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RESOURCE SYSTEMS GROUP, INC.

Findings from RSG's Bi-Annual Air Passenger Study

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The Revenue Management Workshop

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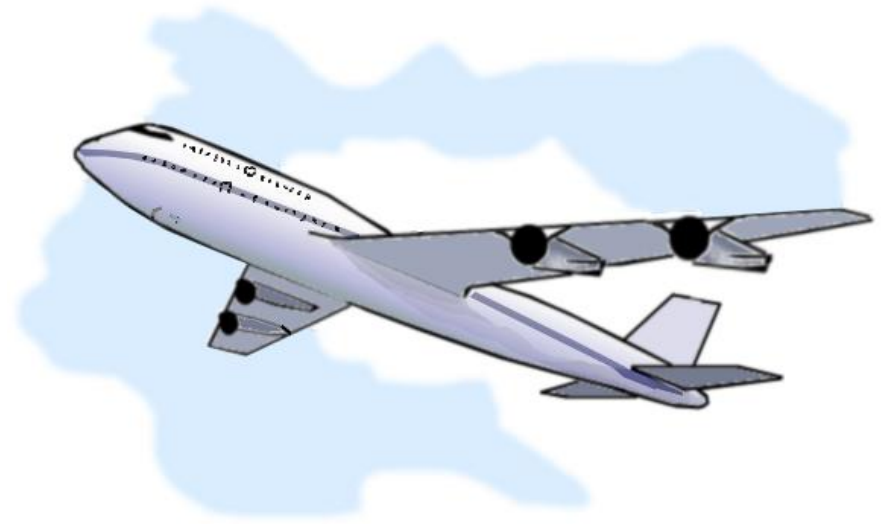
Agenda

- Overview of RSG's Bi-Annual Air Passenger Study
- Modeling Approach
- Ticket Acquisition Experience & Satisfaction
- Flight Experience & Satisfaction
- Willingness-to-Pay for Flight Benefits
- Future Work



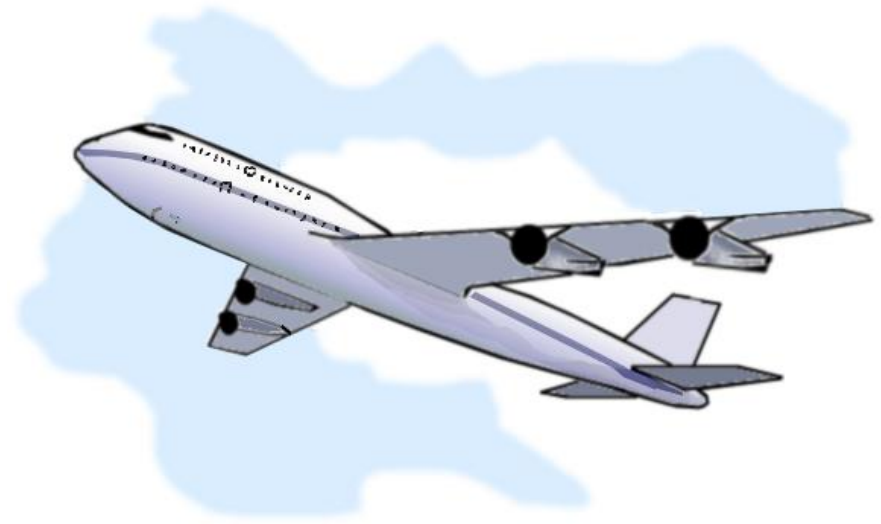
Air Passenger Study History

- Conducted by RSG bi-annually since 2000
- Support and input from both academic and commercial collaborators
- Makes use of SP data and their advantages to more accurately explain air traveler behavior and quantify traveler preferences
- Provides a consistent set of longitudinal data to examine trends over time



2012 Air Passenger Study Sample

- Consisted of 878 domestic air travelers recruited via online sample provider
- 345 business and 533 leisure trips
- 153 international travelers completed the survey as well, but are not reported here



Modeling Approach

Survey Flow

The self interview allowed respondents to describe their most recent air trip (within the last 6 months)

- Trip details such as origin/destination, ticket purchase information, etc.
- Flight related information such as departure and arrival times, party size, purpose, etc.
- Trade-off exercises evaluating flight options and benefits
- Attitudes & Demographics

Trip Details

Flight
Details

Trade-Off
Exercises

Traveler
Information



1. Actual flight information used to provide a reference trip (Revealed Preference)

- Airline
- Fare
- Travel time
- Number of checked bags
- Departure/arrival airports
- Number of connections



Methodology

1. Actual flight information used to provide a reference trip (Revealed Preference)
2. Discrete choice scenarios (DCA) built from the RP trip to trade-off alternative flight options on:

Which of these two alternatives would you have preferred on your trip from the General Edward Lawrence Logan International Airport (BOS) to the Los Angeles International Airport (LAX)?

Note: Flight information may change from screen to screen.

	Option A	Option B
Airline	Delta Airlines	United Airlines
Aircraft Type	Standard Jet	Widebody Jet
Flight Departure Time	9:15 AM Eastern Time	7:20 AM Eastern Time
Number of Connections	Direct flight	1 connection
Total Travel Time	8 hours and 15 minutes	9 hours and 10 minutes
Flight Arrival Time	2:30 PM Pacific Time	1:30 PM Pacific Time
On-Time Performance	60% of these flights are on time	70% of these flights are on time
One-Way Fare	\$180	\$315
Select one:	<input type="radio"/>	<input type="radio"/>

(Question 6 of 8)

Realistic scenarios based on RP data



Methodology

1. Actual flight information used to provide a reference trip (Revealed Preference)
2. Discrete choice scenarios (DCA) built from the RP trip to trade-off alternative flight options on:
3. Adaptive conjoint exercise (ACA) to trade-off a large variety of flight benefits, such as:

Which option would you prefer for the trip that you made?
Assume all else about the trip is equal.

Option #1				Option #2			
Aircraft windows are over-sized				Aircraft windows are a normal size			
1,000 extra Frequent Flyer miles				Normal Frequent Flyer miles			
Beverage and standard airline meal included with fare				Beverage and snack included with fare			

4 3 2 1 0 1 2 3 4

Strongly Prefer Option #1 ← No Preference → Strongly Prefer Option #2

(Question 1 of up to 8)



Methodology

1. Actual flight information used to provide a reference trip (Revealed Preference)
2. Discrete choice scenarios (DCA) built from the RP trip to trade-off alternative flight options on:
3. **Adaptive conjoint exercise (ACA) to trade-off a large variety of flight benefits, such as:**
 - Airline
 - Class of service
 - Flight fullness
 - Wi-Fi
 - Meals
 - Bonus frequent flyer miles
 - Advance seating assignment
 - AC port availability
 - Aircraft age
 - Middle/aisle/window seat
 - And more...

Which option would you prefer for the trip that you made?
Assume all else about the trip is equal.

Option #1	Option #2
Aircraft windows are over-sized	Aircraft windows are a normal size
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4 3 2 1 0 1 2 3 4

Strongly Prefer Option #1 ← No Preference → Strongly Prefer Option #2

(Question 1 of up to 8)



Discrete choice scenarios (DCA) features:

- Airline
- Aircraft type
- Flight departure time
- Flight arrival time
- On-time performance
- Fare

Linking variable provides direct comparison between any features/benefits in DCA or ACA

Adaptive conjoint exercise (ACA) benefits:

- Airline
- Class of service
- Flight fullness
- Wi-Fi
- Meals
- Bonus frequent flyer miles
- Advance seating assignment
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- Middle/aisle/window seat
- And more...



