Economics of International Airline Joint Ventures

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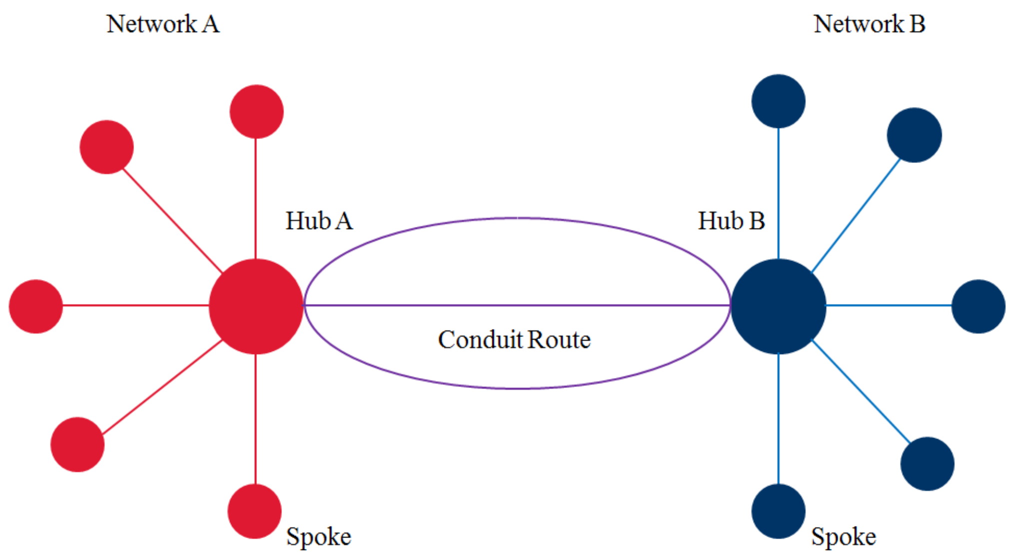
International Airline Joint Ventures Connect Complementary Networks



- No individual airline economically can serve every global destination to which its passengers want to travel relying solely on its own network resources
  - Cabotage laws prevent foreign carriers from operating service between domestic endpoints
  - Foreign ownership restrictions limit foreign equity stakes in domestic carriers
- Consequently, “Behind” (from Network A to Hub A) and “Beyond” (from Hub B to Network B) travel often requires travel on multiple carriers
- To provide seamless global service, carriers have deepened alliances and joint ventures

Without Cooperation Between Carriers, Incentives Will Be Misaligned, Leading to Inefficiencies

- Airlines offer complementary inputs (flight segments) for a product that a customer purchases (an international itinerary)
  - Each input (flight segment) adds value to the ultimate product
  - Without each flight segment, the ultimate product would not exist

- Without cooperation, the incentives of carriers providing service on international itineraries may be misaligned—each carrier will seek to maximize the benefits to itself without regard to carriers operating other segments on an itinerary
  - Carriers will have an incentive to price inefficiently (too high)—pricing will not reflect potential for decreased demand on complementary flight segments
  - Carriers will have an incentive to invest only in their own networks and systems and not in the combined network

“Metal Neutral” Joint Ventures Most Closely Align Incentives

- Metal neutrality is created when the partnering carriers pool and share either the revenue or profits from passengers traveling within a defined geographic scope, causing the cooperating carriers to be indifferent as to whose aircraft a particular alliance passenger chooses
- Consumers benefit from metal-neutral joint ventures because the cooperating carriers will each have the incentive and ability to consider the effects of their decisions on their combined networks
- Full alignment of partner carriers’ incentives creates maximum benefits for consumers:
  - Partner carriers can be expected to pool the network resources of the two carriers to offer potential passengers the most attractive offerings (both in terms of price and schedule)
  - Joint venture carriers offer the same (or nearly the same) degree of efficiency (and prices) as a single carrier

In addition to lower fares, joint ventures create additional non-price benefits

1. New routes/destinations
   – The introduction of new non-stop routes that would not have been economically viable on a stand-alone basis, but that can profitably be flown due to combined carrier flows, marketing, and sales

