite the key role that alliances and JVs play in international air travel, they have often been involved in regulatory disputes. Applications for ATI are frequently praised for delivering the benefits of closer service integration, while at the same time being criticized by some for being anti-competitive. Such controversies arise because the impact of alliances on airfares, and the public interest in general, is potentially complex. Unraveling the economics of these issues will be the subject of this paper. There are a number of influences that will lower fares and increase service, particularly for interline passengers, but for overlapping hub-to-hub services there is the potential for both pro-competitive efficiencies and anti-competitive effects.

Regulators have imposed remedial measures in some cases, as a response to the potential for harmful effects. If cooperation is thought to limit entry in capacity constrained markets then sometimes airlines are required to give up slots, or provide access to feeder traffic or to the airlines' frequent flier programmes. More recently US regulators have sometimes imposed 'carve-outs', preventing co-operation on some hub-to-hub markets when granting ATI. When ATI was granted to Northwest and KLM in the early 1990s there were no carve-outs imposed on their hub-to-hub markets, partly due to their smaller relative size. Nor were carve-outs imposed on the hubs connecting Delta and Air France in the SkyTeam Alliance. However, the US DOT did impose carve-outs when granting immunity to Star Alliance partners United and Lufthansa. The two airlines were allowed to set fares and services co-operatively in all markets except those connecting their hubs on Chicago-Frankfurt and Washington-Frankfurt markets. Carve-outs have also been imposed as a pre-requisite for Star Alliance ATI being extended to new member Continental. The recent transatlantic JV between BA, American Airlines and other oneworld members was subject to some London Heathrow and New York JFK slots being given up, but no routes were 'carved out'. Some studies have questioned whether the net result of such carve outs is to restrain efficiencies rather than prevent anticompetitive harm[i].

Consumer demand and network economics often require airlines to cooperate and integrate their networks

With the exception of operations on city-pair markets with dense passenger flows, airlines are forced into seeking commercial partnerships with other airlines by the economics of running a network and by the needs of their customers. Airlines cooperate to differing degrees to join up their networks because consumers want network scope and depth, and the economics of providing this is not possible for a single airline, particularly while cross-border merger and cabotage prohibitions remain in many jurisdictions.

We know that consumers place value on having access to large networks, that is a 'from anywhere to anywhere' service, and there is significant academic evidence to support this view. Brueckner and Spiller (1991), Bailey and Liu (1995) and Brueckner and Whalen (2000) all develop models showing consumers shop for air travel based on price and network scope. Network scope will be particularly relevant for business travellers who require service to a wide range of destinations. Network depth, with a choice of convenient timings for travel, is also important for these passengers. Passengers would prefer this service to be on-line, with the same airline.

But there are legal and economic reasons why a single airline cannot provide such a service, without entering into commercial partnerships with other airlines. Morrison and Winston (1995) provide formal evidence supporting the view that consumers dislike interline-flights, i.e. connections between different airlines. However, that evidence was based largely on passenger experience of traditional interline travel with non-aligned airlines, which was far from seamless. In the past fifteen years the quality of interline travel has been improved through new types of airline cooperation, from code shares to joint ventures. A survey of 600 businesses by Oxford Economics for IATA (2006) found that over 90% stated that transfers between flights operated by the same airline or by airlines in the same alliance were 'very' or 'sometimes' acceptable. Connecting between non-alliance partner airlines was considered much less acceptable.

Passengers travelling between two large cities will usually find non-stop services, often provided by airlines operating a point-to-point operating model. On these markets, with a large and regular flow of passengers, airlines can use an aircraft large enough to produce the low unit costs necessary to charge a competitive fare. Many of the airlines that have entered post-deregulation markets in the US and Europe operate such point-to-point model to serve existing markets between large cities, or stimulate the required density of traffic between the cities through low fares. A few transcontinental markets, such as London-New York, also have sufficient flow of passengers to make the economics of a point-to-point service work (though the all-business airlines set up to serve this market using a point-to-point model failed in the last recession). Airlines serving these markets with this operating model have no need to take connecting passengers and no need to cooperate with other airlines.

However, the majority of passengers want to travel between smaller cities and the combinations of city-pairs or potential markets amounts to tens of thousands. There is little possibility that one airline could offer such a 'from anywhere to anywhere' service using its own aircraft. There are just too few local passengers to justify the service. The evidence suggests that economies of scale in aircraft fleet size can be fully reached once a fleet reaches around 50 aircraft[ii]. So the optimal size of an airline's fleet will be reached far below the numbers required to connect all the cities between which customers wish to fly. Airlines serving customers wanting to travel between smaller cities will necessarily need to enter into commercial partnerships with other airlines to extend the reach of their networks.