Discrete choice scenarios (DCA) features:

- Airline
- Aircraft type
- Flight departure time
- Flight arrival time
- On-time performance
- Fare

Including fare in DCA allows for willingness-to-pay estimates for DCA features

Adaptive conjoint exercise (ACA) benefits:

- Airline
- Class of service
- Flight fullness
- Wi-Fi
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- Bonus frequent flyer miles
- Advance seating assignment
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- And more...



Discrete choice scenarios (DCA) features:

- Airline
- Aircraft type
- Flight departure time
- Flight arrival time
- On-time performance
- Fare

Linking variables allow willingness-to-pay estimates across DCA *and* ACA features/benefits

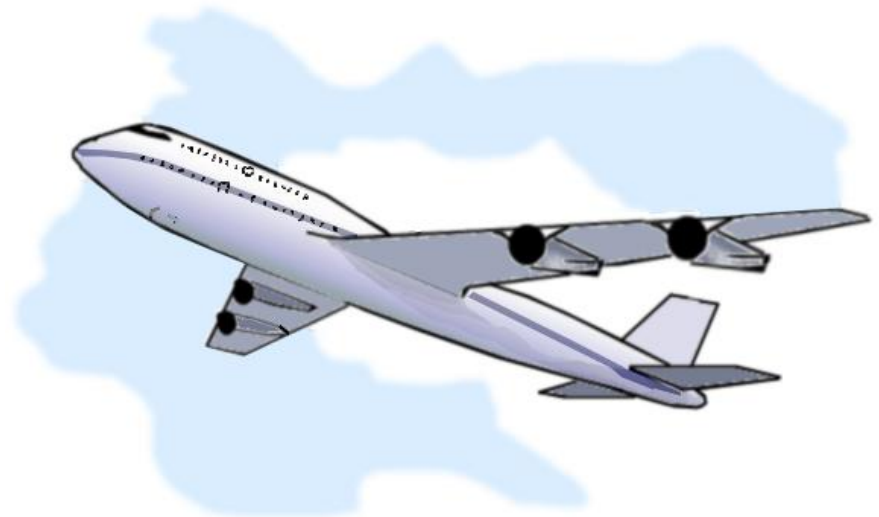
Adaptive conjoint exercise (ACA) benefits:

- Airline
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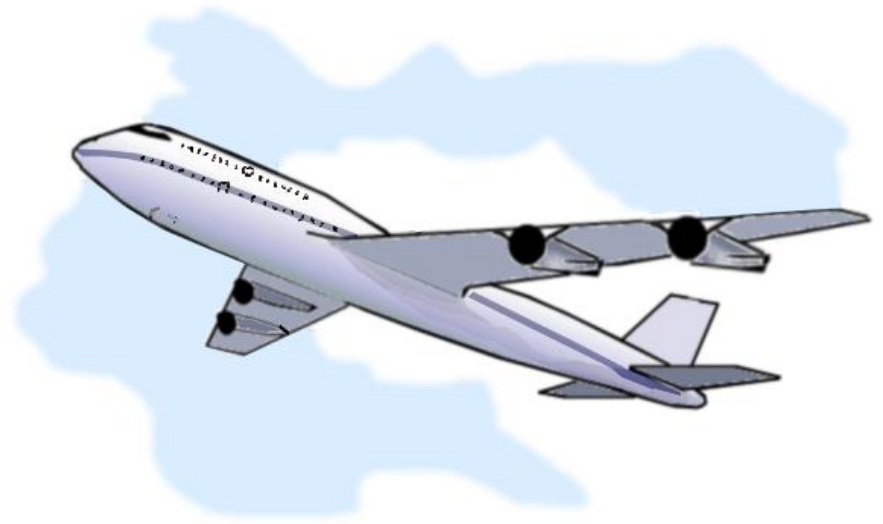


What can we do with these data?

- Can estimate Willingness-To-Pay (WTP) values for each attribute/benefit tested
- Can estimate WTP values for each individual respondent
 - Allows for flexible segmentation
 - Can derive WTP distributions
- Needs-based consumer segmentation (e.g., latent class)
- Capacity management (not just seats)
- Simulation, including estimates of:
 - Airline share
 - Benefit uptake
 - Revenue
 - Other financial forecasting
- Channel offering design

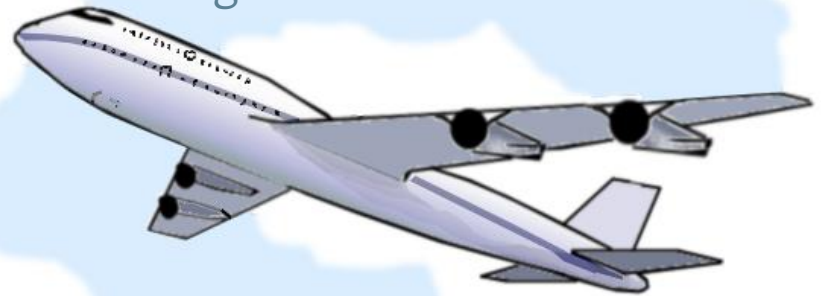


Select Findings



Ticket Acquisition Experience & Satisfaction

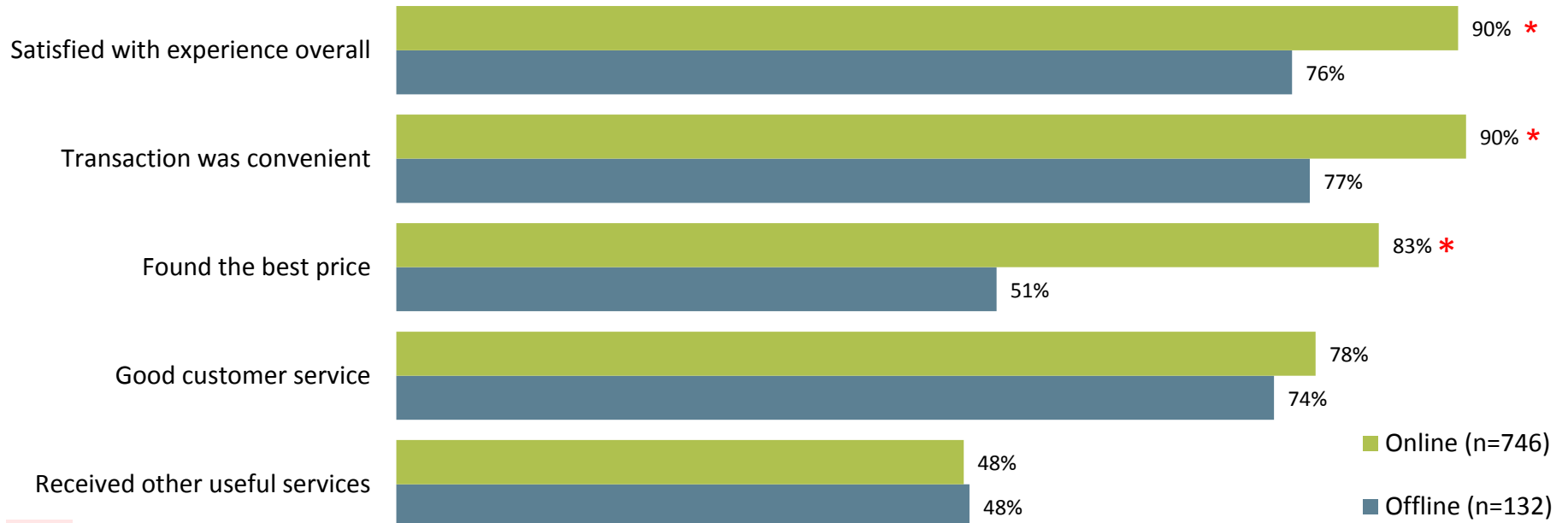
- **Nearly 90% of air travelers gather flight information online**
 - This has increased from 81% in 2008
- **68% of air travelers research flights directly from the airlines' websites**
 - Most of these people (57%) stay to purchase their ticket on the airlines' site, up from 47% in 2008
 - Of people who checked both the airlines' site, and another site, over 60% ended up making their purchase directly from the airline
- **Overall, 85% of air travelers are purchasing their tickets from an online source**
 - Up from 73% in 2008
 - Of the holdouts, more than 50% did not purchase their ticket online because they were required to use a designated travel agent or service



