Competitive Effects of International Airlines Cooperation

July 17, 2017

Forthcoming Paper: Competitive Effects of International Airline Cooperation

- Joint with Robert Calzaretta Jr and Yair Eilat.

- Forthcoming in Journal of Competition Law And Economics.

- Principle finding is that international ATIs and, especially, JVs benefit consumers:

  - We find that international ATIs and JVs result in substantial fare reductions on <u>connecting itineraries</u>.

  - We find that international ATIs and JVs do not result in fare increases on <u>nonstop routes</u> on which multiple members of the same ATI or JV overlap.

  - We find that the creation of ATIs and JVs led to an increase in the number of <u>segment passengers</u> on routes on which the ATI/JV members operated.

Overview of Study

- We examine the impact of increasing levels of coordination as international airline cooperation has evolved from code-sharing to simple alliances, to antitrust immunized arrangements ("ATIs"), to the more recent metal neutral JVs.

- We constructed a comprehensive and detailed panel dataset of international travel to and from the U.S., spanning 1998–2015 and used it to conduct several studies to analyze the fare and output effects from ATIs and JVs on nonstop and connecting routes.

- Our results indicate that ATIs and JVs have been beneficial to international passengers.

Definitions of Levels of Cooperation

Alliance: Airlines are considered in an alliance when they are members or affiliates of one of the same major alliance groups: Atlantic Excellence, oneworld, Skyteam, Star, or Wings.

- *Sources*: *OAG, alliance websites, historical news sources and press releases.*

ATI: Airlines are considered in an ATI when they operate on routes after the U.S. DOT approved their application for antitrust immunity (excluding carved out routes) and there is an Open Skies agreement between the US and the foreign country.

- *Sources: U.S. DOT; U.S. Department of State.*

Joint Venture: Airlines are considered in a Joint Venture if they are in an ATI <u>and</u> companies share revenue or profits. Only Joint Ventures involving a U.S. carrier are considered.

- *Sources: U.S. DOT; company resources; various news sources.*

Connecting Passengers Composition

Fraction of Connecting Transoceanic Passengers by Year and Type

Legend: Pure Interline, Pure Codeshare, Alliance, ATI, JV, Online
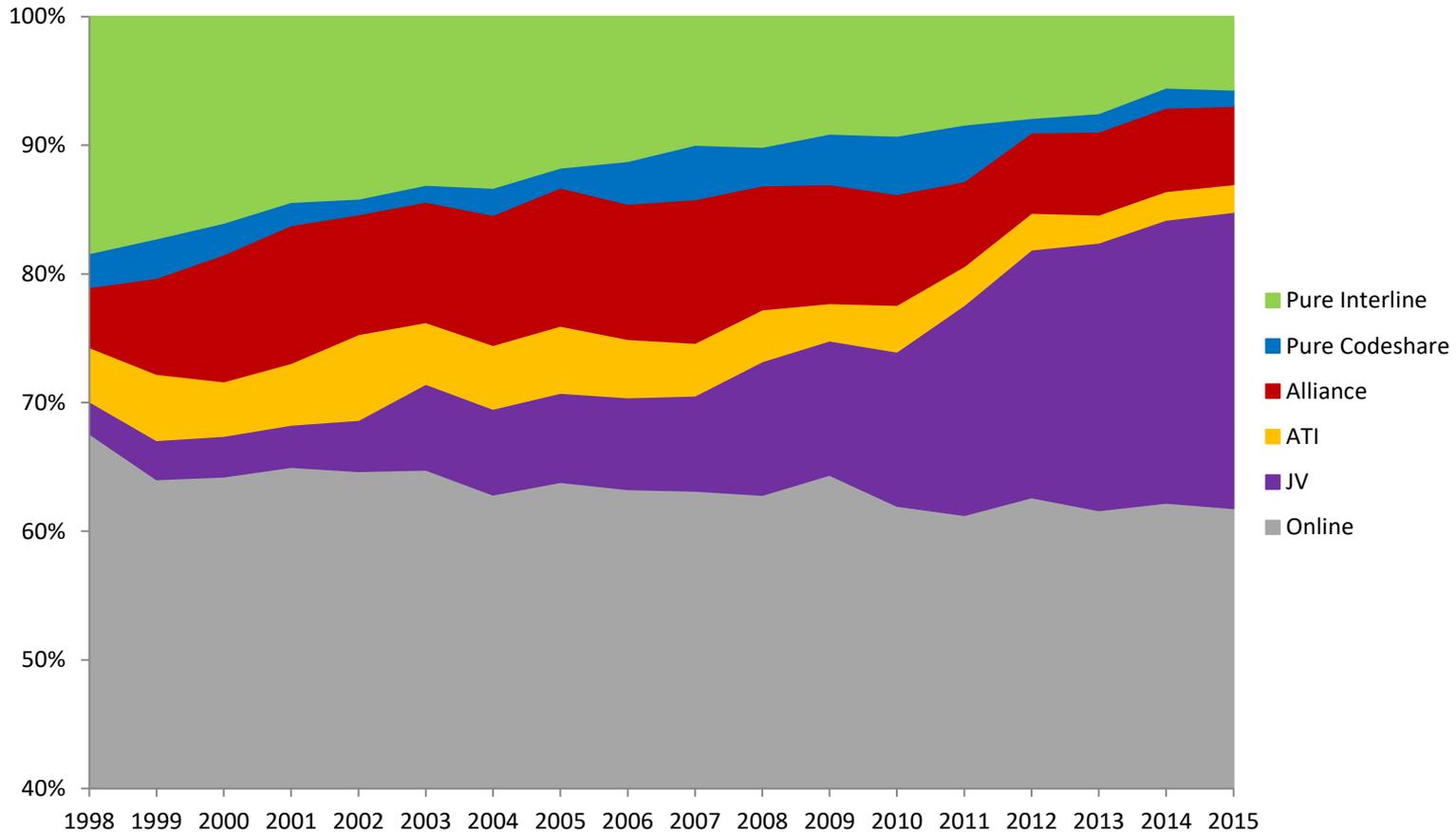
Sources: International O&D; U.S. DOT; company documents.

