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Antitrust Immunity and International Airline Alliances

by

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Abstract

Most of the major carriers worldwide have joined one of three international airline alliances. The U.S. Department of Transportation has granted immunity from the U.S. antitrust laws to many carriers within these alliances. This article assesses the competitive effects and efficiencies associated with such grants. A grant of antitrust immunity to carriers in an alliance reduces competition in routes where these carriers offer competing flights, and the data show that fares paid by passengers for travel in non-stop trans-Atlantic flights are higher in routes with fewer independent competitors. The data also show that the alliances can produce pricing efficiencies for trans-Atlantic passengers who travel with connecting itineraries, but antitrust immunity within an alliance is not necessary to achieve such efficiencies.

1. Introduction

Alliance agreements, whereby an airline may market seats on some of its partner' flights, have been a common practice in the airline industry for the past thirty years. Recent decisions by the U.S. Department of Transportation ("DOT") to grant immunity from the U.S. antitrust laws to large groups of airlines in alliances relating to international air transportation represent a significant development. Airline executives argue that their customers benefit because antitrust immunized alliances deliver greater travel benefits, such as service to more destinations and lower prices. Customer advocates are concerned that substantial competition may be lost as a result of such grants. In this article, we assess how antitrust immunity grants to international airline alliances affect the competitive process, and we provide new evidence on their effects on the fares paid by consumers.

Airline alliances are marketing joint ventures that are traditionally implemented to enable an airline to sell tickets in new routes without having to operate additional aircraft. For instance, major carriers have regional alliance agreements at their hub airports with commuter carriers that serve smaller cities, and some major U.S. airlines have formed alliances to extend their network within the U.S. Faced with entry restrictions in foreign countries, major carriers worldwide have joined one of three major international alliances (the SkyTeam, Star, or oneworld alliances) in order to extend their network to foreign countries. Airline alliances have been shown in the economics literature to benefit customers relative to traditional arms-length arrangements, so-called *interline* arrangements, as they allow the partner airlines to market new destinations and typically lead to lower prices.[1]

DOT has the statutory authority to approve and immunize from the U.S. antitrust laws agreements relating to international air transportation. Over the past seventeen years, DOT has granted immunity to over twenty international alliance agreements, permitting immunized participants in these alliances to collude on prices, schedules, and marketing. In recent years, DOT has granted immunity to larger groups of airlines in the three major international alliances, significantly reducing the number of independent competitors over the North Atlantic. In fact, though over twenty airlines offer trans-Atlantic flights, three groups of antitrust immunized carriers (one within each alliance) combine to carry over 82% of the U.S.-E.U. passenger traffic.[2]

Decisions to grant antitrust immunity to international airline alliances are controversial and regularly prompt many filings in DOT proceedings on their effects on consumer welfare.[3] A principal concern is that the grant of immunity eliminates competition between the participants in routes where they offer competing flights, adversely affecting consumers in these routes. Antitrust concerns have focused in particular on the loss of competition in trans-Atlantic routes

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[1] See, for example, Park and Zhang (1998, 2000), Brueckner and Whalen (2000), Brueckner (2003), Bamberger , Carlton, and Neumann (2004), Bilotkach (2007),Whalen (2007), Armantier and Richard (2003, 2006, 2008), Ito and Lee (2007), and Brueckner, Lee, and Singer (2010) for evidence on domestic and international alliances. Bilotkach and Huschelrath (2010) is a comprehensive review of the literature and policy actions on international alliances.

[2] DOT Order 2010-2-8 at 14.

[3] Filings and Orders in international alliance proceedings at DOT are publicly available at www.regulation.gov. and http://ostpxweb.dot.gov/aviation/X-50%20Role_files/All%20Immunized%20Alliances.pdf

where the alliance partners offer competing non-stop flights, so called *non-stop overlaps*. Carriers filing alliance and antitrust immunity proposals at DOT ("Applicants") argue that an antitrust immunity grant enables the partners to deliver significant benefits, principally in the form of service to more destinations and lower fares to passengers who travel with connecting itineraries (that is, itineraries that include intermediate airport stops). The evidence in the published economics literature, which uses 1990s data, generally supports claims that antitrust immunized international alliances benefit connecting passengers and also shows that they may not harm passengers in non-stop overlaps.[4]

In this article, using data for the period 2005-2010, we provide new findings on the effects of antitrust immunity grants on the fares paid by trans-Atlantic passengers. We find that fares paid by passengers for travel in non-stop trans-Atlantic flights are significantly higher in routes with fewer independent non-stop competitors. The data show that, all else equal, average one-way fares in routes served by one non-stop carrier are $31 higher than in routes served by 2 competing non-stop carriers, $62 higher than in routes served by 3 competing non-stop carriers, and $88 higher than in routes served by 4 competing non-stop carriers. Each of these relative fare differences is statistically significant (that is, different from zero) at the 99% confidence level. They represent, based on average trans-Atlantic fares, average fare increases of about 7% for each reduction by one in the number of non-stop competitors. This evidence supports the normal antitrust presumption that eliminating or substantially reducing competition through merger or collaboration enhances the market power of the remaining suppliers and leads to higher prices, harming consumers. The data further show that the major alliances produce pricing efficiencies for connecting passengers relative to interline arrangements; but antitrust immunity is not necessary to achieve such efficiencies. This evidence undermines the Applicants' claims that antitrust immunity enables alliance members to reduce fares below those offered under non-immunized arrangements in these alliances.

DOT reviews alliance proposals under a public interest standard, which allows for considerations broader than antitrust to factor into the decision-making process. We conclude with an outline of public interest factors, such as foreign policy goals, that have contributed to DOT's determination that antitrust immunity grants to some alliances may benefit consumers.

This article is structured as follow. In Sections 2 and 3, we outline the basics of alliances in international aviation and the review process at DOT. In Sections 4, 5 and 6, we describe the available data and provide newer evidence on the fare effects of antitrust immunized alliances. In Sections 7 and 8, we discuss exemptions that DOT has at times attached to immunity grants as well as public interest considerations in DOT's review process. We conclude in Section 9.

2. International Aviation and Airline Alliances

International commercial aviation agreements, which include the rights to board and deplane passengers in a foreign country, are established in bilateral or multilateral agreements between countries. These agreements may restrict the number of carriers that provide air service

[4] See in particular Brueckner and Whalen (2000), Brueckner (2003), and Whalen (2007) for such evidence. Bilotkach (2007) finds that immunity by itself does not deliver lower prices to coach-class connecting passengers.

between the countries, the number of flights that they offer, and sometimes the fares that they charge for travel between the countries.

In 1993, the U.S. and the Netherlands implemented an Open Skies agreement and DOT granted antitrust immunity to Northwest and KLM. Under the terms of this agreement, U.S. and Dutch carriers no longer needed permission from either government to provide service, carry passengers, and offer particular fares between the U.S. and Netherlands.[5] The U.S. subsequently negotiated Open Skies agreements with other European countries and, in April 2008, most of these agreements were superseded by an Open Skies agreement between the U.S. and the E.U., which liberalized air travel between the U.S. and the E.U.[6] These agreements do not permit cabotage, which is the right of a country's airline(s) to carry air traffic that originates and terminates within the boundaries of another country. For example, Air France may not carry passengers that originate and end their trip within the U.S. Ownership rules in the U.S. and the E.U. also continue to preclude mergers between U.S. and E.U. carriers.

In this regulatory framework, airlines have formed alliances relating to international air travel. In an alliance, participants decide on which international routes to include in the agreement. Each airline may market seats on flights operated by its partner(s) if that flight is a part of a travel itinerary in a route that is included in the agreement. These flights are listed in schedules once by each airline with its own flight number and two-letter code. This practice, known as *code-sharing*, allows an airline to market to its customers flights to destinations served by its partner(s) without having to operate additional aircraft. For example, Delta Airlines flies to Paris, France, but not to Toulouse, France. As a member of the SkyTeam international alliance, Delta can market seats on an Air France's flight from Paris to Toulouse as part of a travel itinerary between Atlanta and Toulouse. Delta customers will see a Delta flight number and a Delta code on both segments of the itinerary even though Delta operates the Atlanta-Paris flight and Air France operates the Paris-Toulouse flight.

If the alliance partners are not competitors (as could be true on many connecting routes like Atlanta-Toulouse), no antitrust immunity is needed and they can jointly decide on fares and other competitively sensitive matters. If the alliance partners are competitors and the alliance agreement is arms-length, then the carrier operating the flight determines seat availability for the marketing partner, but each airline sets prices competitively. All sales revenues go to the operating carrier, and the marketing carrier gets a booking fee to cover handling costs. The partners may agree to adjust flight schedules and operations to provide seamless service on code-share flights. They may also agree to link their frequent-flyer programs to allow a customer to use frequent-flyer miles accumulated with one airline to redeem awards with a partner. If the alliance partners are competitors and the alliance agreement is granted antitrust immunity, then the partners may jointly decide on fares, schedules, and other competitively sensitive matters across the routes that they include in the alliance agreement.