There is another key reason for airline cooperation, which is driven by the economics of transporting passengers, and that is the importance of economies from the density of passenger flows. Although economies of scale in operations appear to be relatively limited, there are very clear economies to be gained from creating denser flows of passengers, which increases seat utilization and allows the use of larger and lower unit cost aircraft. The flow of passengers travelling from one small city to another is usually far smaller than flows between large cities. In the majority of cases there is not enough origin-destination or local passenger flow to justify a regular service. The only way airlines can make the economics work to justify serving these smaller city-pairs is to increase the flow of passengers.

Many LCCs have done this by stimulating larger local passenger flows through low fares. This works where there are large catchment areas around smaller cities, with sufficient price-oriented passengers who wish to travel to the other small city. For many city-pairs and for convenience or time-oriented passengers this will not work. In this case airlines must attract connecting or flow passengers to fly between the cities, on their way to their final destination, in order to generate sufficient density to justify an aircraft size and unit costs that make the route economic.

Airlines operating a 'from anywhere to anywhere' model rather than a point-to-point service will seek to operate a profitable network, rather than requiring each city-pair to be profitable. Service connecting a city-pair that would not be economic to operate on its own may be provided if the feed it gives to passenger flows through its hub make a sufficient contribution to the profitability of the network as a whole.

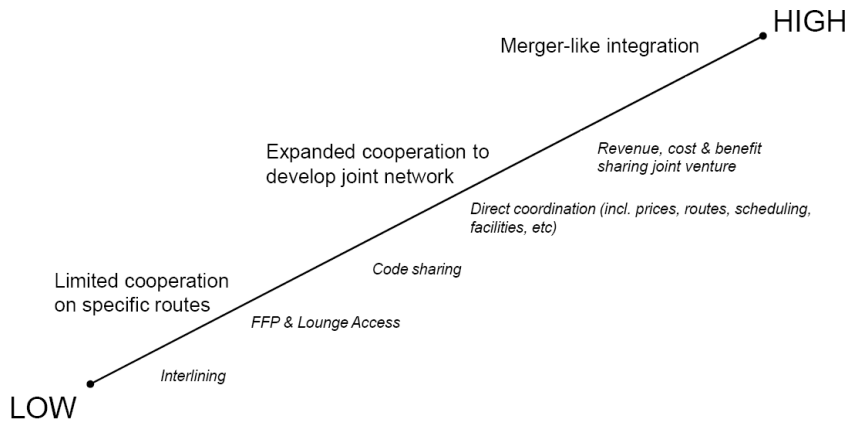
Such a seamless international service is provided by most industries through cross-border merger or the location of production facilities overseas. This is the case for telecoms, banking, audit services, media and many more industries. In open markets firms locate themselves and their services where consumers demand them, constrained only by competition law or regulations such as health and safety.

This is not the case for air transport, where 'freedoms' for airlines to provide such services to consumers require a bilateral treaty between governments. The emergence of 'open skies' agreements between many countries, and the open aviation area within the EU, has significantly liberalized market access. Airlines have fully merged in the US and 'merged' within the EU, in the latter usually with a holding company to preserve the individual national operating entities. However, government restrictions on the ownership and control of airlines by non-nationals remain barriers to cross-border merger. International alliances between airlines have emerged as a second best solution to achieve the economic benefits of closer co-operation and the integration of services.

The benefits for consumers and airlines of airline cooperation, from interlining to joint ventures

Meeting the demands of consumers for network scope and depth can involve airlines in differing degrees of cooperation. The chart below was taken from a recent European Commission and US DOT (2010) report and illustrates the spectrum of airline cooperation, from traditional interlining to joint ventures.

Chart 1: The spectrum of airline co-operation



Source: US DOT and European Commission (Nov 2010) 'Transatlantic Airline Alliances: Competitive Issues and Regulatory Approaches'.