Ticket Acquisition Experience & Satisfaction

- Online purchases are on the rise
- Average overall satisfaction with the ticket purchase experience is improving
 - More convenient
 - Ticket prices perceived to be lower online
- Traditional offline sources are still competitive when it comes to customer service and providing additional services
 - But, these are not the major drivers of overall booking satisfaction

Ticket Purchase Satisfaction by Purchase Channel

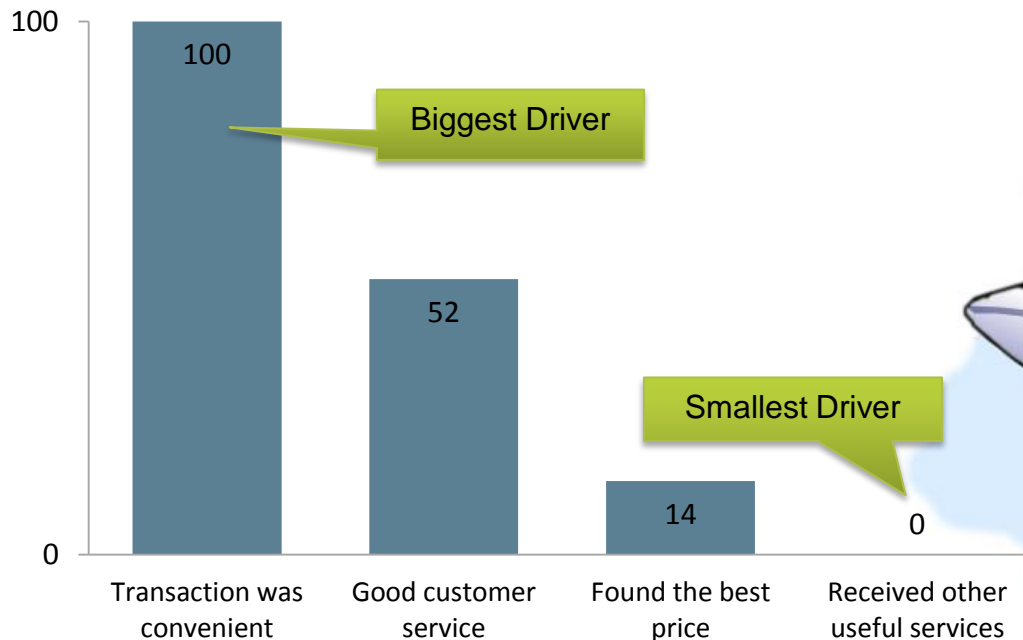


* Indicates a significant difference at the 95% level of confidence.

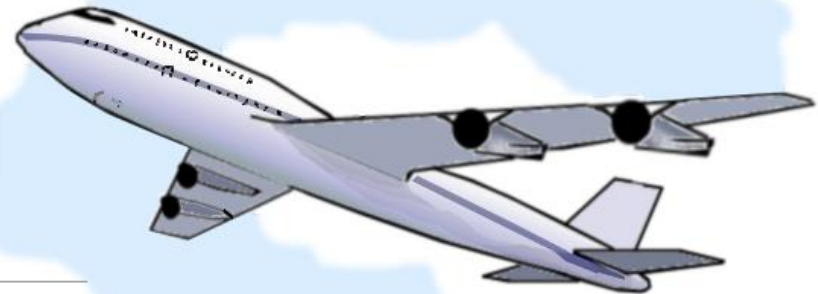
Ticket Acquisition Experience & Satisfaction

- **Ordered Logit (Driver Analysis)** used to model overall booking satisfaction
 - Convenience of the transaction is the major driver in overall booking satisfaction on average
 - The areas in which traditional offline sources remain competitive are not the biggest drivers of overall satisfaction
- **This explains why 85% of air travelers purchase their tickets online**

Drivers of Ticket Purchase Satisfaction



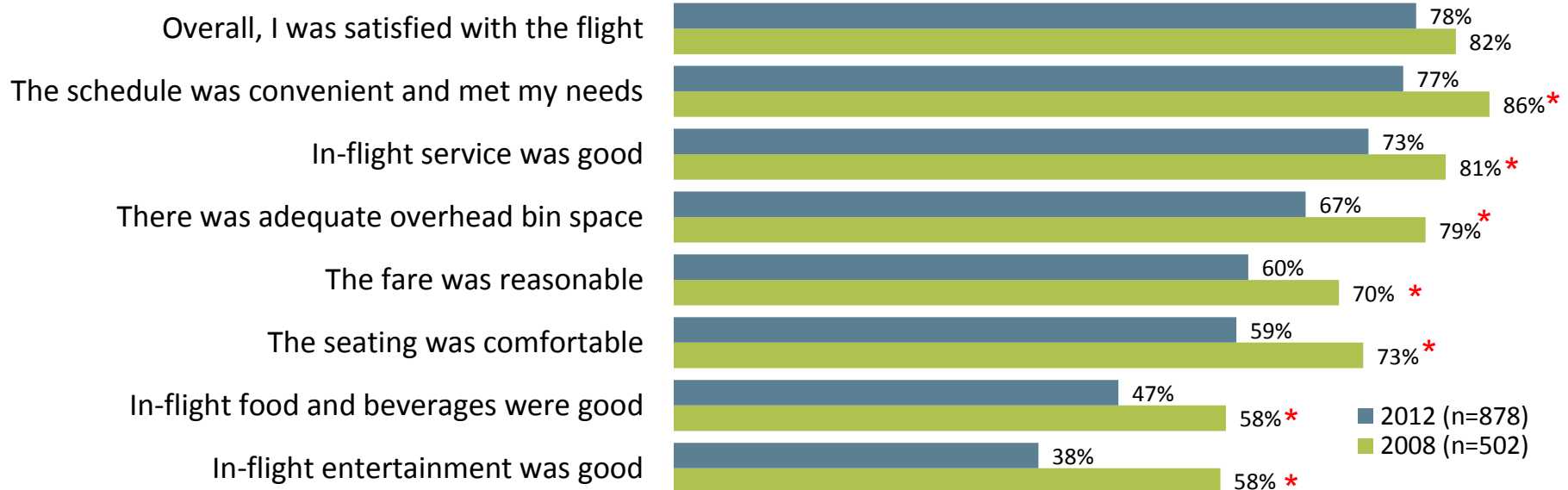
Component of Booking Experience (n=878)



Flight Experience & Satisfaction

- On average, 78% of air travelers were satisfied with their flight overall, which is not significantly different from 2008
 - Even though many components of flight satisfaction have decreased significantly since 2008
- Seating space, in-flight food, beverages and entertainment hit the hardest, and are areas for improvement
- Deeper segmentation may reveal differences (e.g., Business vs. Leisure)

Flight Satisfaction by Year (Percent in Agreement)