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[5] DOT order 93-1-11.

[6] The U.S. – EU Air Transport Agreement signed April 30, 2007. Available at http://www.state.gov/e/eeb/rls/othr/ata/e/eu/114768.htm . The major provisions became effective in April 2008.

Airline executives claim that alliances benefit consumers by (i) expanding the number of flights offered, (ii) opening new routes to their consumers, and (iii) lowering fares in the routes that they serve. For example, airlines in the Star alliance claimed in 2009 that adding Continental Airlines to their alliance would "increase the range of competitive service options available to passengers", "generate new online service and routing options for millions of passengers", and "lower fares to more than 15 million annual passengers in ... nearly 43,000 global airport-pairs."[7]

To illustrate these claims, and to understand how an alliance can affect consumers, consider Figure 1. Cities A, H are in the U.S., cities K, D are in Europe, and a route is defined as a city-pair. Airline 1, the U.S. airline, provides *online* service (that is, it operates and markets its flights) in the routes shown as solid lines, using city H as a hub. It serves routes within the U.S., such as A-H, and routes between U.S. cities and city K in Europe, such as A-K. Airline 2, the European airline, provides online service in the routes shown as dotted lines, using city K as a hub. It serves routes within Europe and between cities in Europe and city H in the U.S. Both airlines have non-stop flights in the trans-Atlantic hub-to-hub route H-K. But for this non-stop overlap, the airlines' networks are end-to-end.

Absent an alliance, customers in route A-D must purchase a so-called 'interline' ticket, whereby they fly segment A-H with the U.S. airline, H-K on either airline, and K-D with the European airline. These tickets entail unfavorable features, such as multiple check-ins and longer distances between connecting gates, and high prices due to double marginalization.[8] An alliance enables the airlines to pair their existing flights to form code-share flights in route A-D (with travel itinerary A-H-K-D) with seamless service and at a lower price. Each airline can list these flights in schedules with its own flight number and two-letter code and market route A-D to its customers. The partners may also agree to form code-share flights in other routes (e.g., A-K, H-D, and H-K) to supplement their online flights in the routes. Each of these code-share flights include travel on trans-Atlantic flights in route H-K, and a participant in the alliance may find it profitable to add capacity (by flying larger aircraft or more flights) in that route should it anticipate to carry more passengers as a result of the formation of the alliance.

The evidence in the economics literature generally supports the claim that alliances, whether or not antitrust immunized, benefit customers relative to interline arrangements. Morrison and Winston (1995), for example, show that customers dislike interline flights, and Park (1997) shows how alliances may enhance flight options and customer welfare. Bamberger, Carlton and Neumann (2004), Armantier and Richard (2006, 2008), and Ito and Lee (2007) provide evidence that prices are lower in routes within the U.S. served by domestic alliances between major U.S. carriers. Looking at international alliances, Park and Zhang (1998, 2000), Brueckner and Whalen (2000), Brueckner (2003), Whalen (2007), and Bilotkach (2007) show that in the 1990s alliance fares for connecting travel itineraries were lower than interline fares.

[7] DOT-OST-2008-0234-0001 at 33, 35, 37

[8] In a connecting travel itinerary that pairs flights from two airlines, double marginalization occurs when each airline maximizes the profits from its own flight independently of the other airline and prices its flight segment too high because it does not take into account the fact that its higher price decreases the other firm's profits by reducing total demand. See, for instance, Tirole (1989) at 172-176.

As of 2010, almost all of the major carriers worldwide have joined one of three alliances: (i) the SkyTeam alliance, with 13 members including Delta/Northwest and Air France/KLM; (ii) the Star alliance, with 28 members including United/Continental, Lufthansa, and Air Canada; (iii) the oneworld alliance, with 11 members including American and British Airways. DOT reports that airlines across these three alliances combined to carry over 82% of the 48,495,038 passengers who flew between the U.S. and the E.U. in the 12-month period ending June 2009. Airlines in Star combined for about a 32% share of the U.S.-E.U. passenger traffic; those in SkyTeam for about a 29% market share, and those in oneworld for a 22% share.[9]

3. International Alliances and Antitrust Immunity

Though the U.S. Congress transferred jurisdiction over airline mergers from DOT to the U.S. Department of Justice ("DOJ") in 1988, DOT retains the statutory authority to approve and immunize from the U.S. antitrust laws agreements relating to international air transportation (49 U.S.C. §§41308-41309). There is no corresponding authority for DOT or DOJ with regard to domestic alliances between U.S. carriers, and domestic alliances don't have antitrust immunity.[10]

DOT has granted antitrust immunity over the past seventeen years to participants in over twenty international alliance agreements, including to participants in the three major alliances. Table 1 lists key dates for each of these three alliances. Some major carriers in each of SkyTeam and Star obtained grants of antitrust immunity in the 1990s and early 2000s, and since late 2008 more major carriers have been granted antitrust immunity within each alliance.

DOT's review of international alliance agreements has two steps. First, DOT determines whether an agreement "substantially reduces or eliminates competition." If it does, then DOT must disapprove it unless DOT finds that the agreement "is necessary to meet a serious transportation need or to achieve important public benefits" and there is no less anti-competitive alternative. 49 U.S.C. §41309(b). If DOT approves an anti-competitive agreement on those grounds, then it must exempt it from the antitrust laws. 49 U.S.C. §41308(c). Second, if DOT finds that an agreement does not reduce or eliminate competition and is consistent with the public interest, then DOT must approve it. But exemption from the antitrust laws is authorized only if it is required by the public interest; even then immunity is authorized only "to the extent necessary to allow the person to proceed with the transaction specifically approved by the order and with any transaction necessarily contemplated by the order." 49 U.S.C. §§41309(b) and 41308(b). DOT's review thus encompasses both a competitive analysis of the transaction and

[9] DOT Order 2010-2-8 at 14.

[10] U.S. airlines may merge. They may also request from the antitrust agencies a business review on joint venture proposals. There was an exception on immunity grants within the U.S after the U.S. Congress passed the Aviation and Transportation Security Act of 2001 in response to the terrorist attacks of 09/11/2001. The Act, which has since expired, included a provision that allowed DOT to grant antitrust immunity to carriers in States with "extraordinary" air transportation needs. This provision only applied to intra-state routes. [See Section 116, Aviation and Transportation Security Act of 2001, Pub. L. 107-171, 115 Stat. 624 (Nov. 19, 2001).] Under this Act, DOT temporarily granted antitrust immunity to Aloha Airlines and Hawaiian Airlines in inter-island routes in Hawaii in the period from 12/2002 to 10/2003. Kamita (2010) shows that with antitrust immunity the carriers made significant capacity reductions and not only did fares rise sharply (by 35% to 41%) but they also remained high well past the expiration of immunity.

public interest considerations. In this article, we focus on the economic issues that have been central to the competitive analyses and subsequently outline public interest factors that have contributed to DOT's decision-making.

4. Available Data

We define a route as a non-directional city-pair with an endpoint in the U.S. and an endpoint in the E.U., Switzerland or Norway. Non-stop flight schedule data are publicly available from the Official Airline Guide ("OAG"). An airline is counted as serving a route non-stop in a year-quarter if it offers at least 60 flights in each direction during that period. [Results can be shown to be robust to a lower flight threshold.] Following Brueckner and Whalen (2000) and Bilotkach (2007), we assume that the number of airlines offering non-stop flights in a trans-Atlantic route is determined prior to these airlines' pricing decisions. This assumption is reasonable at two levels. First, given that airline demand is revealed over time, and the high costs associated with establishing trans-Atlantic non-stop service, airlines that enter a trans-Atlantic route publish their flight schedule and advertise their new service well ahead of actual departure dates. Second, airlines with non-stop flights in a trans-Atlantic route are almost exclusively airlines with a hub at an endpoint of the route, and the number of airlines with non-stop flights in trans-Atlantic routes is quite stable over time (Section 5 provides more details).