2. Improved flight schedules
   – The introduction of more frequencies on existing routes, especially between hubs, to support combined network connecting options
   – Up-gauging (larger aircraft) resulting in more seats due to stimulation of demand prompted by lower prices
   – Better time channel coverage due to eliminating wingtip-to-wingtip flying and offering multiple departure/arrival times to serve varied customer preferences
   – More on-line, connecting, and codeshare options because partners have greater incentives to open larger portions of their networks and inventory to each other
   – More optimal itineraries for customers because partners are agnostic about whose metal the passengers are using for each segment

3. Higher output
   – Higher output is an indicator of lower fares and higher quality, which lead to increased demand

New Flights:
Delta/Air France/KLM/Alitalia Added Many Non-Stop Routes and Frequencies

Destination	Origin	2005	2006	2007	2008	2009	2010	2011
Amsterdam	Atlanta	2.0	2.0	2.0	2.0	1.7	3.0	3.0
	Los Angeles	1.0	1.0	1.7	1.0	1.0	1.0	1.2
	Miami							0.6
	Seattle	1.0	1.0	1.0	1.0	1.0	1.4	2.0
Budapest	New York		0.7	0.7	0.7	0.9	1.0	0.9
Copenhagen	New York						1.0	1.0
Dublin	New York		0.5	1.0	1.0	1.0	1.0	1.3
Duesseldorf	Atlanta		1.0	1.0	0.8	1.0	1.0	1.0
London	Boston							2.0
	Miami							1.0
Malaga	New York				0.6	0.7	0.7	0.8
Milan	Miami	1.0	1.0	1.0			0.5	0.4
Paris	Boston	2.0	2.0	2.0	2.0	2.0	2.0	2.5
	Orlando							0.4
	Philadelphia	1.0	1.0	1.0	0.9	1.0	1.0	1.0
	Pittsburgh					0.7	0.7	1.0
	San Francisco	1.0	1.0	1.0	1.0	1.0	1.5	1.4
Pisa	New York			0.6	0.7	0.9	1.0	0.9
Rome	Detroit	1.0				1.0	1.0	1.0
Rome	Los Angeles				0.7		0.7	1.0
Stockholm	New York						1.0	1.0
Valencia	New York					0.6	0.6	0.6
Zurich	New York					1.0	1.0	1.0
Total Frequencies on Select Routes		**10.0**	**11.2**	**12.9**	**12.4**	**15.4**	**21.1**	**26.9**

Source: OAG data
Note: Figures are for July of each year. Routes shown have added frequencies between 2008 and 2011.

- Access to AF/KL's European network and Delta's US network increases combined flow traffic
- Creates incentives to offer new frequencies

New Flights:
Delta/Virgin Atlantic U.S. to UK Non-Stop Frequencies

Destination	Origin	2010	2011	2012	2013	2014	2015	2016
Belfast	Orlando						0.1	0.1
Edinburgh	New York							1.0
Glasgow	Orlando	0.3	0.3	0.3	0.3	0.3	0.4	0.5
London	Atlanta	2.0	2.6	2.6	3.0	3.0	4.0	4.0
	Boston	1.0	3.0	2.0	2.0	1.9	2.0	2.0
	Chicago	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Detroit	1.0	1.4	1.4	1.0	2.0	2.0	2.0
	Las Vegas	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Los Angeles	2.0	2.0	2.0	2.0	2.0	3.0	2.0
	Miami	1.0	2.0	1.0	1.0	1.0	1.0	1.0
	Minneapolis/St. Paul	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	New York	7.0	8.0	8.0	9.0	9.0	10.0	9.0
	Orlando	2.0	2.1	2.2	2.0	1.9	1.9	1.9
	Philadelphia						1.0	1.0
	Salt Lake City							1.0
	San Francisco	1.0	1.0	1.4	1.0	1.0	1.7	1.8
	Seattle					1.0	1.0	1.0
	Washington	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Manchester	Atlanta	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Las Vegas		0.3	0.3	0.3	0.3	0.3	0.3
	New York	1.0	1.0				1.0	1.0
	Orlando	1.2	1.6	1.5	1.6	1.5	1.7	1.7
Total Frequencies		**24.5**	**30.3**	**27.7**	**28.1**	**29.7**	**36.1**	**36.4**

Source: OAG data
Note: Figures are for July of each year.