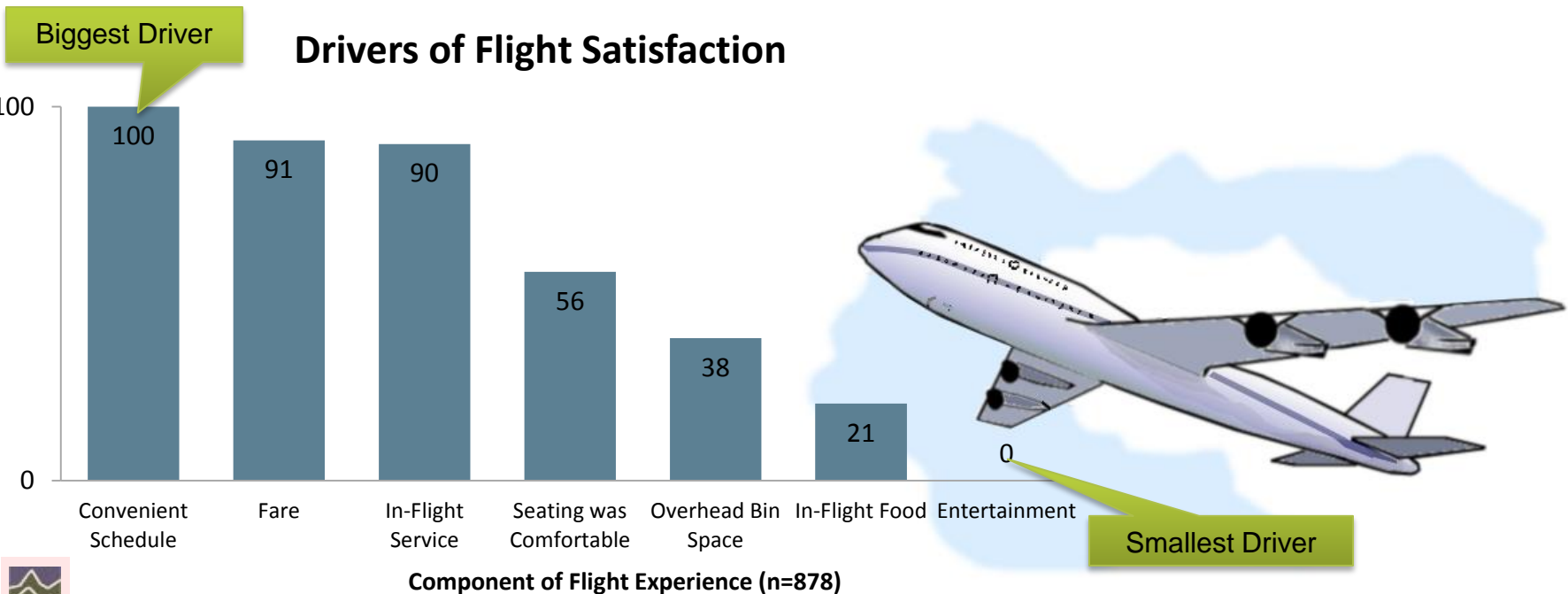


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Flight Experience & Satisfaction

- **Ordered Logit (Driver Analysis) used to predict overall flight satisfaction**
 - Overall satisfaction did not decrease as much as entertainment and in-flight food quality
 - Because these are not big drivers when it comes to overall flight satisfaction
- **Convenient schedules, fare and in-flight service are the primary drivers of overall flight satisfaction**



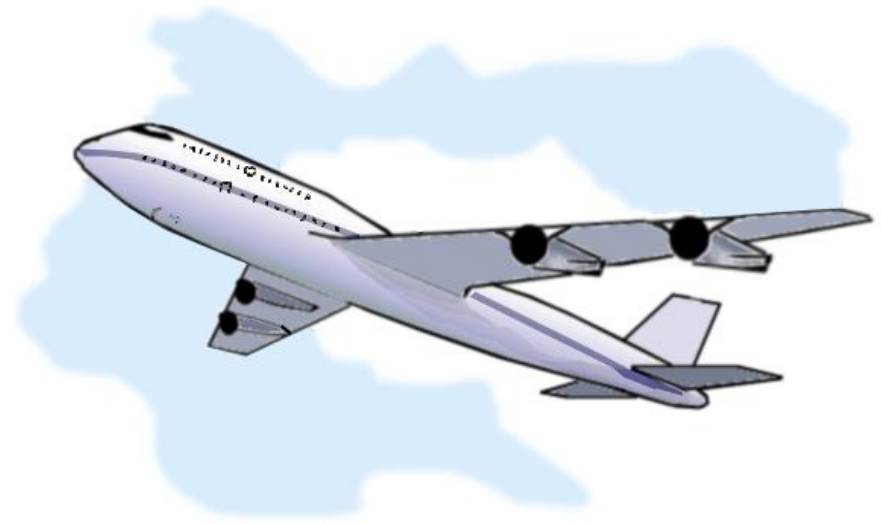
Willingness-to-Pay for Flight Benefits



Willingness-to-Pay for Flight Benefits

- Traveler values of flight time
 - Willingness-to-pay to avoid one hour of travel time
 - Fairly stable over time

	2000	2001	2002	2008	2012
Business	\$76/hr	\$85/hr	\$93/hr	\$55/hr	\$85/hr
Leisure	\$36/hr	\$30/hr	\$30/hr		\$38/hr



Willingness-to-Pay for Flight Benefits

- Coupling of the DCA and ACA results allows for the estimation of Willingness-To-Pay (WTP) values for each benefit/attribute tested

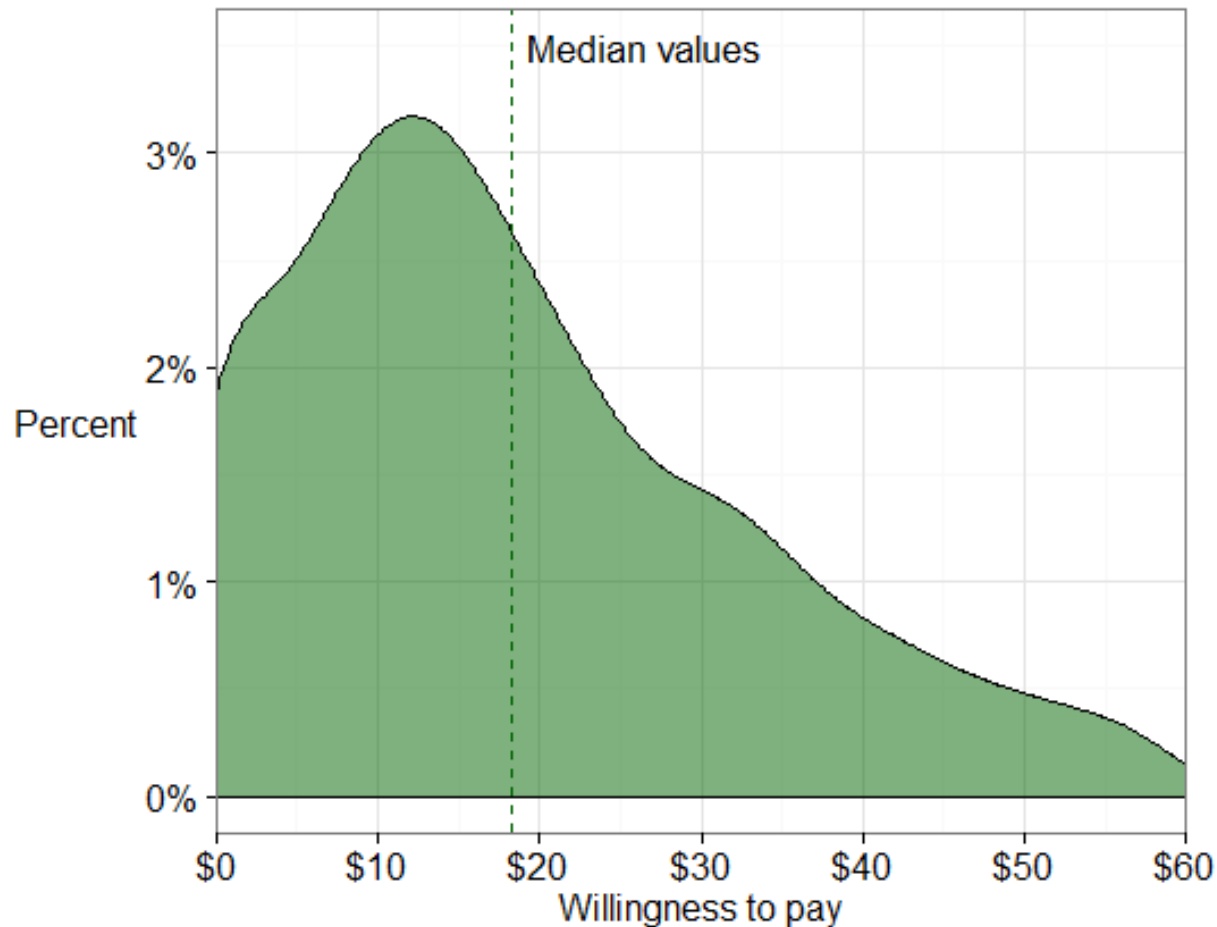
Benefit/Attribute	Aggregate WTP	Leisure WTP	Business WTP
Flight Time (wide body jet)	\$52/hr	\$35/hr	\$78/hr
Flight Time (standard jet)	\$57/hr	\$39/hr	\$84/hr
Flight Time (regional jet)	\$71/hr	\$53/hr	\$99/hr
Flight Time (propeller)	\$110/hr	\$78/hr	\$160/hr
Window Seat	\$19	\$15	\$26
Aisle Seat	\$18	\$15	\$24
Middle Seat	\$0	\$0	\$0
Extra FF Miles	1.2 ¢/mile	1.0 ¢/mile	1.7 ¢/mile
Flight <75% full	\$11	\$9	\$15
Flight 75%-95% full	\$8	\$6	\$10
Flight >95% full	\$0	\$0	\$0