The publicly available fare data are the DB1B data maintained by DOT. The data are a 10% random sample of tickets either ticketed by a U.S. carrier or where a U.S. carrier operated at least one flight in the ticket's itinerary. The data are compiled quarterly. The only information provided for a ticket is the purchased price (in dollars), number of coupons in the ticket's travel itinerary[11], number of sampled passengers traveling the itinerary at the particular fare, and, for each coupon, the fare class, origin and destination airports as well as the operating and marketing carriers. We use quarterly data for the period 2005-2010 (data are available through 2010 quarter three for a total of 23 quarters of data). We extract from DB1B ticket itineraries with up to 6 coupons, but no more than 3 coupons one-way and no surface transfers. Based on these data, 32% of U.S.-E.U. passengers flew non-stop between their origin and destination cities in 2009, and the other 68% traveled with connecting itineraries.

Fare data for tickets ticketed by foreign carriers are not reported in the publicly available DB1B data when they include no flights operated by U.S. carriers. In the data, there are thus no online tickets for foreign carriers, which are the vast majority of tickets sold by these carriers. DOT collects these data under its Orders granting antitrust immunity to alliances (e.g. Orders 2002-7-39, 2001-12-18, 2000-4-22), but these data are not made publicly available. This has two principal implications. First, if the only carrier in a route is a foreign carrier, then there are insufficient data to reliably infer about fares. This limits the scope of routes and entry/exit events that can be analyzed with the data. Second, when there is a U.S. carrier in the route, the fare data reported by U.S. carriers are assumed to be representative of fares across all carriers in the route.

[11] A coupon represents either a non-stop flight or a direct flight, which is a connecting flight with no change of flight number or aircraft at intermediate airport transfers. We characterize a coupon as a non-stop flight when the operating airline listed in the coupon has non-stop flights between the origin and destination airports on the coupon.

5. Competitive Effects: Analysis of Fare Effects for Non-stop Passengers

To analyze how the transaction may affect the competitive process, DOT applies the Clayton Act test, which "requires us to consider whether the Alliance Agreements are likely to substantially reduce competition and facilitate the exercise of market power."[12] DOT thus applies the principles contained in the antitrust agencies' Horizontal Merger Guidelines. Market power for this purpose is the ability to profitably raise prices above competitive levels (or reduce competition on dimensions such as product quality or service), for a significant period of time, in relevant product and geographic markets. Relevant markets in the airline industry consist of scheduled passenger airline service between a point (city or airport) of origin and a point (city or airport) of destination, generally referred to as routes. Granting antitrust immunity to carriers in an alliance agreement eliminates competition between these carriers in their non-stop overlaps, which are the routes where they principally compete (see Section 2). Analyses of competitive effects in DOT proceedings have accordingly focused on the loss of competition in trans-Atlantic non-stop overlaps.

A grant of antitrust immunity to two airlines that offer non-stop flights in a route eliminates competition between these airlines in the route. Numerous economic studies of the domestic U.S. airline industry since deregulation have shown that the number of competitors serving a route matters and reducing the number of non-stop competitors leads to significant fare increases. For example, Peters (2006) computes actual fare increases of 7% to 29% following the loss of non-stop competition in domestic routes involved in mergers. Likewise, Kamita (2010) shows that fares rose by over 30% when two inter-island non-stop competitors in Hawaii were temporarily granted antitrust immunity in 2002-2003.[13] The evidence for international routes is more limited. In a fare study of international routes using 1997 quarter three data, Brueckner and Whalen (2000) find that an extra non-stop competitor lowers average fares by about 5%, all else equal, but this effect is not statistically significant using standard confidence levels. Bilotkach (2007) obtains similar findings using 1999 quarter three data

We propose to use data for the period 2005-2010 to provide newer findings on the effect on fares of antitrust immunity grants and the number of non-stop competitors in trans-Atlantic routes. We consider all trans-Atlantic city-pair routes with non-stop service between the twenty largest cities in each of the U.S. and the E.U over the period 2005-2010. [Cities were ranked by total number of trans-Atlantic departures.] The data include 115 routes. Table 2 lists descriptive statistics. We count different airlines serving a route non-stop as independent competitors unless they are immunized members of the same alliance ("ATI carriers"), in which case they count as a single competitor. This definition assumes that non-immunized members of the same alliance remain vigorous competitors. If not, then the price effects we shall estimate from the loss of a non-stop competitor may underscore the magnitude of the true price effects. In 2010 quarter three, we observe in the data that 52% of the trans-Atlantic routes have one independent non-stop competitor, 25% have two independent non-stop competitors, and the other 23% have at least

[12] DOT Order 2009-4-5 at 11.

[13] See also, e.g., Joskow, Werden & Johnson (1994); Borenstein (1989,1992); Morrison & Winston (1989, 1995).

three independent non-stop competitors. In 11 routes, there are two non-stop carriers that are ATI carriers and thus count as a single independent competitor. In 7 of the 11 routes, the ATI carriers are the only providers of non-stop service.[14]

We considered analyzing fares using a panel approach, which is entirely focused on changes over time in the number of competitors in a route. We chose not to do so in large part because, after accounting for the data limitations, there are simply too few changes over the period 2005-2010 in the number of non-stop competitors across trans-Atlantic routes to reliably employ a panel model. First, DOT granted immunity to larger sets of carriers in each of the three alliances only as of late 2008. The SkyTeam immunity grant eliminated one competitor in two routes as of 2008 quarter three. The Star grant eliminated one competitor in another two routes as of 2009 quarter four [it would have eliminated one competitor in 6 routes total but DOT attached exemptions to its grant; see Section 7]. The oneworld grant eliminated one competitor in another 8 routes as of 2010 quarter four, but fare data are not at this time available through 2010.

Second, apart from changes in the number of competitors as a result of immunity grants, there are few entry and exit events in trans-Atlantic routes. Only fifteen of the 115 routes experienced changes from one-to-two, or two-to-one, carriers over the period 2005-2010. Moreover, when there are only two airlines with non-stop service in a trans-Atlantic route, often one is a U.S. airline and the other is a foreign carrier. Foreign carrier data are not reported in DB1B. If the change in competition resulted from the entry (exit) of the U.S. carrier, then there is no reliable data for the pre-entry (post-exit) period. Therefore, the only trans-Atlantic routes on which there are sufficient data to analyze shifts in competition from one-to-two, or two-to-one, are routes in which the incumbent airline prior to entry, or the remaining airline after exit, is a U.S. airline. There are only seven routes with such a change from two-to-one, or from one-to-two, non-stop carriers in our data.

We analyze fares using a cross-section approach, which is common to airline economics publications.[15] Under this approach, we attempt to control for differences in route characteristics and isolate the remaining difference in fares across routes resulting from the number of competitors. We focus on economy-class tickets (tickets with fare class X coupons), which represent 90% of tickets sold.[16] We use the ordinary least squares method to estimate how average economy fares for non-stop travel vary across routes as a function of the number of independent non-stop competitors, the presence of additional antitrust immunized carriers, route characteristics (distance, population), carrier effects, and year-quarter fixed effects.

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[14] In 2010 quarter three, the eleven routes with an additional ATI carrier were: Atlanta-Amsterdam , Atlanta-Paris, Houston-Frankfurt, New York City (“NYC”)-Amsterdam, NYC-Rome, NYC-Frankfurt, NYC-Munich, NYC-Zurich, Chicago-Munich, San Francisco-Frankfurt, and Washington-Munich.

[15] See for example Borenstein (1989, 1990), Brueckner and Whalen (2000), Bamberger, Carlton and Neumann (2004), Armantier and Richard (2006), Ito and Lee (2007).

[16] We eliminate tickets with zero prices and tickets in the bottom and top 5% of the fare per mile distribution. This selects one-coupon tickets with a one-way fare per mile flown from 2.5 cents to 25 cents. Trans-Atlantic business class service is known to differ significantly from economy-class service, and we observe few business class tickets in the data (about 30% of route-year-quarter observations in our data have less than 30 sampled business passengers). In addition, business class tickets have a largely bi-model distribution requiring different econometric treatment. See the discussion at footnote 34 below.