- Access to Virgin's UK network and Delta's US network increases combined flow traffic
- Creates incentives to offer new frequencies
- Frequencies increased by 29 percent from 28 to 36

New Flights:
Non-Stop Frequencies Increased as a Result of the JV

DL/AF U.S. to Paris (CDG)

DL/AF/KL JV Drove an 18% Increase in Flights Between the U.S. and Paris Charles de Gaulle Airport

U.S. Airport	2009	2017
ATL	4.0	4.0
BOS	2.0	3.0
CVG	1.0	1.0
DTW	1.0	2.0
EWR	1.0	1.0
IAD	3.0	2.0
IAH	1.0	1.0
JFK	5.0	5.0
LAX	2.9	2.4
MIA	1.0	1.0
MSP	0.0	2.0
ORD	1.0	1.0
PHL	1.0	1.0
PIT	0.7	1.0
RDU	0.0	1.0
SEA	1.0	1.0
SFO	1.0	2.0
SLC	1.0	1.0
Total	27.5	32.4

DL/KL U.S. to Amsterdam (AMS)

DL/AF/KL JV Drove a 164% Increase in Flights Between the U.S. and Amsterdam Schiphol Airport

U.S. Airport	2009	2017
ATL	1.7	4.0
BOS	0.0	2.0
CVG	1.0	0.0
DFW	0.7	0.0
DTW	0.0	3.9
EWR	0.0	1.0
IAD	1.0	1.0
IAH	1.7	1.0
JFK	2.0	4.0
LAX	1.0	2.0
MSP	0.0	3.5
ORD	0.9	1.0
PDX	0.0	1.0
SEA	0.0	2.0
SFO	1.0	1.4
SLC	0.0	1.5
Total	11.1	29.2

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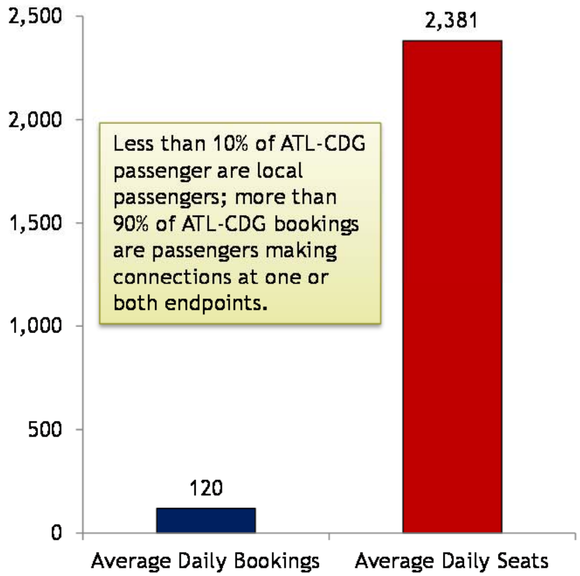
Improved Schedules:
Delta’s JV with Air France Results in Superior Service