Willingness-to-Pay for Flight Benefits

WTP for the window seat (over the middle seat)

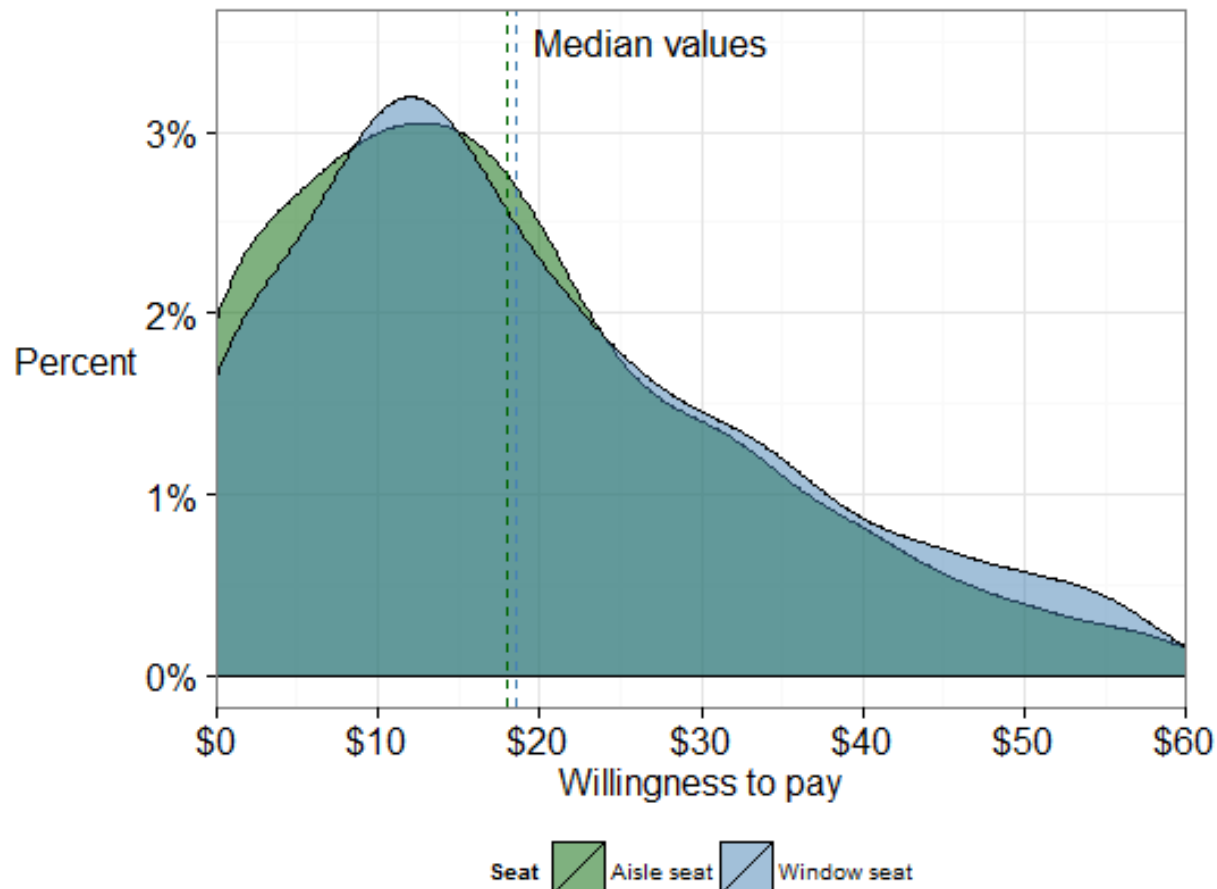
- Nearly all air travelers (92%) prefer the window seat over the middle seat
- WTP values distributed about a median of \$18
- Unbundling the seating location from the fare could increase revenue and comfort satisfaction scores



Willingness-to-Pay for Flight Benefits

WTP for the window and aisle seat (over the middle seat)

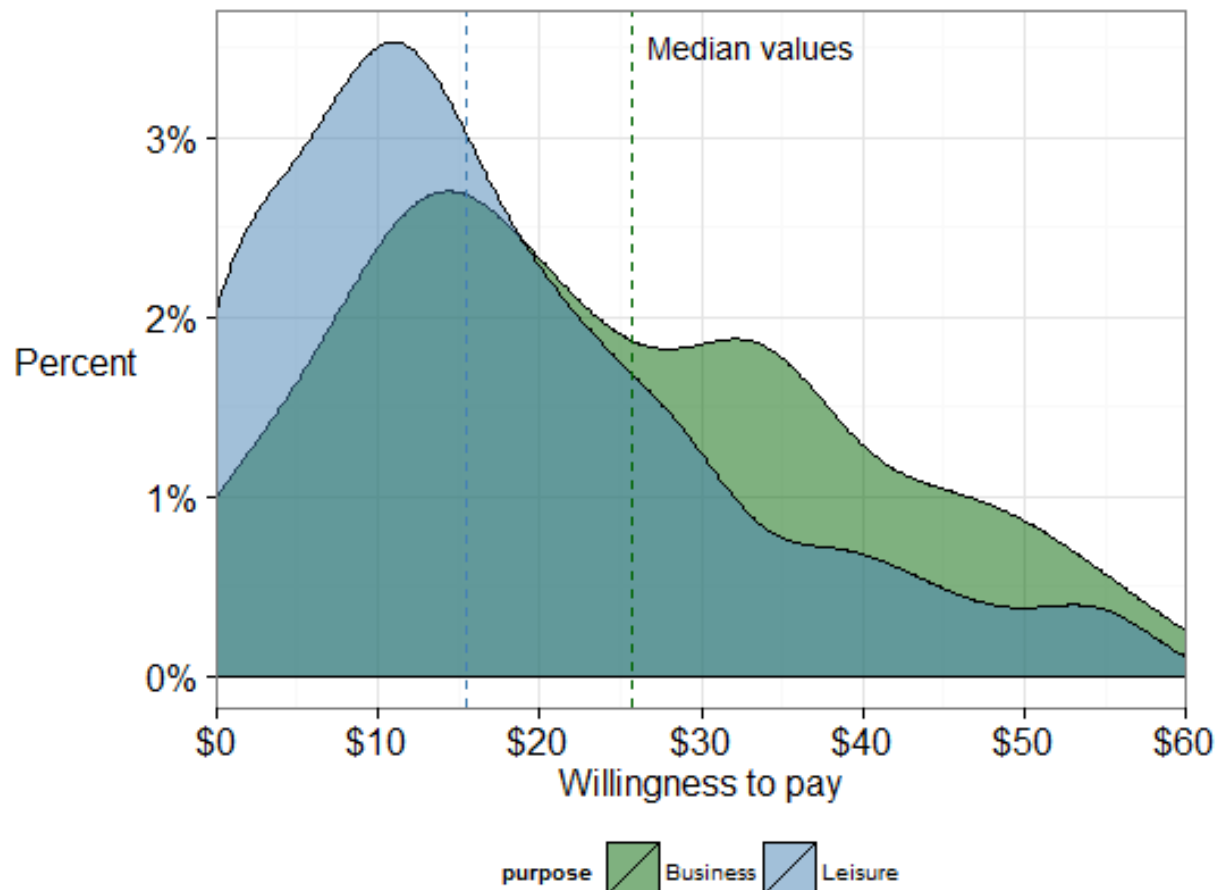
- On average, the window seat is slightly more desirable than the aisle seat, worth \$19 and \$18 respectively
- Business travelers on average prefer the window seat, and leisure travelers value the two seats about the same