We use dummy indicator variables to denote the number of independent competitors in a route. Single-competitor routes are the reference group. The competitive variables equal one when there are, respectively, 2, 3, 4, or 5 or more non-stop competitors in the route and zero otherwise. We define a variable ATI equal to the number of additional ATI carriers in a route over and above the number of independent competitors. For example, if the only two carriers serving a route are ATI carriers, the two carriers count as a single independent competitor, but the ATI variable equals 1 on that route because there is one additional ATI carrier in the route. If the presence of an additional ATI carrier lowers fares, then the ATI variable will have a strongly negative and statistically significant effect on fares. We allow for the effect of the ATI variable to vary with the number of independent competitors in a route. Following Brueckner and Whalen (2000), we control for the mileage distance of the route and for the route's population potential, which is computed as the geometric mean of the population at the two endpoints in the route. The carrier effects control for factors invariant to a carrier across routes, and the year-quarter fixed effects control for factors that are invariant across routes in a year-quarter. Lastly, the airports in our trans-Atlantic routes are major airports in the U.S. and E.U. at which members of each alliance offer flights. These airlines make available a large number of competing single-connect and double-connect travel itineraries to passengers across the routes in the data.[17]

Results are listed in Table 3. The model explains 84% of the variation in average fares across routes (R^2=0.84), meaning the model fits the data very well. We find that, all else equal, average one-way non-stop fares in routes served by a single independent non-stop competitor are \$31 higher than in routes served by two independent non-stop carriers. Average one-way non-stop fares in routes with two independent non-stop carriers are also \$31 higher than in routes served by three independent non-stop carriers. And average one-way non-stop fares in routes with three independent non-stop carriers are \$26 higher than in routes with four independent non-stop carriers. Each of these fares differences is statistically significant at the 99% confidence level. They represent average fare increases of about 7% for each reduction by one in the number

[17] Data notes: a) We exclude from the data the New York City – London route, which has from 5 to 9 independent competitors during the period 2005-2010. All other routes have 5 or fewer competitors (but for Los-Angeles-London which has 6 in two quarters). Routes with 5 independent competitors have no additional ATI carrier.

b) The mileage is the great circle distance mileage between the endpoints of the route. The U.S. metropolitan area population data are available at http://www.census.gov/popest/metro/metro html. European population data is from European Spatial Planning Observation Network, Study on Urban Functions (Project 1.4.3), Final Report, Chapter 3, (ESPON, 2007), located at http://www.espon.eu/mmp/online/website/content/projects/261/420/index_EN html.

c) Almost all non-stop tickets in DB1B (97%) are solely operated by U.S. carriers, and most foreign carriers appear in just 1 or 2 sample routes. In the model, therefore, the average fare in a route is computed across non-stop tickets operated by U.S. carriers and carrier effects are defined for U.S carriers only (based on the total number of U.S. carriers in the route). Fare effects from the number of competitors are interpreted holding constant the sum of the estimated carrier effects (given our model specification, these fare effects may represent in particular the fare effects associated with variations in the number of foreign competitors in a route, all else equal). Allowing carrier effects to vary across each year-quarter (or, alternatively, not including carrier effects) produces similar results.

d) Routes where a foreign carrier offers online connecting flights cannot be identified in the available DB1B and OAG data. We pair non-stop flights (based on a common destination/origin) in the OAG data to form potential one-stop connecting flights that are online or may be offered as a result of alliance agreements. We observe across the routes in our data at least three additional airlines (other than the airlines with non-stop flights), if not often many more, with potential one-stop connecting flights.

of independent non-stop competitors, based on average fares listed in Table 2.[18] Controlling for the number of independent non-stop competitors in a route, we find that the competitive effect of the presence of additional ATI carriers in a route is small, with no discernible pattern, and not statistically significant.

These findings provide evidence that fares are significantly higher in routes with fewer independent non-stop competitors. This evidence is consistent with published work on the fare effects from the loss of non-stop competition in domestic routes (see, e.g., Peters 2006). Moreover, across our routes, the vast majority of economy-class passengers (76%) fly non-stop even though average non-stop fares are 8.3% higher than average connecting fares. Hence, even if connecting service is in the relevant market, the loss of nonstop competition significantly increases concentration levels in the market, and we have evidence of large, statistically significant fare effects from differences in non-stop competition on the fares paid by the vast majority of passengers. This evidence supports the normal antitrust presumption that eliminating or substantially reducing competition through merger or collaboration enhances the market power of the remaining suppliers and leads to higher prices, harming consumers.

6. Efficiencies

Applicants may claim efficiencies that enhance their ability and incentive to compete and deliver benefits to customers. Under the antitrust agencies' 2010 Horizontal Merger Guidelines, only efficiencies likely to be accomplished with the transaction and unlikely to be accomplished in its absence are credited. It is incumbent upon the Applicants to substantiate their claims, in part because much of the information relating to efficiencies is uniquely in their possession. In DOT proceedings, Applicants have claimed that with antitrust immunity they can agree to form alliances that combine their trans-Atlantic networks and thereby deliver benefits to all of their trans-Atlantic customers, the majority of which are connecting passengers. Applicants then cite evidence in the economics literature that shows that antitrust immunized alliances deliver lower fares to connecting passengers relative to non-immunized alliance and interline arrangements.

6.1 Network Integration

Applicants have proposed to form with antitrust immunity alliances with so-called metal neutral revenue arrangements. Under these arrangements, participants pool ticket revenues across the trans-Atlantic routes that they agree to include in the JV and, at periodic intervals, share the revenues using a "capacity-based formula."[19] Applicants argue that such arrangements create a common bottom line among the partners that enables them to agree to "open their entire combined transatlantic network (including behind and beyond points) to consumers, thereby making more inventory accessible and offering consumers a greater range and quality of service options (…) than any of the participants could offer on its own."[20]

[18] If we define the dependent variable as the natural logarithm of the average fare in a route, then we also obtain statistically significant fare increases of about 7% for each fewer non-stop competitor.

[19] DOT-OST-2008-0234-0001 at 14: "A capacity-based formula that is subject to adjustment on an annual basis is used for the allocation of revenues." The specific formula is not described in public filings at DOT.

[20] DOT-OST-2008-0234-0001 at 17.

To illustrate, in proposing in 2009 to form an antitrust immunized JV (which they refer to as "JBA"), the oneworld Applicants stated that: "While antitrust immunity is not a regulatory prerequisite for full behind/beyond and transatlantic codesharing, American, British Airways and Iberia currently lack the commercial incentive to do so absent the JBA. Without metal neutrality, the risk of diversion makes it more profitable to keep certain key transatlantic segments and behind/beyond points out of the other carrier's reach. For example, British Airways has non-stop service on the Seattle-London route, while American offers connecting service over Chicago. But if American were to place its code on the British Airways flight, a significant number of American's customers might opt for the non-stop British Airways flight. Since that would result in a revenue transfer from American to British Airways, it would be commercially undesirable to place the AA* code on the BA flight unless a balance of benefits could be found on another route (such as Chicago-Frankfurt). The JBA with its metal neutral joint venture completely eliminates this issue regardless of which airline the customer chooses."[21]

An alternative to immunity has been widely used by non-immunized carriers for years. Rather than evaluate each route strictly based on the revenues each carrier expects to earn or lose, alliances with no antitrust immunity typically adopt a simple expedient: the partners agree on how to map fares into each other's yield management systems. Using these mappings to make sure that the fares being evaluated are comparable, each carrier treats fares partly booked on the partner's aircraft as its own fares. The carrier operating the flight gets the fare revenues (but for a handling fee paid to the marketing partner), and, in travel itineraries that combine flights operated by two carriers, the carriers split the revenues. The partners then form code-share flights across their routes within the geographic area of their JV -- similarly to what Applicants propose to do with antitrust immunity. Presumably the partners expect that their combined flight offerings deliver sufficient incremental value to customers across their combined routes that they will each earn higher revenues on aggregate, even if they incur diversion losses on any one route (or passenger). This type of arrangement was adopted by the domestic alliances between Delta, Northwest, and Continental over the period 2003-2008 and United and Continental over the period 2009-2010.[22] These carriers successfully offered code-sharing across routes in their combined domestic networks without any antitrust immunity.

An antitrust immunity grant allows the participants in the JV to collude in the routes that they agree to include in the agreement. If the JV partners include in their agreement routes where they offer competing flights, then they may collude, raise prices, and earn incremental profits in these routes simply as a result of the lessening of competition. With antitrust immunity, the JV partners thus have commercial incentives to expand the set of routes in their agreement to include routes where they compete, irrespective of whether the JV delivers any benefits to consumers in these routes. It does not follow that the customers in these additional routes benefit. In fact, the results in Section 5 show that consumers in non-stop overlaps would pay higher fares.

[21] DOT-OST-2008-0252-0001 at 22.

[22] The Delta, Northwest, and Continental domestic alliance ended as a result of the Delta-Northwest merger, and the United-Continental domestic alliance ended as a result of their merger in 2010.