Atlanta-Paris
Avg. Daily Seats vs. Avg. Daily Bookings



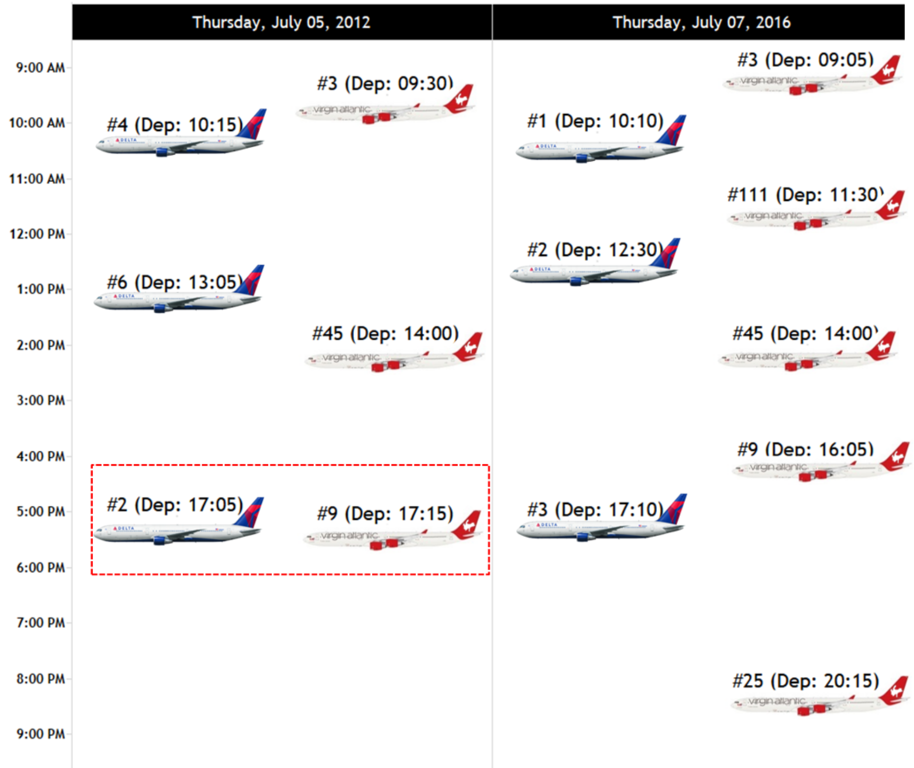
ATL-CDG Flight Schedule (Eastbound)

Hour	Air France	Delta
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		

Sources: OAG, MIDT.
Notes: Booking and seat figures are in either direction. OAG data is for full year 2015, MIDT bookings are full year 2015. Schedule is for Wednesday, June 1, 2016.

- Local passengers traveling on conduit routes benefit greatly from the JV because of the high frequency of service that the partner carriers are incentivized to provide
- As a consequence of service for flow traffic, the frequency of non-stop service far exceeds what local demand would otherwise warrant
- The increase in capacity available to local passengers can place downward pressure on prices for those routes

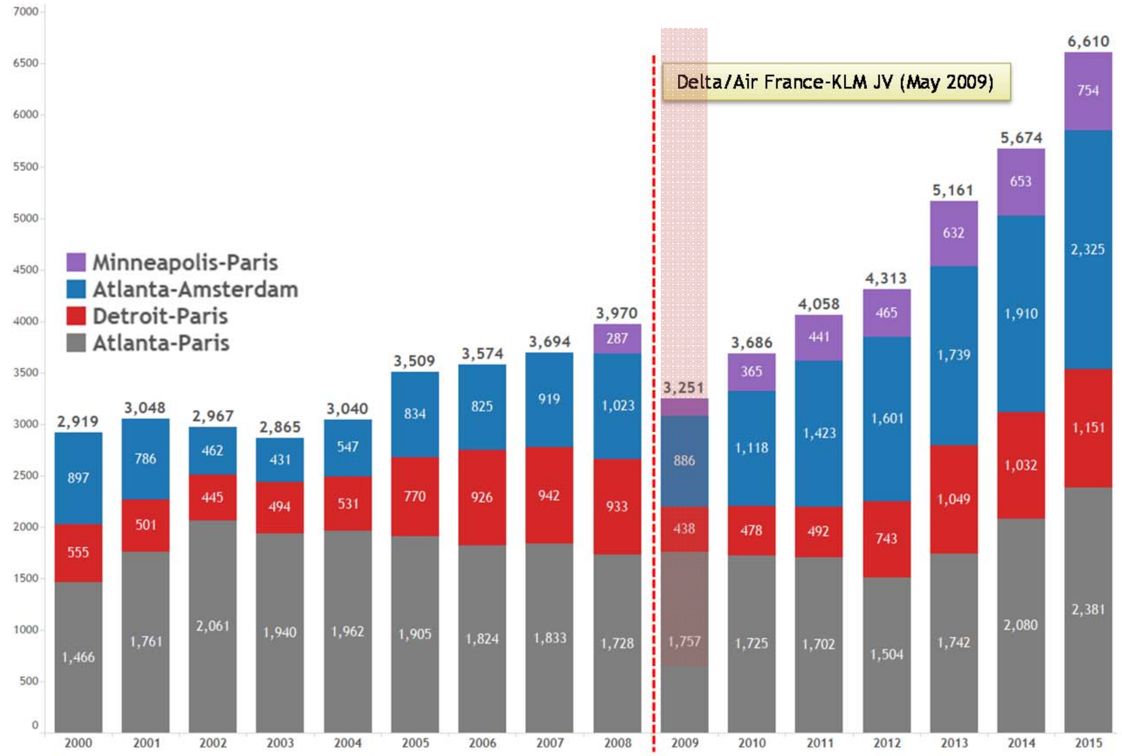
Improved Schedules:
Scheduled Departure Times for Delta and Virgin Atlantic Flights London Heathrow to New York (JFK)