Willingness-to-Pay for Flight Benefits

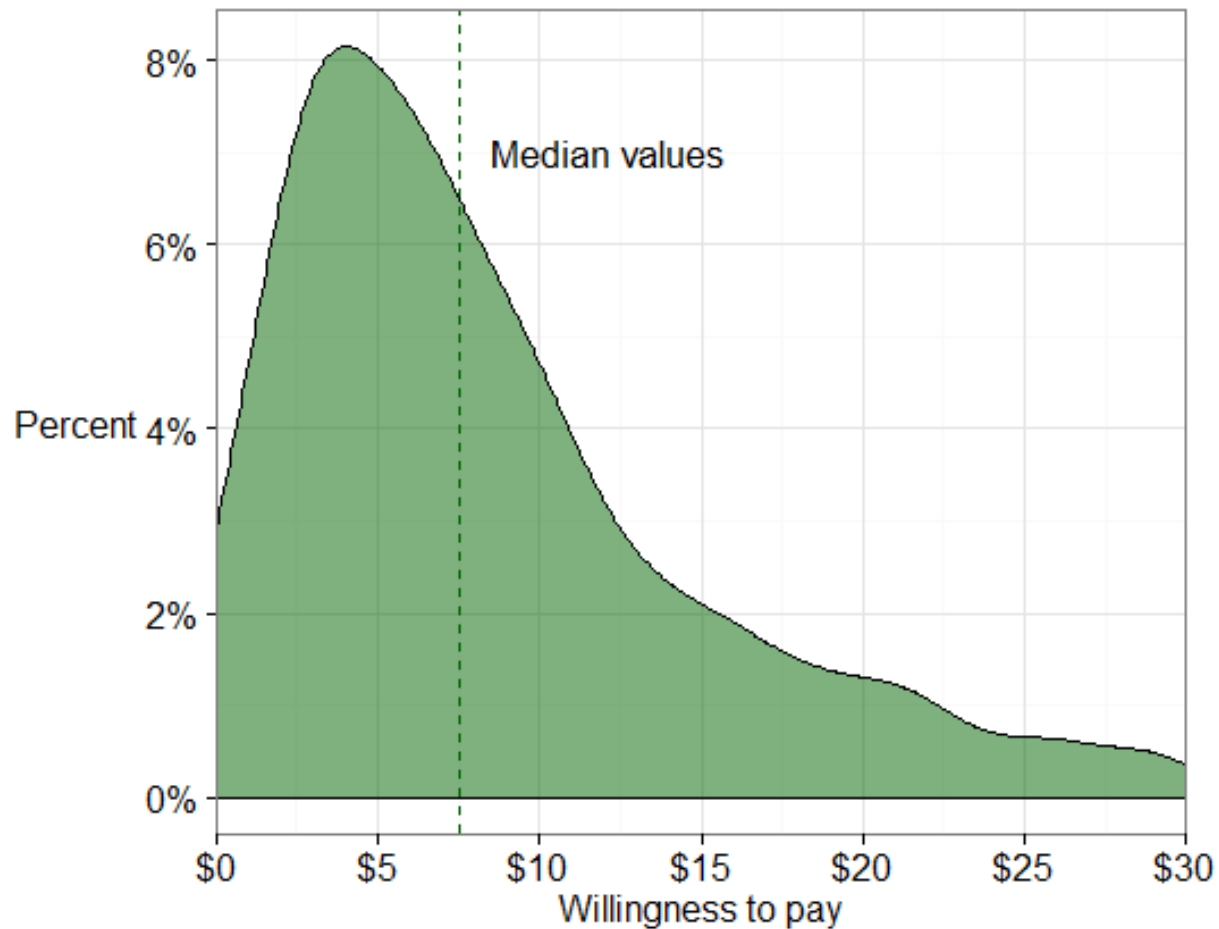
WTP for the window (over the middle seat)