The parties to immunized JVs also argue that seat inventory management will be improved in a metal neutral JV that has a common bottom line. Without immunity, carriers might prefer to allocate seats to their own passengers rather than alliance passengers to maximize revenues. An immunized JV with revenue pooling will eliminate those incentives.[23] This argument overlooks two issues. The first is that sophisticated inventory management systems can be programmed to avoid this problem, as many non-immunized JVs have shown. The second issue is the assertion that the common bottom line will solve this problem. A JV is not a merger and participants remain distinct firms that only share the revenues attributable to the routes included in the JV. In the oneworld JV, for example, the common bottom line and joint revenue sharing covers only the trans-Atlantic.[24] Suppose, for example, that American is considering how to allocate a seat on its Atlanta-Miami flight after it gets immunity in oneworld. If it sells the seat to an Atlanta-Miami-London passenger, then it has to share revenues with its oneworld partners because the route is included in the oneworld agreement. If it sells the seat to an Atlanta-Miami or Atlanta-Miami-Bogota passenger, then it keeps all the revenues because these routes are not in the oneworld JV. Hence, even if the Atlanta-Miami-London passenger is willing to pay a higher fare for the seat, all else equal, American may not have commercial incentives to sell the seat to that passenger, even if doing so would maximize consumer welfare.

Applicants in DOT proceedings have otherwise made few claims that a grant of antitrust immunity uniquely enables them to launch new trans-Atlantic service. For example, Applicants in the Star alliance stated in 2008 that antitrust immunity would “enable them to maintain and expand their non-stop services on international routes”, but they provided no specifics.[25] In their 2009 filings, oneworld Applicants stated that the immunized JV would “help facilitate the launch of new service between Dallas/Fort Worth and Madrid”, but American launched this service in 2009 quarter two, more than one year before oneworld got an immunity grant.[26] We also do not observe in the OAG data that the immunized SkyTeam participants expanded trans-Atlantic service ex-post the larger grant of immunity within SkyTeam in 2008 quarter three.[27]

In the 2005 SkyTeam proceedings, DOT stated that “[T]he mere association of carriers under marketing arrangements such as the SkyTeam alliance creates additional demand that naturally flows over the hub-to-hub routes that serve as network-linking conduits... Continental, which does not have transatlantic immunity and was not even a member of SkyTeam until recently, added Houston-Amsterdam service in May 2002 as it expanded its (non-immunized) marketing cooperation with KLM. Over time, Continental has increased capacity and frequency

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[23] [Public] Joint Applicants’ Motion For Leave To File and Supplemental Comments, DOT-OST-2008-0252, September 8, 2009, at 13-15.

[24] [Public] Joint Application for Antitrust Immunity, DOT-OST-2008-0252 August 14, 2008, at 22-23.

[25] DOT-OST-2008-0234-0001 at 31.

[26] DOT-OST-2008-0252-0001 at 24.

[27] In OAG data, we observe that the immunized SkyTeam participants offered 22,393 non-stop flights across 85 trans-Atlantic routes in 2008 quarter three and only 18,294 flights across 78 routes in 2010 quarter three. Note that oneworld participants, who had no antitrust immunity, offered 15,715 non-stop flights across 43 routes in 2008 quarter three and 15,016 flights across 42 routes in 2010 quarter three. Star immunized participants, including Continental, offered 23,843 non-stop flights across 83 routes in 2008 quarter three and 22,613 flights across 81 routes in 2010 quarter three. Variations in numbers are similar for other quarters in each year.

in that market, despite its lack of transatlantic immunity. These examples illustrate that immunity is not required for the initiation of new transatlantic routes between the hubs of alliance partners."[28]

6.2 Analysis of Fare Effects for Connecting Passengers

To support their claim that antitrust immunized alliances benefit consumers, Applicants cite evidence in the economics literature that shows that consumers pay significantly lower fares for connecting flights offered through antitrust immunized alliance arrangements rather than non-immunized alliance and interline arrangements. In particular, they cite a fare study using 1999 data by Brueckner (2003), which shows that, controlling for route and travel itinerary characteristics, fares paid by connecting passengers for flights offered by carriers in immunized alliances were 8% to 10% lower than for flights offered by non-immunized alliances, and 17% to 20% lower than for flights offered through interline arrangements. Likewise, Whalen (2007), using data for the period 1990-1999, finds that, all else equal, immunized alliance fares paid by connecting passengers were similar to online fares, 8% to 15% lower than non-immunized alliance fares, and 13% to 20% lower than interline fares. The authors (see also Brueckner and Whalen 2000) argue that their results are consistent with the hypothesis that carriers in an immunized alliance charge lower fares to connecting passengers because they internalize a double marginalization problem that arises from the uncoordinated choice of fares in the absence of immunity (see Section 2).

Since the 1990s, however, as DOT has highlighted, the competitive structure of the global airline industry has changed "in unprecedented ways through mergers, financial restructurings, and additional forms of cooperative agreements."[29] Findings for the 1990s, which were the formation years of alliances, may not apply nowadays. Recent published work also cast doubt on the claim that antitrust immunity is needed to reduce a double marginalization problem in connecting fares. Bilotkach (2005) provides a theory framework that shows that immunity is not needed to deliver this benefit, and Bilotkach (2007) finds using 1999 data that alliances with and without antitrust immunity have equivalent prices for economy-class connecting tickets. Likewise, though Brueckner, Lee, and Singer (2010) state that their results using 1998-2009 data mostly confirm findings in the literature that antitrust immunity by itself reduces connecting fares for trans-Atlantic passengers, they actually find little, if any, fare effect from immunity for economy-class tickets, which represent 95% of all tickets sold to passengers in their data.[30] In this Section, using more robust methodology and data for the period 2005-2010, we provide empirical evidence on trans-Atlantic connecting fares that shows that immunity by itself is in fact not necessary to the accomplishment of pricing efficiencies in international airline alliances.

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[28] DOT Order 2005-12-12 at 36.

[29] DOT Order 2005-12-12 at 32.

[30] Brueckner, Lee, and Singer (2010) apply a methodology similar to that in the prior literature. Their general conclusion obtains from a model that combines data on economy and business class tickets without controlling for fare class differences between tickets. When they estimate their model only on data for trans-Atlantic economy-class tickets, they find either no difference or only a 1% reduction in fare from immunity. In the present paper, we focus on data for the period 2005-2010, in part because the terrorist attacks of 09/11/2001 profoundly affected global air travel for several years afterwards (see, e.g., Borenstein and Rose 2008).

Following the economics research cited by Applicants in their DOT filings, we propose to control for differences in route and travel itinerary characteristics and isolate the remaining difference in fares across connecting tickets resulting from the alliance that operated and ticketed the ticket and the type of ticket sold. We label a ticket as a SkyTeam ticket (Star, oneworld, respectively) when all of the flights in the ticket are operated and marketed by members of the SkyTeam alliance (Star, oneworld, respectively). For each ticket in each alliance, we identify the type of ticket, specifically whether the ticket is online, ATI or non-ATI. A ticket is an online ticket if all of the coupons in the ticket are operated and marketed by a single airline (including its regional affiliates). An ATI ticket is a ticket that lists two or more airlines as operating or marketing carriers and all of the airlines listed on the ticket are immunized members of the same alliance. A non-ATI ticket is a ticket that lists two or more airlines, and all listed airlines are members of the same alliance, and at least one of the airlines is not an immunized alliance member. [31] All other tickets in the data list two or more carriers that are not members of the same alliance. This type of ticket, hereafter generically referred to as 'interline', include traditional interline tickets and tickets from code-share arrangements between airlines not in alliances or in different alliances.

We extract from DOT's DB1B data all tickets sold to passengers over the period 2005-2010 in trans-Atlantic routes with no non-stop flights. We focus on economy-class tickets (tickets with fare class X coupons), which account for 95% of all tickets sold in these routes. The sample data include 1,933,166 tickets sold to individual passengers for travel on connecting itineraries across 24,183 trans-Atlantic routes. Fifty-six percent of these tickets are online, 21% are ATI tickets, 14% are non-ATI tickets, and the remaining 9% are interline tickets. As these data indicate, alliance-based travel has become the dominant way most tickets for trans-Atlantic travel are sold. This result differs dramatically from the 1990s. Whereas Whalen (2007) reports that 38% of U.S.-E.U. connecting passengers traveled with interline flights in the 1990s, less than 9% did so over the period 2005-2010.

We use ordinary least-squares regression to analyze how prices paid by individual connecting passengers vary across tickets based on the type of ticket, the alliance that operated and marketed the ticket, the mileage and number of coupons in the ticket's itinerary, carrier effects, and route-year-quarter fixed effects. We define dummy variables that identify each of the type of ticket and alliance, and we interact these variables to estimate how online, ATI and non-ATI tickets differ both within and across each alliance. The carrier effects control for carrier-specific factors, such as service or cost differences, that may explain some fare differences across tickets.[32] The route-year-quarter fixed effects control for all factors, such as the level of competition, that are invariant to a specific route at a specific time.