Source: OAG.
Notes: Post-JV, in addition to adding a new JFK-LHR frequency, Virgin Atlantic shifted one daily LHR frequency from EWR to JFK to provide better connectivity to Delta's JFK hub.

Partners are incentivized to eliminate wingtip-to-wingtip flying and offer multiple departure/arrival times to serve varied customer preferences

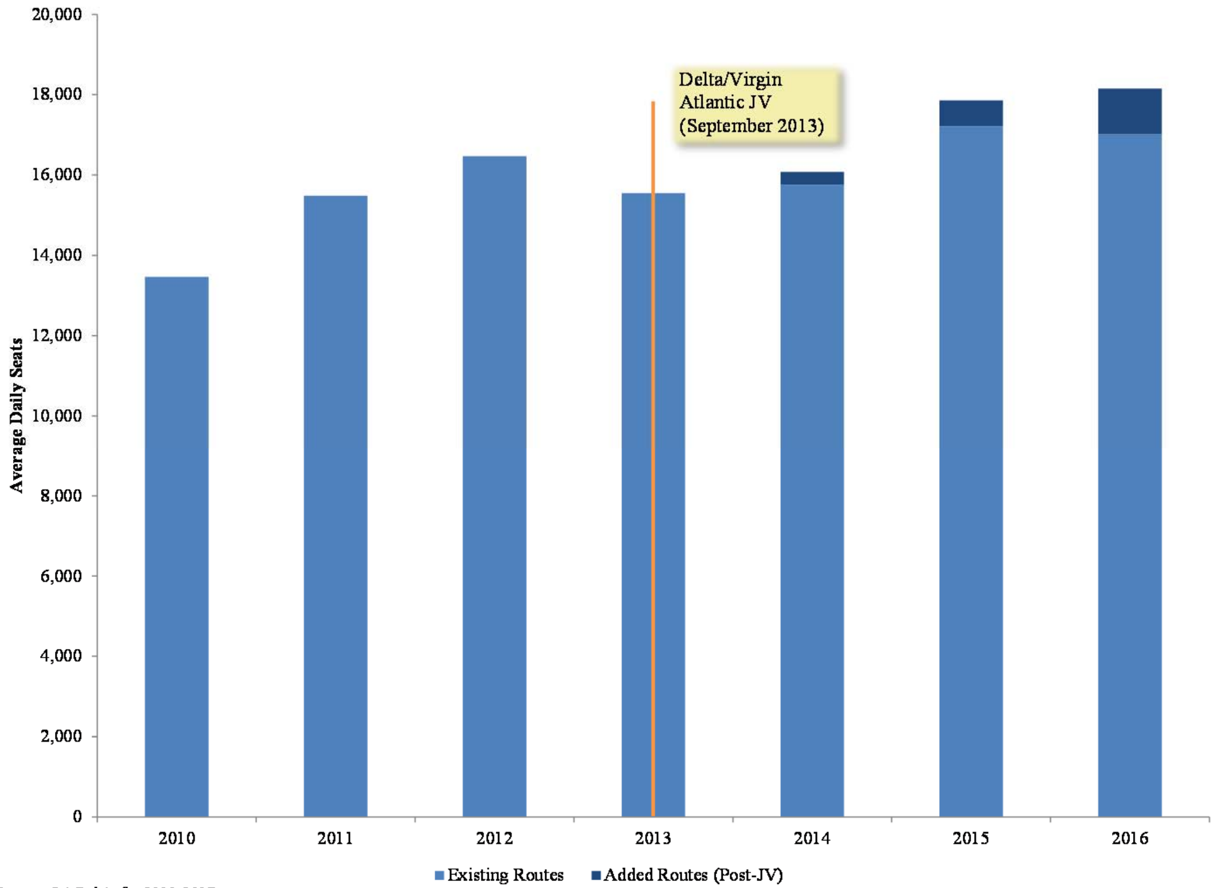
Increased Output:
Average Daily Seats Increased Significantly on Select Delta/Air France-KLM Hub-to-Hub Routes