- Business vs. Leisure travelers



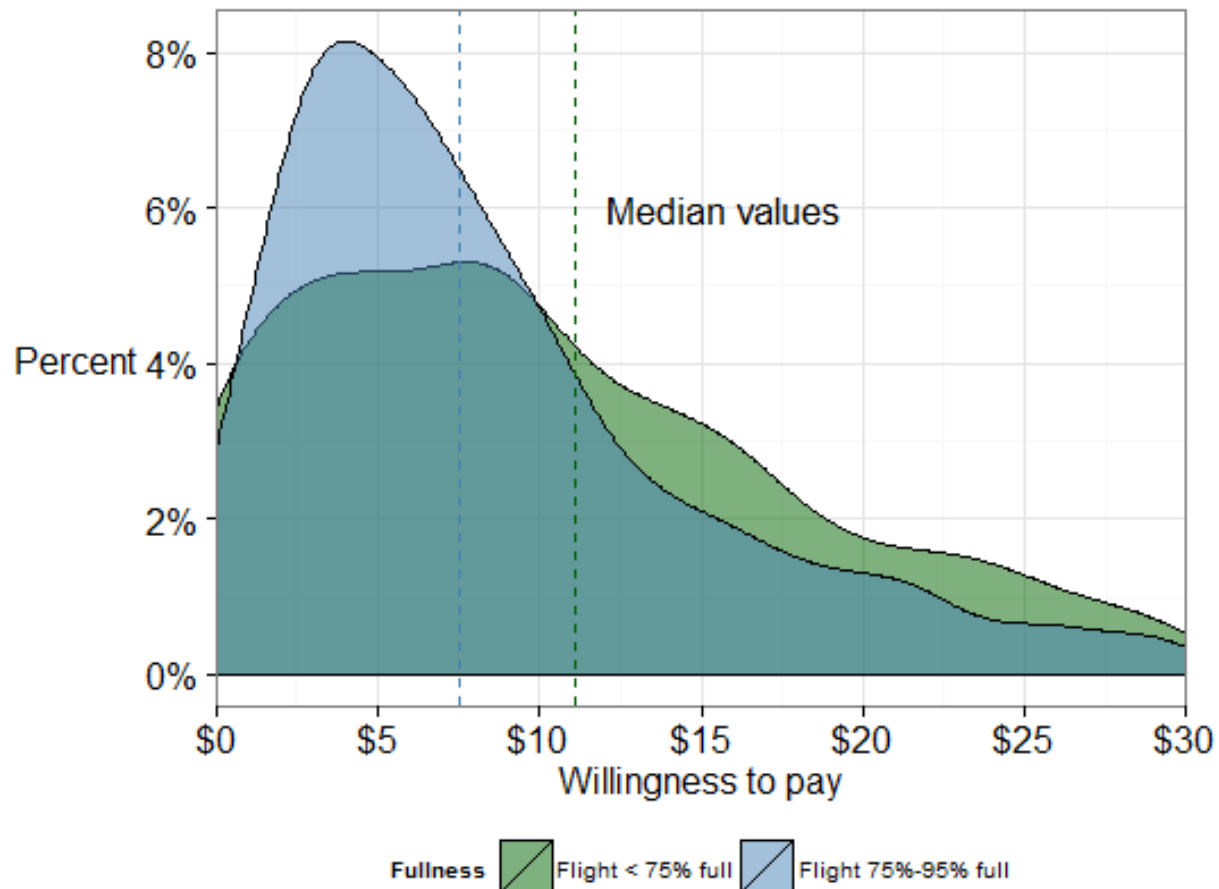
Willingness-to-Pay for Flight Benefits

WTP for a flight that is 75%-95% full (versus 95%+)



Willingness-to-Pay for Flight Benefits

WTP for a flight that is less than 75% full or 75%-95% full (versus 95%+)



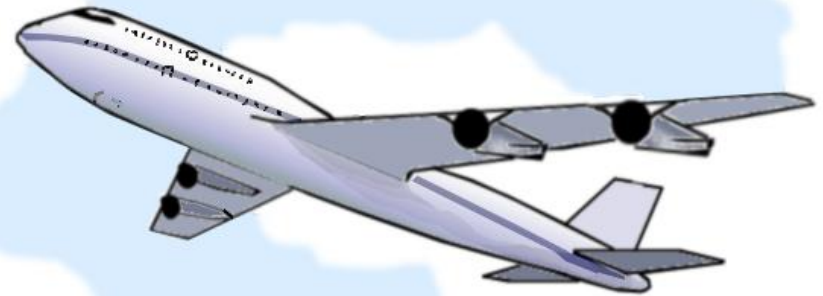
Airport Cooperative Research Program (ACRP) 03-19

Passenger Value of Time, Benefit-Cost Analysis, and Airport Capital Investment Decisions

- Will quantify air travelers' values of time for various stages of an air trip
- What is the relative importance of time savings through security versus time to get to the gate versus in-flight time, etc.?
- Monetize reliability and on-time performance
- RSG leading the quantitative research, in collaboration with Stephane Hess and Ken Small

Planning underway for the 2013/2014 Air Passenger Study

- Input welcome!



Questions?



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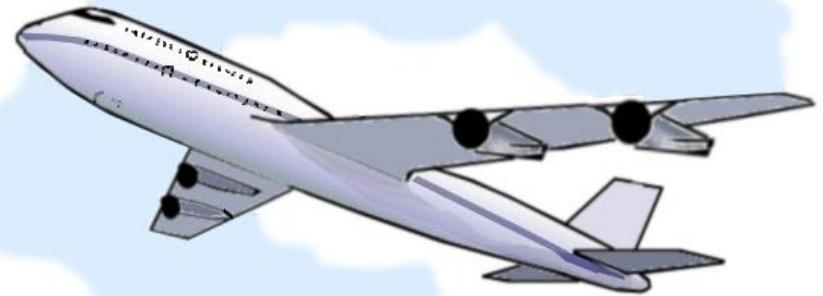
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ACA Benefits Tested

Airline

1. Most preferred airline
2. Second most preferred airline
3. Third most preferred airline
4. Least preferred airline

Seating Assignment

1. Seating assigned at time of reservation
2. Seating assigned on arrival at gate
3. Open seating – board in order of arrival at gate

Wi-Fi Enabled Flight

1. Wi-Fi is available
2. Wi-Fi is not available

Food On-Board

1. Beverage and superior airline meal included with fare
2. Beverage and standard airline meal included with fare
3. Beverage and snack included with fare
4. Beverage included with fare

Extra-Legroom

1. Additional 5 inches of legroom
2. Standard legroom

Aircraft Age

1. Aircraft is less than 5 years old
2. Aircraft is 5-15 years old
3. Aircraft is greater than 15 years old

Over-Sized Windows

1. Aircraft windows are a normal size
2. Aircraft windows are over-sized

Preferred Seat Location

1. Aisle seat
2. Middle seat
3. Window seat

Reservation System

1. Purchase ticket online from a site other than the airline's
2. Purchase ticket online using the airline's website
3. Purchase ticket directly from the airline by telephone or in person
4. Purchase ticket through a travel agent

Class of Service

1. Seat width and spacing equivalent to a first class seat
2. Seat width equivalent to a regular coach seat but increased spacing between seats
3. Seat width and spacing equivalent to a regular coach seat

AC Power Ports

1. AC power ports available at your seat
2. AC power ports are not available

Flight "Fullness"

1. Flight is less than 75% full
2. Flight is between 75% and 95% full
3. Flight is more than 95% full

Potential to Upgrade

1. Seat upgrade is available
2. Seat upgrade is not available

Frequent Flyer Award

1. 1,000 extra Frequent Flyer miles
2. 500 extra Frequent Flyer miles
3. Normal Frequent Flyer miles



Wi-Fi and Satisfaction

- Wi-Fi is an in-flight service may improve flight satisfaction
- Respondents on flights where Wi-Fi was available were significantly more satisfied with their flight overall – even if they didn't use it!

Overall Flight Satisfaction

Wi-Fi Available	Wi-Fi Not Available
84%* (n=376)	74% (n=502)



* Indicates a significant difference at the 95% level of confidence.



Modeling Approach

- Flight information used to build a reference trip (RP)
- Discrete choice scenarios (DCA) built from the RP trip to trade-off alternative flight options on:
 - Travel Time
 - Cost
 - **Airline**
 - Departure/Arrival Time
 - On-time performance
 - Number of connections
 - Aircraft type
 - Etc.
- Adaptive conjoint exercise (ACA) to trade-off a variety of flight benefits such as:
 - Legroom
 - Class of Service
 - **Airline**
 - Flight fullness
 - Wi-Fi
 - Meals
 - Bonus FF Miles
 - Etc.
- Knowing Cost relative to Airline from the DCA, and Airline relative to the flight benefits from the ACA, we can estimate willingness-to-pay (WTP) values for each benefit for each respondent



Discrete Choice Exercises

- Based on the reported air trip
- Utilized a database of airlines, airports, latitudes/longitudes, time zones, etc. to generate realistic experiments

Which of these two alternatives would you have preferred on your trip from the General Edward Lawrence Logan International Airport (BOS) to the Los Angeles International Airport (LAX)?

Note: Flight information may change from screen to screen.

	Option A	Option B
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Aircraft Type	Standard Jet	Widebody Jet
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On-Time Performance	60% of these flights are on time	70% of these flights are on time
One-Way Fare	\$180	\$315
Select one:	<input type="radio"/>	<input type="radio"/>

(Question 6 of 8)



Adaptive Conjoint Exercises

- Respondents first ranked and rated a variety of flight benefits
- Then traded-off sets of benefits
- Full list of tested benefits available in the Appendix

Which option would you prefer for the trip that you made?

Assume all else about the trip is equal.

