



MIT International Center for Air Transportation

How Relevant is Elapsed Time in Passenger Airline Choice?

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How Relevant is Elapsed Time in Passenger Airline Choice?

Timetable design is one of the critical airline management decisions:

- Airlines have to observe the timetable's attractiveness to its customers (time of day, length of connection)
- At the same time, they have to ensure an efficient use of their resources (aircraft, gates, personnel, etc.)



Depeaking is an example for this tradeoff

- Depeaking has proven to enhance efficiency at airlines, i.e. reduce operational costs (American Airlines reported that they saved 5 aircraft by depeaking)
- At the same time, airlines have reported that depeaking leads to an increase in average transfer times and thus an increase in itinerary elapsed time
- Some airlines are reluctant to depeak further since they fear a loss of passengers to competitors
- How does a change in elapsed time impact passenger itinerary choice and thus an airline's market share?



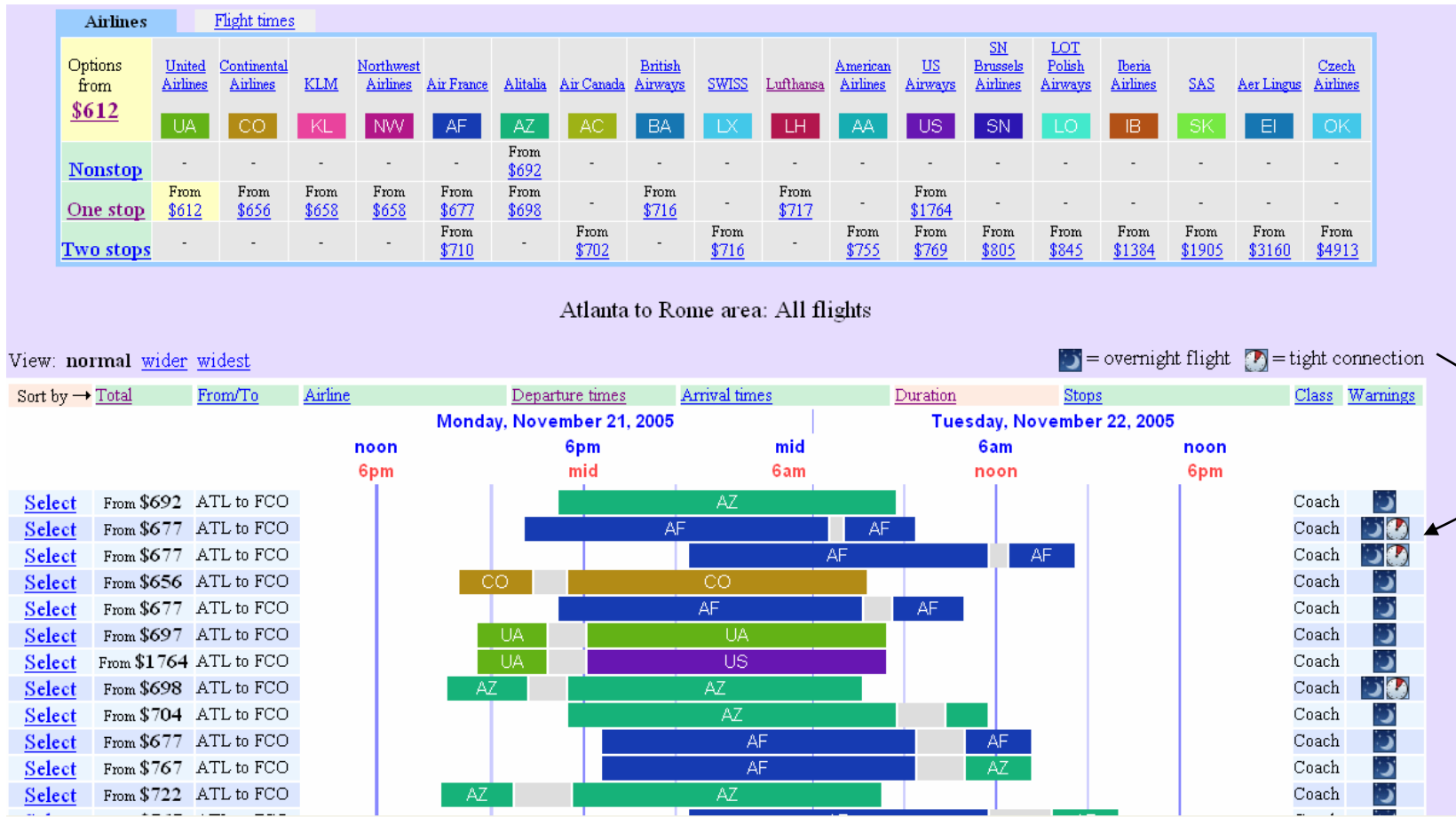
Why is elapsed time deemed to be important in passenger itinerary choice?