Sources: OAG and "The Air France KLM Group and Delta Air Lines Launch New Trans-Atlantic Global Joint Venture", PRNewswire, May 20, 2009.

Lower fares and higher quality lead to increased output, despite the short-term effects of the Great Recession (red bar)

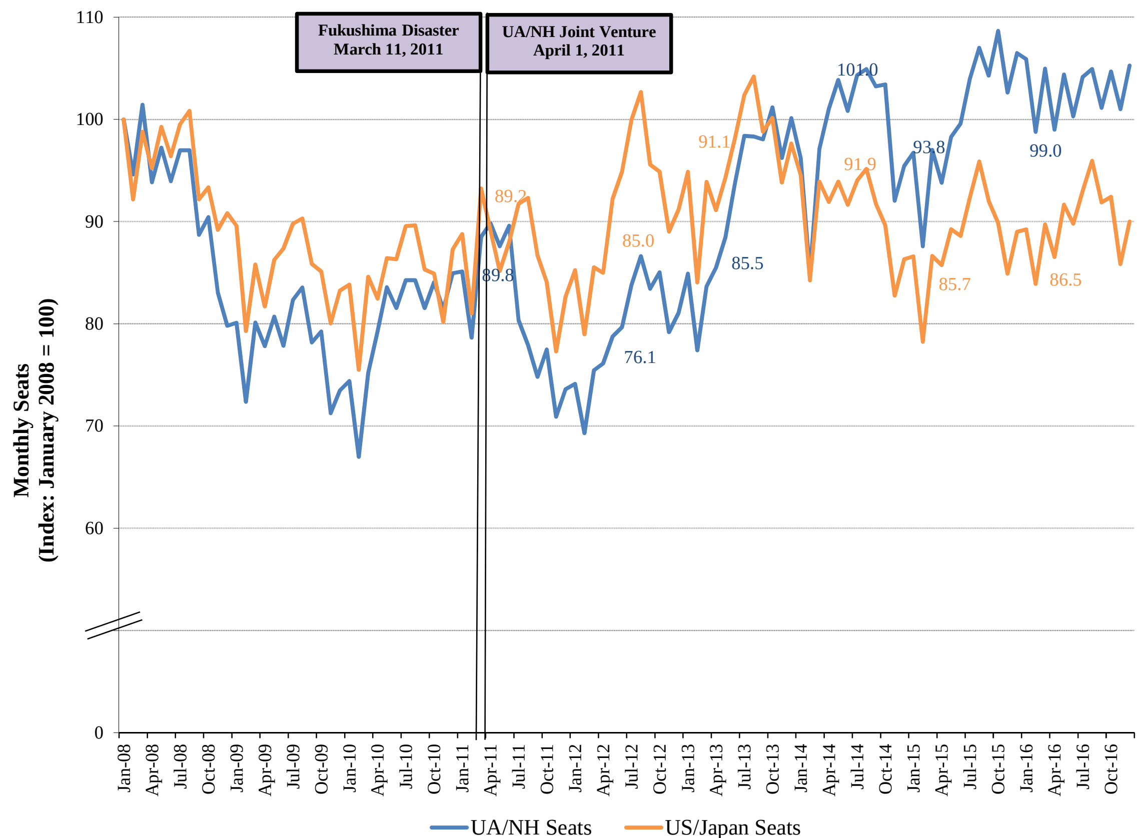
Increased Output:
Delta/Virgin Atlantic Average Daily Seats on U.S.-U.K. Routes