Connecting Fares: Introduction

- We examine the impact on fares of various degrees of cooperation among carriers in the service of a given connecting itinerary.

- We specify a regression model that compares connecting fares that involve multiple alliance, ATI, or JV partners with fares on itineraries between the same city pairs that are pure interline or simple codeshare.

- The comparison is done both cross-sectionally (*i.e.*, by comparing different itineraries on the same route at the same point in time), and across time periods (*i.e.*, by comparing different itineraries on the same route at different points in time, controlling for regional fare trends and other itinerary attributes).

Connecting Fares: Methodology

Itinerary level analysis: The regression compares different connecting itineraries involving different degrees of cooperation among the connecting carriers.

The regression controls for non-time varying characteristics of a route (via route fixed effects), common factors that affect all routes (via time and season fixed effects), and carrier specific effects (via carrier fixed effects). The model is estimated as:

$$Log(fare) = \beta_0 + \beta_1(Online) + \beta_2(Alliance) + \beta_3(ATI) + \beta_4(JV) +$$
$$\gamma_1(Distance) + \gamma_2 Log(Distance) + \gamma_3(US\ POS) + \gamma_4(Foreign\ connnect) +$$
$$\gamma_5(Coupons) + O\&D\ City\text{-}pair\text{-}Quarter\ Fixed\ Effects + Year\text{-}Quarter\text{-}Region\ Fixed\ Effects +$$
Carrier Fixed Effects + Fare class Fixed Effects

Cooperation dummy variables are defined as following:
- o Online: on when all segments of the itinerary are marketed and operated by a single carrier
- o JV: on when all segments of the itinerary are marketed and operated by different members of the same JV.
- o ATI: on when all segments of the itinerary are marketed and operated by different members of the same ATI (and JV is off).
- o Alliance: on when all segments of the itinerary are marketed and operated by different members of the same alliance (and both ATI and JV are off).

Connecting Fares: Results

- Substantial fare reductions in connecting itineraries involving airline cooperation.

- Specifically:

  - ATIs (that do not involve JVs) resulted in reductions in connecting fares relative to interline fares and slightly larger than the reduction from alliances.

  - JVs resulted in fare reductions in connecting fares substantially larger than alliances and ATIs, and comparable to online itineraries.

Connecting Fares: Results

VARIABLES	Baseline
Online	-8.17%***
Alliance	-4.51%***
ATI	-5.62%***
JV	-7.98%***
Coupons	-7.05%***
US POS	1.19%***
Foreign Connection	2.99%***
Distance	0.00%***
Log(Distance)	-6.81%***
Observations	12,308,118
R-squared	0.736
Adj. R2:	0.730

Statisitical significance of underlying
coefficients: *** p<0.001, ** p<0.01, * p<0.05

Nonstop Fares: Introduction

- We analyze whether the formation of an ATI or JV on a route affects fares on the route, holding constant the number of competitors and controlling for regional fare trends.

- We specify regression models that explain *changes* in nonstop fares after a route goes from not having two members of the same ATI/JV to having two members of the same ATI/JV, or vice versa.

  - o We control for the number of carriers on a route, whether an LCC operates on the route, who the carriers operating on the route are, fare class, and regional fare trends.

  - o We run separate regressions to measure the fare effects of all ATIs (including, but not limited to JVs) and only JVs.

Nonstop Fares: Methodology

- Route level analysis: Unlike the connecting analysis which compares connecting <u>itineraries</u> involving different levels of cooperation among the connecting carriers, the non-stop analysis compares <u>routes</u> with different number of nonstop competitors.
  - In this way, we study the effects of different market structures (including the presence of ATI or JV) on market prices.