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[31] a) A coupon in a ticket is online if the operating carrier is the marketing carrier on the coupon. If the carriers do not match, the coupon may yet be online since the operating carrier may be a regional affiliate of the marketing carrier. We use the OAG flight listing data to identify regional carrier affiliations for major airlines on an individual coupon basis. If all of the coupons in a ticket are online coupons from the same carrier, then the ticket is online.
b) When a ticket lists two or marketing carriers across coupons (for example, 62% of ATI and non-ATI alliance tickets do so), it is not possible to infer from the DB1B data which of the marketing carriers sold the ticket.

[32] For each carrier, we define a variable that equals zero except in tickets where the carrier operates a trans-Atlantic flight, in which case the variable equals 1 if it operates both trans-Atlantic flights in the ticket and 0.5 otherwise.

Our methodology differs from that in the prior literature in three important respects. We examine how fares vary with the type of ticket and alliance at the passenger level. Authors in the literature aggregate tickets to compute the average fare paid for each type of ticket in a given travel itinerary. They compare these average itinerary-level fares and generally assign in their model equal weight to each itinerary, though the number of tickets sold in an itinerary varies widely. [In our data the number of tickets per itinerary varies from 1 to 311 with a mean of 2.2 tickets per itinerary.] This approach raises two related issues. Consider for example two itineraries with an average non-ATI fare of $1000. In one itinerary, there is 1 passenger who bought a $600 ATI fare, and in the other itinerary there are 4 passengers who bought a $1,100 ATI fare. Taking the simple average of the $600 and $1,100 itinerary-level fares yields an average ATI fare of $850 [$850=($600+$1,100)/2]. As this fare is lower than the average non-ATI fare, it would appear using this itinerary-level approach that immunity by itself reduces fares for consumers. In fact, the five passengers with ATI tickets paid an average of $1,000 per ticket [$1,000=($600+ 4*$1,100)/5], which equals the average non-ATI fare. In addition, using a dependent variable based on average prices introduces a specific form of heteroskedasticity in the model. Authors generally do not correct for it, meaning that their estimators are inefficient and inferences drawn from their models may be erroneous (see Greene 1997).[33]

Second, authors in the literature generally compute average fares from economy and business tickets without controlling in their model specification for important differences in these tickets' characteristics and fare distributions.[34] They also use data on all trans-Atlantic connecting tickets with a round-trip fare of $100 or more. No basis is given for the $100 figure. We find some results to be sensitive to this threshold and to fares at the top of fare distribution, which is highly skewed to the right. [In our data, the 95th percentile economy fare is $1,989; the maximum economy fare is $10,515.] In this paper, we rule out tickets in the bottom and top 5% of the fare per mile distribution, which is equivalent to selecting connecting tickets with a round-trip fare per mile flown from 2.3 cents to 20.3 cents.

Fare effects from the type of ticket are interpreted holding constant the sum of the estimated carrier effects (holding constant for example, in our model, the identity of the carriers operating the trans-Atlantic flights in the tickets).

[33] In models in the prior literature, the dependent variable is the natural logarithm of the average price paid at the itinerary level. Some authors report doing a 'passenger-weighted least squares' estimation to correct for the heteroskedasticity introduced by the use of average prices. They provide no details on the weights applied. When the dependent variable is the natural logarithm of the average price, the correct weight is not apparent analytically.

[34] Business tickets (tickets with fare class C and D coupons) represent in our data less than 4% of tickets sold to trans-Atlantic connecting passengers, and we observe on average only 0.4 sampled business passengers per route in a year-quarter. These are too few data to reliably infer about connecting business travel, which differs significantly in service from economy travel. In addition, the fare distribution of business tickets is largely bi-modal. Whereas 5% of connecting economy tickets have a round-trip fare less than $230 (greater than $2,000, respectively), 14% (76%, respectively) of business tickets do. This distribution of business fares requires special econometrics treatment if these fares are included in the data, unless the polarity in fares can be effectively controlled for -- perhaps by including in the model control variables for whether a business ticket is the result of an upgrade, which may explain the cheap business fares in the data. Such control data are not publicly available. Models in the literature include no special treatment of the fare distribution of business tickets. They also generally include no controls for business tickets. [Brueckner (2003) computes an average itinerary-level fare across economy and business tickets and includes as a control variable the share of tickets in an itinerary that are business tickets. That variable is highly significant in his results, with a t-statistic well over 100, highlighting the relevance of the issue.]

Lastly, our model includes route-year-quarter fixed effects that control for all factors, such as the level of competition and demographics, that are invariant to a specific route at a specific time --- and not simply, as in models in the literature, across all routes at a specific time or over time in a specific route. Our model thus controls for the same factors controlled for in the literature, but also for all additional factors specific to a route in a year-quarter. This allows us to more accurately measure differences in fares across types of tickets.[35]

Results are listed in Table 4. We estimate that online fares are from 3.3% to 7.6% lower than interline fares, all else equal. We find that ATI and non-ATI fares are higher on average than online fares and, depending upon the alliance, from 0.5% to 2.1% lower than interline fares. Importantly, we find that within each of the SkyTeam and Star alliances ATI fares are no lower than non-ATI fares, all else equal. Within SkyTeam, ATI fares are actually 0.3% higher than non-ATI fares. Within Star, ATI fares are 0.8% higher than non-ATI fares. These differences are not statistically significant (that is, different from zero) at standard confidence levels. These findings show that immunized arrangements in SkyTeam and Star do not reduce fares below those sold under non-immunized arrangements in these alliances. This evidence is consistent with published work by Bilotkach (2005, 2007) and it significantly undermines the claim that antitrust immunity is necessary to the accomplishment of pricing efficiencies in airline alliances.

7. Exemptions to Antitrust Immunity Grants

The harm as a result of antitrust immunity grants to international alliances is to customers in trans-Atlantic non-stop overlaps. To preserve competition in non-stop overlaps, DOT has at times carved them out (that is, excluded them) from immunity grants, meaning that the alliance carriers had to remain independent competitors in their non-stop overlaps. For example, when DOT granted immunity to the United-Lufthansa alliance in 1996, it carved-out the two non-stop overlaps between their major hubs (Frankfurt-Chicago, Frankfurt-Washington, D.C). DOT also carved-out two non-stop overlaps in the Delta-Air France-Al Italia agreement in 2002 (Atlanta-Paris, Cincinnati-Paris) and four non-stop overlaps when Continental joined the Star alliance in late 2009 (New York City - Stockholm, Lisbon, Geneva, and Copenhagen).

To understand how a carve-out works, consider Figure 1. If DOT grants antitrust immunity to the two airlines and carves out route H-K, then the carriers may not collude on fares to 'local' passengers in route H-K, who are passengers who have cities H and K for origin and destination and fly non-stop between H and K, as long as these passengers buy their ticket at a U.S.-point-of-sale. The carriers may collude on fares to these local passengers at non-U.S.-point-of-sales because DOT may only carve-out U.S.-point-of-sales. The carriers may also collude on fares to all other passengers in their combined networks, including fares to A-K, H-D and A-D

[35] Results in the literature are affected by these econometric issues. For example, using 1999 quarter three data, Brueckner (2003) finds that immunity by itself delivers this benefit, whereas Bilotkach (2007) finds that it does not using a similar methodology but with different control variables and focusing on economy-class tickets.

passengers who use H-K flights as a part of their travel itinerary.[36] Carve-outs thus narrowly seek to preserve competition at U.S.-point-of-sales in trans-Atlantic non-stop overlaps.