Source: OAG data for 2010-2017.

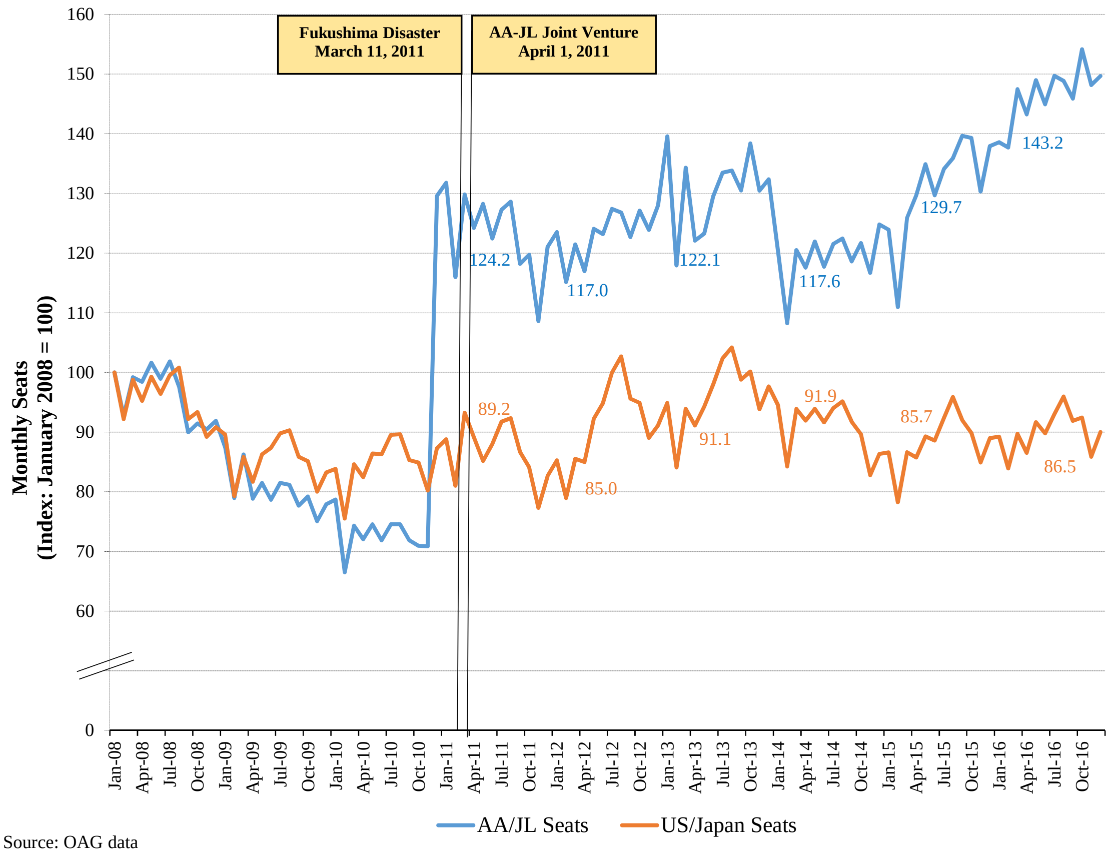
Lower fares and higher quality lead to increased output on both existing and new routes

Increased Output:
UA/NH Seats Increased Following JV



Source: OAG data

Increased Output:
AA/JL Seats Increased with JV



Source: OAG data