- In particular, we run a "panel" (or "diffs-in-diffs") regression controlling for stable variation across routes (via season-specific route fixed effects), and changes over time that affect all routes in a region (via region-specific time fixed effects), as well as carrier and fare class. The model is estimated as:

$$Log(Fare) = \beta_0 + \beta_1(\text{ATI or JV}) + \beta_2(LCC) + \beta_3(2 \text{ or more carriers})$$
$$+ \beta_4(\text{Three or more carriers}) + \beta_5(\text{Four or more carriers}) + \text{Route-Quarter Fixed Effects} +$$
$$\text{Year-Quarter-Region Fixed Effects} + \text{Carrier Fixed Effects} + \text{Fare Class Fixed Effects}$$

- The ATI or JV dummies are the main variables of interest. They are "turned on" when two (or more) carriers on the route-quarter are members of the same ATI or JV.
  - We run a separate set of regressions for all ATIs (including JVs) and just JVs.

11

Nonstop Fares: Results

- No fare increases on nonstop routes on which multiple members of the same ATI or JV overlap.

  - No fare increases following ATI or JV on routes with overlapping ATI/JV members.

  - A reduction in the number of competitors operating on a route (from 3 to 2, or 2 to 1) leads to a small, statistically significant fare increase (4-5 percent).

  - The creation of ATIs and JVs led to substantially more entry than exit of ATI/JV members into segments between the countries of the ATI/JV partners, and thus no evidence of anti-competitive effects either via higher fares or reductions in the number of competitors from ATI/JV formation.

Nonstop Fares: Results

VARIABLES	Baseline
ATI on Route	2.17%
JV on Route	-1.13%
Oneway Itinerary	
LCC on route	-9.61%***
Adding 2nd Carrier	-4.63%***
Adding 3rd Carrier	-4.21%**
Adding 4th Carrier	-0.86%
Observations	126,170
R-squared	0.924
Adj. R2:	0.922

Statisitical significance of underlying coefficients: *** $p<0.001$, ** $p<0.01$, * $p<0.05$

Nonstop Fares: Robustness Results

- Conclusions are very robust, including to the of the following modifications:
    - Running the regression unweighted
    - Changing the threshold for number of quarterly nonstop flights needed to be counted as operating on a route to 20 (Regressions 4) or to 60
    - Not limiting the regressions to routes with 4 or fewer carriers
    - Running the regression only for coach fares
    - Changing the start date to 2002 (post 9/11)
    - Replacing the marketing carrier fixed effects with operating carrier fixed effects

Segment Traffic: Introduction

- We analyze how the formation of ATIs or JVs impacted the number of segment passengers on affected routes.

  - Affected routes are routes between the U.S. and the country of the foreign ATI or JV member on which at least one of the ATI or JV members operated within the "time window." For example, after oneworld started operating, we analyze routes between the U.S. and the U.K. on which AA and/or BA operated.

  - We look at time windows of one, two, and three years around each ATI/JV events.

  - Segment traffic includes both nonstop and flow traffic.

Segment Traffic: Methodology

The analysis involves three steps:

<u>Step 1</u>: Identifying events in which ATIs and JVs were formed between a U.S. and a foreign carrier.

<u>Step 2</u>: Identifying the routes potentially affected by these events. These are routes between the U.S. and the country of the foreign ATI or JV member on which at least one of the ATI or JV members operated within a certain "time window." (For example, after AA and BA entered into a JV, we analyze routes between the U.S. and the U.K. on which AA and/or BA operated within the time window).

- We look at three time windows of 1, 2, and 3 years before/after each event.

- The analysis is done separately for all ATI events (including JVs), and for JV only events.

<u>Step 3</u>: Calculating the change in passengers between the beginning and the end of the time window (in similar quarters).

Segment Traffic: Results

- ## We find that the creation of ATIs and JVs led to an increase in the number of segment passengers on routes on which the ATI/JV members operated

  - o Such increases demonstrate the net procompetitive, pro-consumer effects of ATI/JVs.

	ATI Events		JV Events	
Window Length	Change in ATI Member Traffic	Change in non-ATI Member Traffic	Change in JV Member Traffic	Change in non-JV Member Traffic
1 Year	3.7%	2.0%	2.3%	2.6%
2 Year	8.8%	7.5%	11.6%	2.8%

Two Questions Often Asked

- Question 1: Have the benefits from antitrust immunity declined over time, perhaps because airlines have learned how to solve double marginalization problems via codesharing?

- Some responses:

  - The most recent JV, oneworld, shows *bigger* connecting fare reductions and output expansions.

  - The empirical analysis of ATI/JV vs. interline/codeshare is becoming harder over time as there are fewer and fewer simple interline/codeshare itineraries. This affects comparisons of results over time, as the control set is dwindling.

  - In contrast, the relative comparison of alliance vs. ATI vs. JV has been more stable over time. Most notably, the result that JVs generate lower connecting fares than alliances or ATIs, performing similarly to online itineraries, has been quite stable.

Two Questions Often Asked

- Question 2: Is the study too narrow, in the sense that it does not deal with issues of foreclosure or of inter-system competition?

- Some responses:

    - Ultimately competition has to occur on routes. Given the findings that nonstop fares do not go up after ATI/JV is granted, while connecting fares go down, hard to see where the harm could be.

    - The output effects are particularly telling – more passengers on the routes at the heart of ATI/JV activity demonstrate overall pro-competitive outcomes.