Carve-outs are controversial. Applicants make two claims against carve-outs. First, they assert that their ability to deliver benefits to connecting passengers is inextricably linked to their ability to jointly coordinate and add capacity in trans-Atlantic routes between their major hubs, which typically are non-stop overlaps.[37] As noted by DOT in the 2005 SkyTeam proceeding, the formation of an alliance provides incentives to increase capacity (see Section 6.1). This expansion is evident on routes within alliances that are not immunized. For example, since 1996, United and Lufthansa have increased seat capacity by 75% in Chicago-Frankfurt and 105% in Washington-Frankfurt, even though these routes were carved-out of their immunity grant. Applicants have provided no evidence in their DOT filings that antitrust immunity would lead them to add capacity in carved-out routes beyond additions that flow from the formation of an alliance.[38]

Second, Applicants argue that carve-outs "impose cost and other inefficiencies because they force the affected carriers to make potentially substantial commercial and administrative resource expenditures that they otherwise would not incur in order to serve 'carved-out' passengers on an individual-carrier basis."[39] This argument fails to note that airlines operate highly sophisticated yield management systems that manage myriads of pricing rules to allocate seats on flights to passengers across many alliance arrangements that encompass varying sets of routes. Consider for instance the Star alliance. It has over twenty member carriers who operate without immunity and provide joint services such as code-sharing, coordinated reservations, baggage transfers, and frequent flyer reciprocity. Within this group, there is a sub-group of ten airlines that have antitrust immunity and coordinate pricing, scheduling and other activities on

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[36] For example, in Appendix A of DOT Order 2009-7-10, relating to the 2009 Star alliance agreement, DOT establishes the following carve-out limitations on immunity: "The foregoing grant of antitrust immunity shall not extend to pricing, inventory or yield management coordination, pooling of revenues, or the provision by one party to the other of more information concerning current or prospective fares or seat availability that it makes available to airlines and travel agents generally, with respect to (i) local U.S. point of sale passengers flying nonstop between New York and Copenhagen, New York and Geneva, New York and Lisbon ,and New York and Stockholm; …"

[37] Under the 2010 Horizontal Merger Guidelines, the antitrust agencies in their prosecutorial discretion will consider efficiencies not strictly in the relevant market, but so inextricably linked with it that a remedy could not feasibly eliminate the anticompetitive effect in the relevant market without sacrificing the efficiencies in the other market(s).

[38] Applicants have also argued that with antitrust immunity they are able to coordinate on the timing of their flights, to the benefit of consumers. In their 2009 filings at DOT (see [PUBLIC] Joint Applicants Supplemental Comments DOT-OST-2008-0252 at p.16), oneworld Applicants cite the experience of American and Swiss in 2004. Both offered one non-stop flight per day between JFK and Zurich at almost the same peak time. After they obtained antitrust immunity, American agreed to move its flight to 9 p.m., a time that was less desirable for local passengers but was more convenient for passengers seeking to connect through Zurich. Applicants claim that, although the profitability of the American flight fell, traffic increased. They further note that when the alliance began to fall apart, American moved its JFK-Zurich flight back to the peak time, hurting traffic. This story is incomplete, however. After American moved its flight back to the time preferred by more passengers, Swiss independently added a 9 p m. flight at JFK to accommodate late evening demand from passengers seeking to connect through Zurich, meaning there were now three flights between JFK and Zurich rather than two. This calls into question the claim that revenue sharing on the local traffic was necessary for the addition of the later JFK flight and it serves to highlight that competition leads to capacity increases that benefit consumers.

[39] DOT-OST-2008-0234-0001 at 87.

certain routes. Within this sub-group, four airlines have been granted antitrust immunity to form an additional joint venture across yet a different subset of routes. These alliances within alliances not only require carriers to incur commercial and administrative expenditures in order to serve passengers on an agreement-specific basis, but may further create diverging interests amongst the alliance carriers.

That having been said, there are insufficient data to inform about the fare effects of carve-outs. Only four trans-Atlantic routes were carved-out by DOT prior to 2009 quarter four, and different subsets of local passengers, which cannot be separately identified in DOT's publicly available fare data, were carved-out across these routes.[40] DOT may only carve-out ticket sales at U.S. points of sale. The E.U. in its own review process of international alliances has yet to impose corresponding carve-outs at point of sales in Europe. On a given trans-Atlantic flight, current carve-out regulations thus allow airlines to collude on fares offered at European point-of-sales, but not on fares offered at U.S. point-of-sales. This may affect the effectiveness of carve-outs at preserving competitive prices in trans-Atlantic overlaps.

Noting skepticism about the efficacy of carve-outs, DOT has highlighted its belief that "where an integrated 'metal-neutral' joint venture is present, carve outs inhibit the realization of efficiencies and thereby the public benefits resulting from those efficiencies."[41] The thinking presumably is that metal neutral arrangements more effectively align alliance participants' incentives. Accordingly, exercising its discretion as the decision-maker in balancing estimated harm and efficiencies, DOT has not required carve-outs when Applicants have proposed to form with antitrust immunity a JV with metal-neutral revenue arrangements.

Lastly, when nonstop overlaps have had an endpoint at a slot-controlled airport, DOT has at times requested that Applicants divest slots at that airport in order to facilitate entry. Many of the nonstop overlaps between oneworld members have as an endpoint London Heathrow, which is a slot-controlled airport. DOT long required that oneworld members divest slots at Heathrow as a condition to a grant of antitrust immunity. In 2010, oneworld Applicants agreed to divest four slots at Heathrow, and they were subsequently granted antitrust immunity by DOT.[42]

8. Public Interest Considerations

Under 49 U.S.C. §§41308(b), the U.S. Congress has given DOT the authority to exempt airlines from the antitrust laws to the extent necessary to allow a proposed transaction to proceed, provided that the exemption is required by the public interest (see Section 3).

DOT has long stated that "U.S. foreign policy goals are a key element of these [public] benefits"[43], and many of DOT's grants of antitrust immunity to international alliances have been used in large part to further foreign policy goals, such as Open Skies agreements. For instance, in conjunction with the U.S.-Netherlands Open Skies agreement in 1993, DOT granted immunity to

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[40] The carve-outs in the 1996 United-Lufthansa grant encompassed all local passengers in the overlap routes. The carve-outs in the 2002 SkyTeam grant applied only to 'time-sensitive' passengers in the overlap routes.

[41] DOT Order 2009-7-10 at 20.

[42] DOT Order 2010-7-8.

[43] DOT Order 2010-9-4 at 4.

the alliance between Northwest and KLM explaining that "the grant of immunity should promote competition by furthering our efforts to obtain less restrictive aviation agreements with other European countries."[44] Grants of antitrust immunity presumably provided assurances to policy-makers that decisions within an alliance would be made in the joint interest of all participating carriers, including the smaller country carriers in the alliance. Likewise, DOT granted antitrust immunity to alliances between United and Lufthansa in 1996 and Delta, Air France and Al Italia in 2002 in conjunction with Open Skies agreements between the U.S. and these European airlines' governments.

Other factors have also been determinant in recent years. In the SkyTeam proceedings in 2005, DOT tentatively concluded that a grant of antitrust immunity was not required by the public interest in large part because "the carriers had not shown they could effectively reconcile" differences in business practices in order to achieve a common bottom line within the alliance.[45] In the 2009 Star proceedings, with the airline industry mired in the global economic recession, DOT stated that antitrust immunity "will help Continental and the other participants manage cyclical changes in the industry to preserve existing services, with a view towards increasing capacity and enhancing competition between carriers and alliances."[46] DOT also affirmed in that matter that there was "a sufficient risk of antitrust exposure to accept the Joint Applicants' statement that they would not proceed with the joint venture agreements without antitrust immunity."[47] In the 2010 oneworld proceedings, DOT highlighted the importance of strong inter-alliance competition, stating that oneworld's proposed antitrust immunized JV "would provide a third global network that can better discipline the fares and services offered by the Star and SkyTeam alliances", adding that "[T]his too is a public benefit."[48]

9. Conclusion

Open Skies agreements have removed significant barriers to airlines' ability to offer trans-Atlantic service between the U.S. and the E.U. At the same time, almost all of the major airlines offering trans-Atlantic flights have joined one of three international alliances, and large sets of airlines in these alliances have been granted antitrust immunity, significantly decreasing the number of competitors over the North Atlantic. Rather than being an exceptional event designed to induce positive regulatory changes, antitrust immunity has become virtually the norm for participants in all major international alliances.

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[44] DOT Order 93-1-11 at 11-2. Similarly, in October 2010, DOT tentatively granted antitrust immunity to JV proposals by (i) Star alliance members All Nippon Airways, United/Continental, and (ii) oneworld members American and Japan Airlines International, conditional upon the U.S.-Japan Open Skies aviation agreement being signed (see DOT Order 2010-10-4 at 1). After the agreement was signed, DOT finalized its grants of immunity.

[45] DOT Order 2008-4-17 at 2. In 2010, DOT tentatively denied a grant of antitrust immunity to Delta Airlines and the Virgin Blue Group in part because "the applicants have virtually no experience as commercial partners and employ business processes that they admit are not compatible." (see DOT Order 2010-9-4 at 2)

[46] DOT Order 2009-7-10 in Docket OST-2008-0234 at 16.

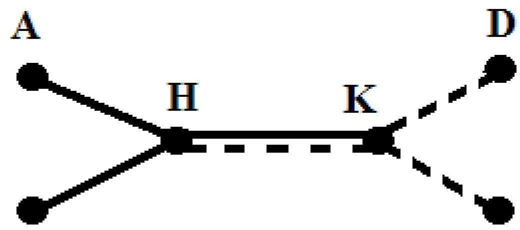
[47] DOT Order 2009-7-10 in Docket OST-2008-0234 at 14.