Consumers have always been able to interline, that is buy a single ticket for an itinerary on two or more independent airlines, if the airlines had signed multilateral or bilateral airline agreements to accept other airlines' customers. The traditional interline fare would be less than the sum of available fares on the individual sectors, so there would be a consumer benefit from lower fares as well as convenience. However, the interline fare would be higher than the fare

under a code share or a closer form of cooperation, because each airline would set fares to maximize profit on its own sector with no regard for the impact on demand for the other airline's segment. The quality of the interline product is also lower than closer forms of cooperation because passengers would be faced with possible multiple check-ins, longer distances between gates for connecting flights, a higher possibility of lost luggage and uncertainty over the responsibilities of carriers in the face of missed connections and similar issues.

A higher quality service is provided to the consumer through code share agreements, where the marketing airline puts its ticket code on a connecting flight operated by another airline. This enables the airlines in the code share to offer consumers a more seamless service with coordinated scheduling, close proximity of gates for connections, access to lounges and frequent flier programmes. In the absence of ATI there is no cooperation on pricing with a code share, but fares may be well be lowered by the impact of economies from more dense passenger flows, as described below, if the code share results in additional passenger journeys.

If ATI has been granted by the competition authorities then alliance airlines can work together to produce a much more coordinated service for the passenger, delivering a number of distinct consumer benefits including lower fares for interline-passengers. A significant body of empirical evidence suggests that these passengers benefit from fares up to 27% lower on an immunized alliance compared to an interline trip on non-aligned airlines[iii]. These studies found that successively closer airline cooperation (code-sharing, alliance membership, the addition of ATI) each add to the reduction in the interline fare.

There have been some studies that have disputed the existence of such consumer benefits[iv]. In particular, the US Department of Justice (DOJ) in two papers[v] in 2009 argued that the beneficial effects of alliance cooperation on interline fares was no longer evident. The DOJ studies found the opposite of the previous studies i.e. that successively closer cooperation raised fares for interline passengers. The source of the conflict between the studies was found[vi] to be an apparently small methodological difference – whether or not to control for the individual identities of the airlines in the regression analysis. The DOJ thought not. However, other researchers believe it is necessary to control for cost and product quality differences across carriers[vii]. The most recent research paper on this issue[viii] has re-established the earlier empirical results, showing that code-sharing, alliance service and antitrust immunity each separately reduce fares for interlining passengers below the traditional interline fare level.

There are several reasons why interline fares may fall with closer degrees of airline cooperation. There are also a number of additional consumer benefits from improvements in service quality arising from airline network cooperation. The introduction to the European Commissions' guidelines for the evaluation of joint ventures among competitors states, "Horizontal co-operation agreements can lead to substantial economic benefits, in particular if they combine complementary activities, skills or assets. Horizontal co-operation can be a means to share risk, save costs, increase investments, pool know-how, enhance product quality and variety, and launch innovation faster… On the other hand, horizontal co-operation agreements may lead to competition problems. …"[ix]

This general guidance on joint ventures applies equally to airline alliances, but there has been pressure to fully integrate operations to achieve the potential efficiencies. In many cases, the airlines forming alliances have sought antitrust immunity or its equivalent from regulatory authorities, in order to achieve integration as comparable to a merger as possible, despite the ownership restrictions. The case of the SkyTeam alliance application for antitrust immunity in the United States is particularly instructive. An initial application for immunity made in 2004 to merge the SkyTeam alliance of Delta Air Lines and Air France, with the Wings alliance of Northwest Airlines and KLM was rejected. The application was made again and granted in 2008 following respective mergers between Delta and Northwest and Air France and KLM[x]. Department of Transportation officials expressly supported the greater integration of 'metal neutrality' to ensure that the efficiencies would be achieved. As discussed above metal neutrality occurs when the economic arrangements between the carriers eliminate incentives for opportunistic advantage in the joint operations, and the parties enjoy common incentives for the development of joint, seamless services for the customer.

Airline alliances create substantial opportunities for generating economic benefits, many of which are dependent at least in part on the closer integration achievable only with antitrust immunity. These benefits can be viewed as demand-side – relating to the creation of new or improved services through expanded networks or seamless service, or supply-side – essentially the ability to produce the same services at lower cost taking advantage of traffic densities, improved utilization of capacity and lower transaction costs[xi]. Potential demand-side benefits include the elimination of double marginalization, expansion of route networks, expansion of flight frequency, and improved 'online' service options. Supply-side efficiencies include cost reductions through economies of traffic density, cost reductions through coordination of second-degree competition parameters (sharing of facilities), and cost reductions through coordination of first degree competition parameters (pricing and yield management, capacity)[xii]. Several of these economic benefits are described in greater detail below:

1. Lower fares for interlining passengers

One major consumer benefit that arises when alliance airlines are granted ATI is gained by 'interline' passengers flying behind and beyond international hub airports to and from smaller cities, who need to fly on two alliance airlines to complete their trip. There seems to be widespread recognition of the benefits to the interline component of international travel[xiii].