- **GDS screen position**
(“80% of all trips are booked from the first page”), However,
 - ❑ deregulation of prices
 - ❑ increasing incentivization to all members of the decision chain
 - ❑ reduction of GDS’s dominant position by new distribution channels
 - ❑ Deregulation of GDS’s

- **Convenience assumption**
(“shorter transfers are valued higher by passengers”). However,
 - ❑ While airport terminals were expanded, published minimum connecting times have often stayed the same, leading to potential “discomforting rush” when connecting

 - ❑ Growth in air traffic in combination with limited system capacity has led to increasing variability in arrival and departures times of flights. As a consequence, the risk of misconnections has increased

Websites are starting to warn about “tight connections”



Source: matrix.itasoftware.com

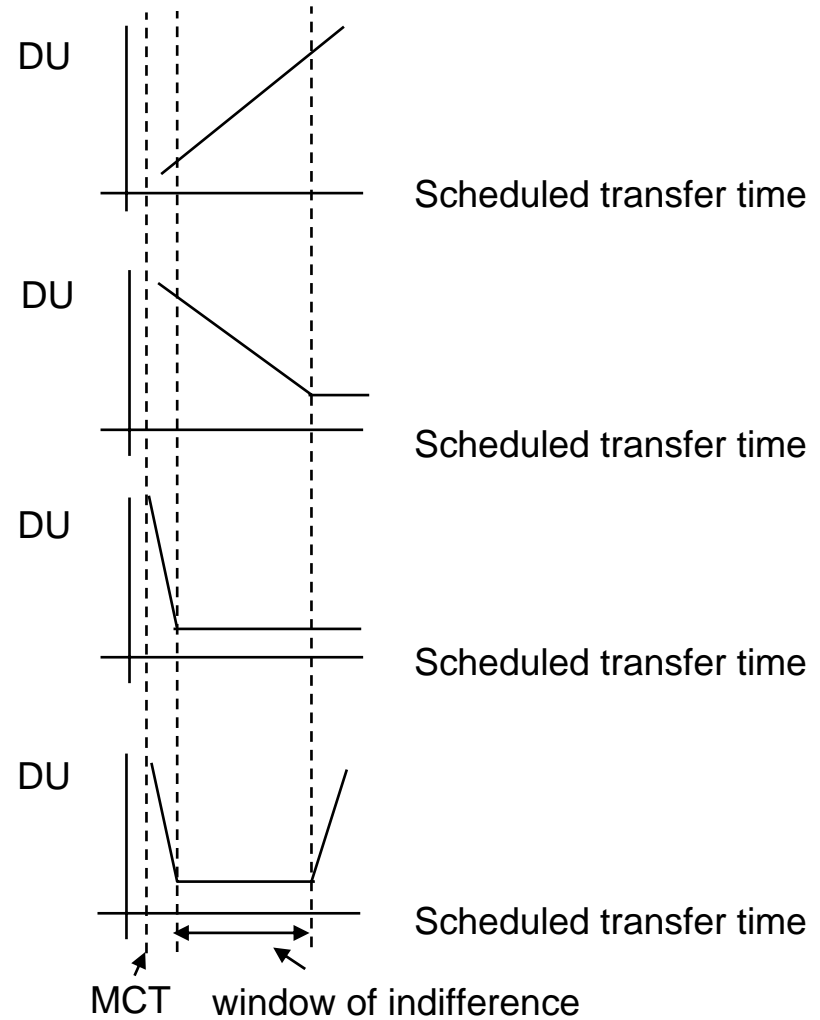
We hypothesize that passengers take risk and rush into account

Value of time

Transfer success rate

Discomfort of rush

Total





Approach

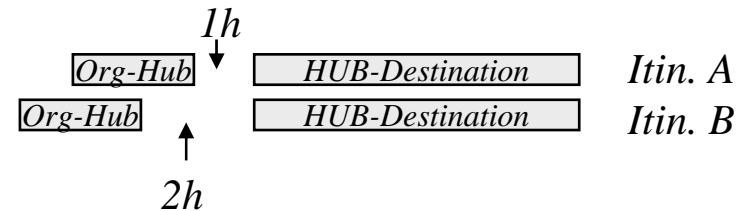
- **Preliminary case study: Assess what share of passengers is risk averse in their booking patterns**

- **Passenger Choice and Latent Variable Model**



What share of passengers is risk or rush averse as revealed in their bookings?

- What share of passengers voluntarily books a longer connection?