[48] DOT Order 2010-2-8 in Docket OST-2008-0252 at 32.

In this article, using data for the period 2005-2009, we have provided newer findings on the effects of antitrust immunity grants on the fares paid by trans-Atlantic passengers. The data support the presumption that the loss of competition in trans-Atlantic routes with non-stop service as a result of antitrust immunity grants adversely affects consumers. The data also show that antitrust immunity is not reasonably necessary for alliance participants to deliver pricing efficiencies to connecting passengers. This evidence does not support broad regulatory exemptions from the U.S. antitrust laws for international airline alliances.

More generally, in recent DOT airline alliance proceedings, including proceedings relating to trans-Pacific alliances, carriers have stressed the need for regulators to 'balance' the competitive playing field between the three major international alliances. Such talk highlights that regulators will continue, in spite of Open Skies agreements, to be called upon to determine how much competition will be preserved in international aviation. Given the clear benefits of competition in terms of lower prices for consumers, regulators should be wary of calls to further decrease competition in pursuit of increasingly uncertain benefits.

Figure 1.



Cities A, H are in the U.S. **Cities K, D are in the E.U.**

Airline 1 flies routes shown as solid lines, using city H as a hub.
Airline 2 flies routes shown as dotted lines, using city K as a hub.

Cities A, D are so-called *behind/beyond* cities because airlines offer no non-stop trans-Atlantic flights at these cities.

Table 1.
Main Relevant Dates for SkyTeam, Star, and oneworld alliances.

SkyTeam (13 member airlines as of 2010). http://www.skyteam.com/news/facts/index.html	
1993	Northwest and KLM obtain antitrust immunity for their code-share alliance.
2000	Aeromexico, Air France, Delta and Korean Air form SkyTeam.
2002	Air France, Delta, Korean Air, Al Italia, Czech Airlines obtain a common grant of antitrust immunity within SkyTeam.
2004	Air France and KLM merge. Continental Airlines, Northwest, and KLM become full members of SkyTeam.
2008	Air France/KLM, Delta, Northwest, Al Italia, Czech Airlines obtain a common grant of antitrust immunity in SkyTeam. Air France/KLM, Delta, Northwest get approval to form an additional immunized 3-way JV within SkyTeam. Delta and Northwest merge.
Star (28 member airlines as of 2010). http://www.staralliance.com/en/about/airlines/	
1997	Air Canada, Lufthansa, SAS, Thai Airways International and United launch Star. United and Lufthansa obtain antitrust immunity within Star.
2004	US Airways joins Star as a non-immunized participant.
2009	Continental joins Star and obtains antitrust immunity with nine other already commonly immunized Star members. Air Canada, Continental, Lufthansa and United get approval to form an additional immunized 4-way JV within Star.
2010	Continental and United merge.
oneworld (11 members as of 2010). http://www.oneworld.com/ow/news-and-information	
1999	American, British Airways, Cathay Pacific, Canadian Airlines, and Qantas launch oneworld.
2002	American and Finnair obtain antitrust immunity within oneworld.
2010	American, British Airways, Finnair, Iberia, and Royal Jordanian obtain common antitrust immunity within oneworld. American, British Airways, and Iberia also get approval to form an additional immunized 3-way JV within oneworld.

Table 2.
Descriptive Sample Statistics for Data on Non-Stop Overlaps

	Mean	Standard deviation	Minimum	Maximum
One-way fare	$438	$96	$184	$720
Number of sampled passengers	958	992	88	7,682
Mileage of route	4,180	563	2,885	5,788
Population	0.06	0.02	0.02	0.15
Number of independent non-stop competitors	1.78	0.92	1	6
Number of additional ATI carriers	0.10	0.31	0	2

Average one-way fare when # of independent nonstop competitors is:	Mean	Standard deviation	Minimum	Maximum	Number of observations
1	$465	$94	$243	$720	944
2	$423	$92	$184	$705	650
3	$403	$88	$230	$655	268
4	$370	$76	$236	$579	76
5 or mote	$415	$78	$275	$578	27

Data: DOT DB1B data for 2005-2010 quarterly. 1,965 route-year-quarter observations.
Routes between twenty largest cities in each of the U.S. and the E.U over the period 2005-2010. U.S. cities: Atlanta, Baltimore, Boston, Charlotte, Chicago, Cincinnati, Dallas, Denver, Detroit, New York City, Houston, Las Vegas, Los Angeles, Miami, Minneapolis, Orlando, Philadelphia, San Francisco, Seattle, Washington DC. European cities: Amsterdam, Athens, Barcelona, Brussels, Copenhagen, Dublin, Dusseldorf, Frankfurt, London, Lisbon, Madrid, Manchester, Milan, Munich, Paris, Rome, Shannon, Stockholm, Vienna, Zurich.

Table 3.
Price Effects from Differences in Non-stop Competition across Transatlantic Routes.
The Dependent Variable is Average One-Way Fare.

Explanatory Effects:	Estimate (Standard Error)	Explanatory Effects:	Estimate (Standard Error)
Effect of number of non-stop independent competitors:		**Effect from differences in number of non-stop independent competitors:**	
1	---	---	---
2	-$31.08* (6.99)	2 to 1	-$31.08*
3	-$61.95* (10.30)	3 to 2	-$30.87*
4	-$87.91* (11.43)	4 to 3	-$25.96*
5 or more	-$139.96* (13.00)		
Additional ATI competitor effect when the number of independent competitor equals:			
1	-$6.92 (14.97)	3	$29.24 (19.72)
2	-$12.98 (8.41)	4	$3.95 (9.63)
Other Controls			
log(Mileage)	281.25* (28.94)	Population	456.42* (131.96)
American Airlines	$12.47 (10.62)	Northwest Airlines (up to 2008q4)	-$0.12 (14.36)
Continental Airlines	$4.52 (10.29)	Delta/Northwest Airlines (ex post 2009q1)	-$2.89 (7.86)
Delta Airlines (up to 2008q4)	$27.27 (8.94)	United Airlines	$42.60 (9.93)
Intercept	-1,809.95* (238.65)	US Airways	---

Data: DOT DB1B, 2005-2010 quarterly. 115 routes; 1,965 route-year-quarter observations.
R^2 = 0.84. Passenger-weighted estimation. Clustered robust standard errors (route clusters).
* indicates statistical significance at the 99% confidence level.
Results for year-quarter fixed effects not reported.

Table 4.
Price Differences Across Connecting Tickets based upon the Type of Ticket.
The Dependent Variable is log(Individual Ticket Fare)

Explanatory Effects: Alliance	Ticket type	Estimate	Standard error	Estimated fare differences relative to interline[1]	Within each alliance, estimated fare differences relative to non-ATI[2]
oneworld alliance	Online	-0.034	0.006*	-3.3%*	-2.1%*
	non-ATI	-0.013	0.005*	-1.3%*	---
	ATI[3]	0.017	0.015	+1.7%*	+3.0%
SkyTeam alliance	Online	-0.053	0.004*	-5.2%*	-3.1%*
	non-ATI	-0.021	0.006*	-2.1%*	---
	ATI	-0.018	0.004*	-1.8%*	+0.3%
Star alliance	Online	-0.079	0.004*	-7.6%*	-6.4%*
	non-ATI	-0.013	0.005*	-1.3%*	---
	ATI	-0.005	0.005	-0.5%	+0.8%
Interline ticket		---	---	---	
Other Controls					
Log(Mileage of ticket)		0.052	0.018*		
# of coupons in ticket		-0.011	0.002*		
Route-year-quarter fixed effects			Yes		
Carrier effects			Yes		

R^2 = 0.42. The data include 1,933,166 individual round-trip economy tickets.
Descriptive statistics: Mean round-trip ticket fare is $941 (standard deviation is $349). Mean itinerary mileage is 10,248 (1,685). Mean number of coupons per ticket is 4.35 (0.83).
Ticket breakdown: Oneworld: 85,829 non-ATI, 6,250 ATI, 142,485 online. SkyTeam: 88,771 non-ATI, 196,208 ATI, 617,543 online. Star: 88,422 non-ATI, 212,566 ATI, 315,693 online. Interline:179,399.

Data: DOT DB1B, 2005-2010 quarterly. Clustered robust standard errors (route clusters).
* Indicates statistical significance at a 99% confidence level.
[1] Percentage effects calculated as exp(coef) - 1
[2] Percentage effects calculated as exp(coef – non-ATI coef) within each alliance.
[3] Only 0.3% of all tickets in the data are ATI oneworld tickets.
Results for carrier effects and route-year-quarter fixed effects not reported.

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