Option #1					Option #2				
Aircraft windows are over-sized					Aircraft windows are a normal size				
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Beverage and standard airline meal included with fare					Beverage and snack included with fare				

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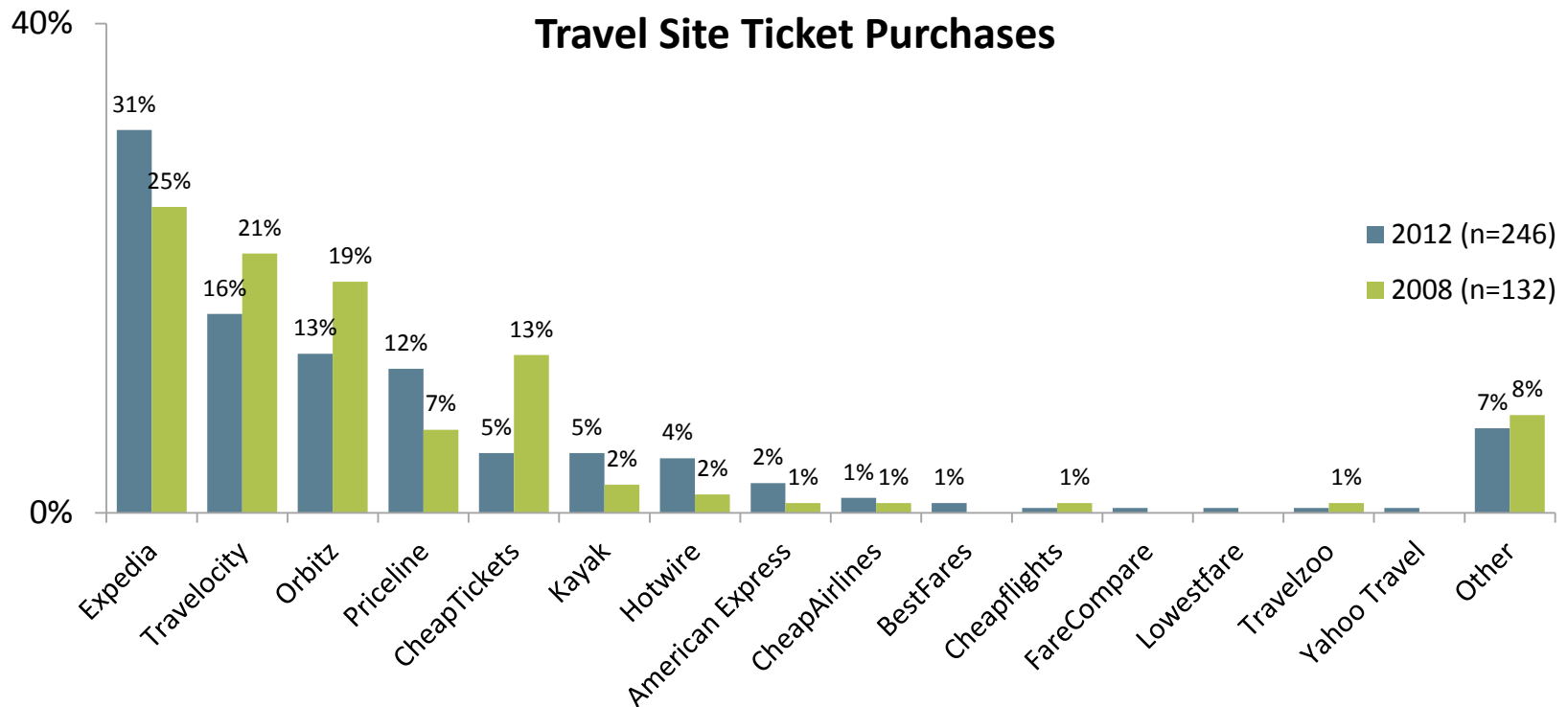
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Appendix

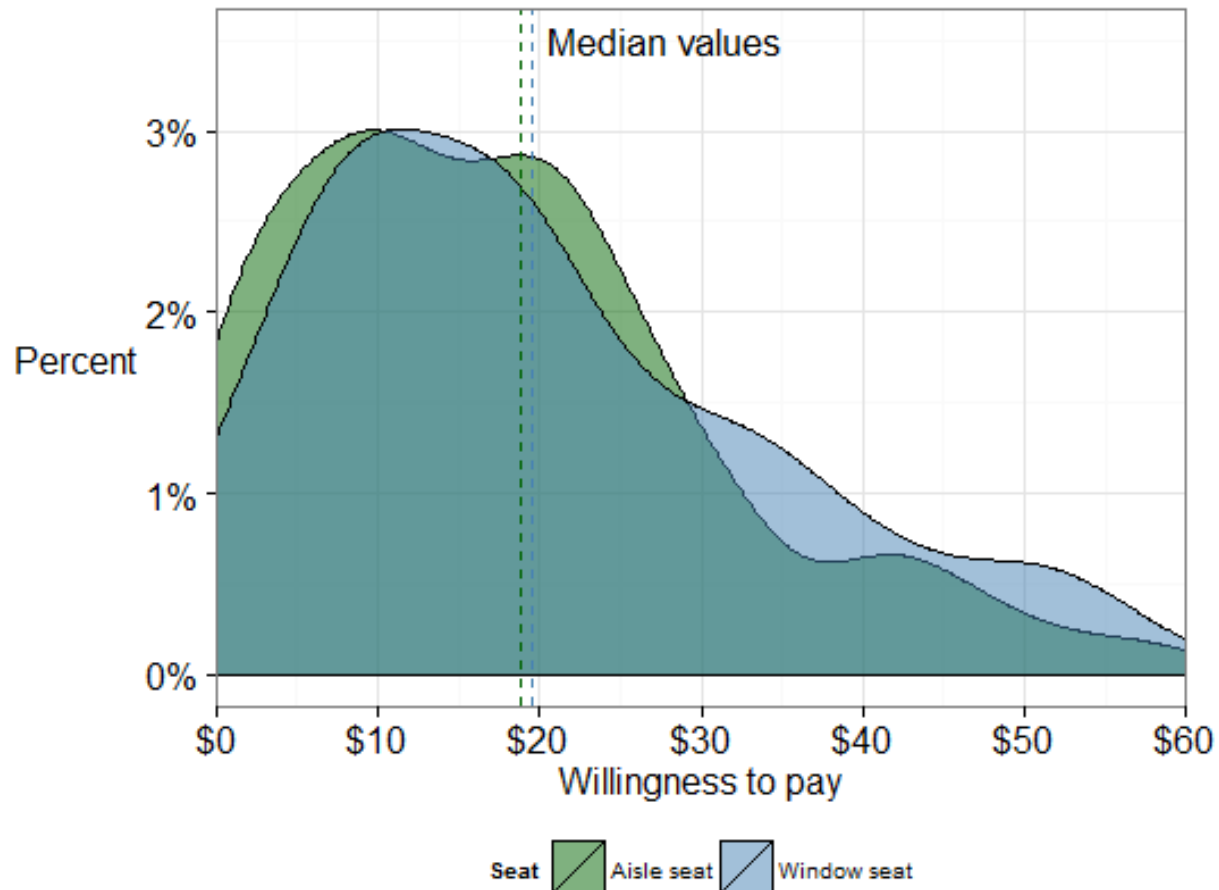
- 28% of ticket purchases were made using a travel website, with Expedia leading the pack in 2008 and 2012
- Expedia, Priceline, Kayak and Hotwire taking more share of the online ticket market since 2008
 - Largely, at the expense of Travelocity, Orbitz and CheapTickets



Appendix

WTP for the window and aisle seat (over the middle seat)

- Business travelers



Appendix

WTP for the window and aisle seat (over the middle seat)

- Leisure travelers