When the airlines serving these 'interline' passengers are not aligned the fare setting process involves each co-operating airline individually setting fares on the part of the route that they operate with their own aircraft. Airlines set fares, through their revenue management processes, depending on market conditions. This sophisticated process has been simplified in academic papers to be represented as airlines both maximizing their mark-ups based on demand in their segment, ignoring the negative impact on the other's segment. This price effect is known in the academic literature as 'horizontal double marginalization'. It will both raise the fare for consumers and reduce profits for the airlines[xiv].

A recent report by the European Commission and the US Department of Transportation[xv] neatly summarizes the consumer benefits for interlining passengers that result from immunized alliance airline cooperation: 'When two firms engage in cooperative pricing of a complementary product each carrier can account for the effect of its pricing, and will price to satisfy demand for the entire itinerary. By doing so, fares are reduced and more interline passengers can be accommodated. The result is that both airlines and consumers are likely to be better off.' A more modest supply side efficiency in moving from interline to alliance fare structures is likely to be improved transaction costs between the alliance carriers combining to provide the interline itinerary.

2. Lower fares resulting from economies of traffic density

Perhaps one of the most fundamental potential benefits from closer cooperation and integration arises from economies of density. This type of economy of scale is a key feature of airline network models[xvi]. Feeder routes and services delivering connecting traffic can increase the traffic density on a city-pair, allowing airlines to operate larger, more efficient aircraft and to spread end point fixed costs over a larger number of passengers.

The enhancement of the combined network in an alliance relationship can bring improved traffic density to both spoke to hub, and hub-to-hub routes. The density of a given spoke-to-hub route benefits at the margin by the demand for travel to new spokes served by the alliance partner that would not have been reached with 'online' service in the absence of the alliance. The ability to flow these incremental passengers over a hub-to-hub intervening segment allows for improved density in that segment as well. The increased demand drives increased, and better utilization of, capacity which boosts profitability but also allows the airlines to charge lower fares, benefitting consumers.

However, with more distant forms of co-operation such as code-sharing or unimmunized alliance relationships the scope for integrating service and maximizing economies of density is limited. In the absence of a JV, alliance partners will operate separate services on a hub-to-hub route. This will divide traffic between the two separate operations, whereas under a JV, and in particular a metal-neutral JV, the airlines would operate as a single entity, consolidating operations, allowing the use of larger aircraft and maximizing the efficiency gains.

3. Passengers can more easily combine fares in an itinerary

The list of non-price benefits of airline alliances is substantial, and largely undisputed. Recent trends toward product differentiation place special importance on these elements of competition.

The internet and related technological advancements in the distribution of airfares led to near complete price transparency and placed low fare search tools in the hands of both travel agents and consumers. It is widely believed this led to a commoditization of air transportation in which shoppers rated price above all other factors in choosing an airline. However, the combination of price transparency and the ability of airlines to make immediate price changes leads to highly homogenized pricing. Airlines have begun to emphasize product differentiation as a result, competing on other elements valued by consumers such as increased frequency, better timed flights leading to lower total elapsed time, airport lounges, frequent flyer programs and unbundled price and service offerings.

A key consumer benefit from closer airline cooperation is fare combinability, whereby passengers are able to view fares for different segments operated by different alliance partners and combine them easily into a single itinerary. Achieving fare combinability requires airlines to harmonize their fare class maps and rules. Under more arms-length forms of cooperation, airlines may be focused on pricing and selling their own flights and may not have the incentive to make these

detailed changes to their own pricing and sales processes. The incentive to cooperate on sales and pricing in this way will be strongest with a JV whose 'metal neutrality' means airlines are no longer seeking to maximize their own revenue but the revenue of the JV network.

As the level of cooperation increases within an alliance its airlines become indifferent to which flights the passenger chooses, allowing passengers who value low fares to choose the least expensive fares for each segment of the trip even if the fares are offered by different airlines. Consumers will have access to a larger number of itineraries at lower fares as a result.

4. Airlines can offer passengers a much wider range of schedules

Cooperation between alliance carriers can also improve schedules with increased route frequency, separating otherwise simultaneous departures to offer greater choice, and coordinating arrivals and departures to shorten connecting times. One of the features of competing airlines, and other services, is a clustering of services around times of peak demand. This feature of the marketplace was observed many years ago by Hotelling[xvii], who saw that competing businesses will make their products as similar as possible to maximize market share. The classic example is ice cream sales on a beach, where sellers will end up clustered together in the middle. Likewise competing airlines often operate 'wingtip-to-wingtip' flights to capture the highest amount of traffic, even though for the market as a whole this is not efficient. Immunized alliances, in particular metal-neutral JVs with complete indifference over which flight passengers take, will be able to coordinate schedules and flight times provide the right capacity at peak times, and spread departures more evenly throughout the day, rather than flying simultaneous competing departures. Arrival and departure times can also be managed by the allied airlines to improve total elapsed time for connecting itineraries. Moreover, increased demand caused by the expanded network may lead to increased frequency on spoke-to-hub and hub-to-hub routes, giving passengers greater choice.

5. The passenger experience benefits from more seamless service and similar products

As alliances build brand equity in the alliance itself, airlines have an increased incentive to harmonize and improve customer service standards. Joint venture participants thus have an incentive to integrate their operations to provide a true 'online' quality experience throughout the processes of ticketing, seat selection, airport lounges, gate location for connecting services, on board amenities and service quality, baggage policies and problem resolution, frequent flyer plans and refunds and exchanges. As these aspects are integrated and jointly managed, the customer receives a

correspondingly simplified and consistent service. This aspect of cooperation is likely to provide consumer benefit without anti-competitive results, due to the intense, global competition between alliances for customer loyalty.

The potential for anti-competitive harm

Of course for hub-to-hub passengers the close cooperation of airlines with overlapping services on that market could have anti-competitive effects. The co-operating airlines could decide to restrict the supply of ticket inventory to non-stop or hub-to-hub passengers, forcing fares higher.

The ability of airlines to force fares higher by restricting inventory to these non-stop hub-to-bub passengers will of course depend on the extent of the competition they face. Apart from other airlines offering non-stop services on the same city-pair, there are two other competitive forces that may exert an effective restraint on pricing power.

First, for many passengers, connecting services offer a good substitute for the non-stop product, if appropriately priced. With business and first class tickets representing less than 10% of international air travel markets, it is clear that the vast majority of passengers are price sensitive, and the academic literature supports this view. There is extensive evidence that as the range of potential substitute services grow in air travel markets so passenger price sensitivity increases. Work by InterVISTAS[xviii] has demonstrated that, although at a pan-national level passengers are price inelastic, they are increasing sensitive or price elastic as the scope of markets moves down to the national and then to the city-pair level – because the range of potential substitutes increases. At the level of airlines competing for passengers travelling between the same city-pair, either non-stop or connecting, then price elasticities have been found to be very high. Many passengers are easily attracted to connecting services and airlines price these services competitively. Increasingly many business travellers are finding their corporate travel offices are selecting these cheaper connecting services over the more convenient and faster non-stop service. Participating in an alliance also allows smaller airlines to offer consumers a wider range of destinations, through connections with alliance partners, increasing their competitive influence. This implies that connecting services can certainly be an effective constraint on the pricing of services for non-stop hub-to-hub passengers.

Second, airline markets are contestable in many cases. In the absence of capacity or route right constraints it is relatively easy for a new airline to enter a market. Capital and other assets are far more mobile than most industries, which substantially reduces entry barriers. Even at capacity constrained London Heathrow airport the liberalization of market access under US-EU Open Skies led to new competition from new entrant airlines, as scarce slots were acquired on secondary markets.

Two academic studies[xix] suggest the fare impact of alliance cooperation on hub-to-hub route has been close to zero. There are at least two explanations for this result. First, alliance partners typically add capacity to overlapping routes to adequately serve the flow demand stimulated by additional spokes and improved service quality. Long haul capacity cannot be increased in small increments due to large aircraft size and the net result may exert downward pressure on average fares. Further, as discussed above, competing connecting routes and potential entry provide an effective restraint on pricing. The DOJ studies[xx] mentioned earlier dispute this finding but, as with the impact on fares for interlining passengers, the results of the earlier studies were re-established in subsequent work by Willig et al[xxi]. There have been two studies[xxii] that found higher fares for non-stop passengers on overlapping hub-to-hub markets, for one particular code-sharing alliance on the US domestic market. However, the second of these studies, by Gayle (2007), pointed out that the alliance resulted in increased non-stop traffic alongside higher fares. Clearly the alliance airlines were not restricting inventory to force fares up for these passengers, suggesting that the alliance did not result in anti-competitive effects.

Nonetheless, the 'carve-outs' discussed above were imposed by competition authorities because of fears about the potential anti-competitive effects on hub-to-hub passengers, even if flow or interline passengers originating behind and connecting beyond the hubs benefit from lower fares on the same segment.

But even in the event of a high potential for a lessening of completion, a new element to the economics of such markets is introduced by the metal-neutral JV. Imposing a 'carve-out' on a hub-to-hub market served by a JV could cause consumer harm if the lost efficiencies from unrealized economies of density exceed the potential anti-competitive effects.

Brueckner and Proost[xxiii] provide a formal economic analysis of the trade-off showing the key difference between an alliance relationship and a JV on a hub-to-hub route being the ability to fully exploit economies of traffic density, to the benefit of both the airline and the consumer.

Consumer harm might also be caused by the unintended incentive 'carve-outs' may give to airlines to take local O-D traffic before flow or interline traffic. An example used by American Airlines[xxiv] helps to illustrate this point. In a metal neutral JV, airlines share the revenues from all passengers on a transatlantic segment – both local (gateway-gateway or hub-to-hub) and flow (interlining, gateway-beyond etc):

O&D	Fare	Retained	Rank
Gateway-Beyond	$1,000	$500	#1
Behind-Gateway	$800	$400	#2
Gateway-Gateway	$600	$300	#3

In this example, a simple 50:50 revenue sharing arrangement would lead a member of a metal neutral JV to rank the three passengers as shown above – an economically efficient result, as the consumers who value the service the most are able to obtain inventory.

However, if the local gateway-gateway traffic is 'carved-out' from a revenue-sharing agreement then the airline's incentives are changed:

O&D	Fare	Retained	Rank
Gateway-Beyond	$1,000	$500	#2
Behind-Gateway	$800	$400	#3
Gateway-Gateway	$600	$600	#1

In this example, the operating airline keeps half the revenue from the JV traffic, but all the revenue from 'carved-out' local traffic. So the passenger who values the seat least (gateway-gateway) would get the inventory. This would reduce consumer welfare.

Conclusion

Airlines cooperate with other airlines, from accepting interline passengers to joint ventures, for strong economic and legal reasons. Many customers want a 'from anywhere to anywhere' service which a single airline cannot offer because of limited economies of scale in operations and legal barriers to market entry and cross-border merger. Point-to-point services requiring no cooperation between airlines can be operated on dense city-pairs. But the majority of city-pairs would not support a viable regular service on local point-to-point traffic alone. Network airlines can provide services to these city-pairs by creating sufficiently dense flows through channeling connecting or flow passengers on their way to final destinations. However, given the tens of thousands of city-pairs consumers wish to fly between, the legal barriers, limited economies of scale in operations but significant economies of density, airlines have to seek commercial partnerships with other airlines to link their networks. Alliances have become a dominant feature of the international airline industry as a result. Joint ventures have recently taken that airline cooperation to an even closer degree on a number of markets.

The benefits for the interline passenger, of closer cooperation between airlines, due to quality improvements resulting from better schedules, fare combinability and a more seamless passenger experience, are widely evident and accepted. There is also a significant body of evidence showing that these passengers also benefit from lower fares, due to the economics of density, efficiency gains and also the elimination of 'horizontal double marginalization', although the scale of these benefits is not uncontested. The evidence suggests that closer and closer forms of airline cooperation lead to increasing fare reductions, with interline passengers benefitting from fares 27% lower under immunized alliance partners, than an interline fare between non-aligned airlines.

The more serious issues arise when considering the impact of cooperation on overlapping non-stop hub-to-hub markets, where there is the potential for anti-competitive effects if airlines reduce the inventory they provide to non-stop passengers, forcing fares higher. However, there is little evidence that this happens in practice. Competition from connecting services and the threat of entry are powerful constraints on pricing power for most markets. But competition authorities are still resistant to allowing some alliance proposals. In the US antitrust immunity has been granted in some cases after 'carving out' hub-to-hub markets, prohibiting cooperation for fear of anti-competitive effects. However, even if these effects were likely, a 'metal-neutral' joint venture would bring additional efficiency gains that may offset any anti-competitive impacts. There is a trade-off on these non-stop markets that requires careful analysis. Prohibiting JVs on these markets carries the risk of losing significant consumer benefits.

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