- **Data:**
source: large network carrier
bookings: 10AUG-30SEP, departures 01SEP-30SEP, POS Origin Country
- **Methodology:** For all bookings (e.g. itinerary B), check whether the alternative (itinerary A) was available in the same reservation class on day of booking. If the alternative was available, count “short” and “long” connection bookings
- **Results:**
 - for early morning departures, approximately 25% of passengers voluntarily chose the longer connection
 - For midday departures almost 50% of passengers chose the longer connection
- **Results indicate that passengers take misconnection risk/rush into account when making their booking choices**



Discrete Choice and Latent Variable Model

■ Purpose:

- A choice model can give us information on relative importance of attributes
- Latent Variables (attitudes toward rush, risk) are valuable explanatory variables in a choice context

■ Approach:

- Survey
 - ❖ SP Experiment
 - ❖ Rating Exercise
 - ❖ Socio-Demographics

SP Experiment -Attributes




Which would you choose for a trip to Jacksonville, FL?

		Your Current Flight	Alternate Flight
AIRLINE		Delta	Continental
AIRCRAFT TYPE		Regional Jet	Standard Jet
DEPARTURE	AIRPORT	Logan International Airport, Boston MA	Burlington International Airport, Burlington VT
	TIME	8:00 AM	5:00 PM
ARRIVAL	AIRPORT	Jacksonville International	Jacksonville International
	TIME	12:00 PM	10:00 PM
LAYOVER TIME		1 hr. (your connecting airport requires a minimum of 40 mins. to connect)	40 mins. (the connecting airport requires a minimum of 40 mins. to connect)
TOTAL TRAVEL TIME		4 hrs.	5 hrs.
NUMBER OF CONNECTIONS		1	1
ON-TIME PERFORMANCE		80% of these flights are on time	90% of these flights are on time
ROUND TRIP FARE		\$250	\$188
I would choose:		<input type="radio"/> my current flight	<input type="radio"/> the alternate flight

Question 10 of 10

80%



If you have questions or problems, please call toll free 1-888-774-5987 between 9 AM and 5PM Eastern Time and ask for Air Travel Study or extension 135, or email AirTravelStudy@surveycafe.com

Source:



Rating Exercise

Air Travel Study 2005

How strongly do you agree or disagree with the following statements?

	STRONGLY DISAGREE	SOMEWHAT DISAGREE	NEITHER AGREE NOR DISAGREE	SOMEWHAT AGREE	STRONGLY AGREE
I like to take my time when connecting between flights	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's hard for me to find my way through airports	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Given two itineraries that only differ in connecting time, I always choose the one with shorter connecting time	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't think time at airports is wasted because I can shop, eat or work at airports	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm willing to accept the risk of a missed connection if this gets me to my destination earlier most of the time	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I usually arrive at the check-in counter just before the check-in deadline	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Catching my scheduled connecting flight is of great importance to me	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Progress 55% 

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Air Travel Study 2005

How strongly do you agree or disagree with the following statements?

	STRONGLY DISAGREE	SOMEWHAT DISAGREE	NEITHER AGREE NOR DISAGREE	SOMEWHAT AGREE	STRONGLY AGREE
Airlines sometimes underestimate the time needed to connect between flights	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is the passenger's responsibility to plan for a sufficient connecting time when booking a connecting itinerary	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't mind being rushed at a connecting airport if this means I'll arrive at my final destination earlier	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Airlines only sell connections that they expect passengers are able to make	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to avoid short connections because of the risk of either me or my luggage missing the connecting flight	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy having extra time at airports	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I make sure that the planned connecting time is adequate for me when booking a connecting itinerary	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

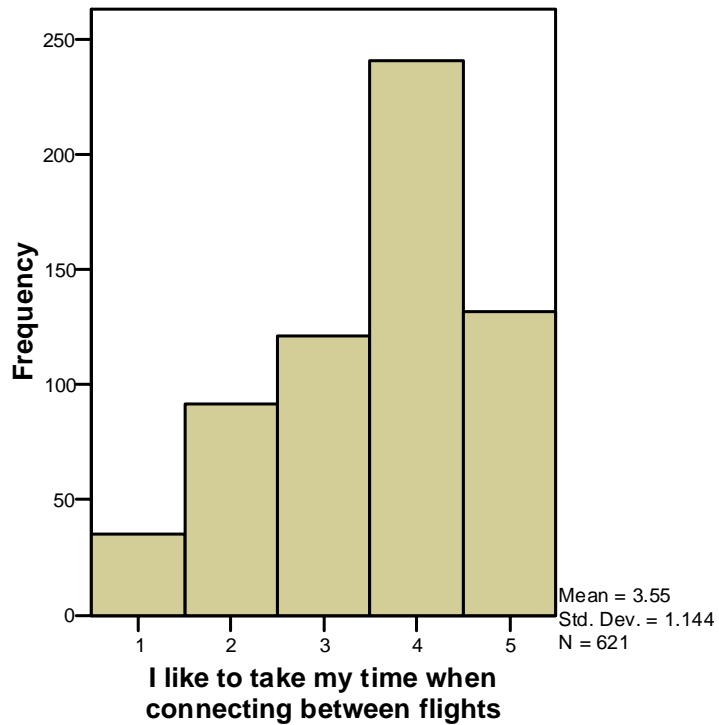
Progress 55% 

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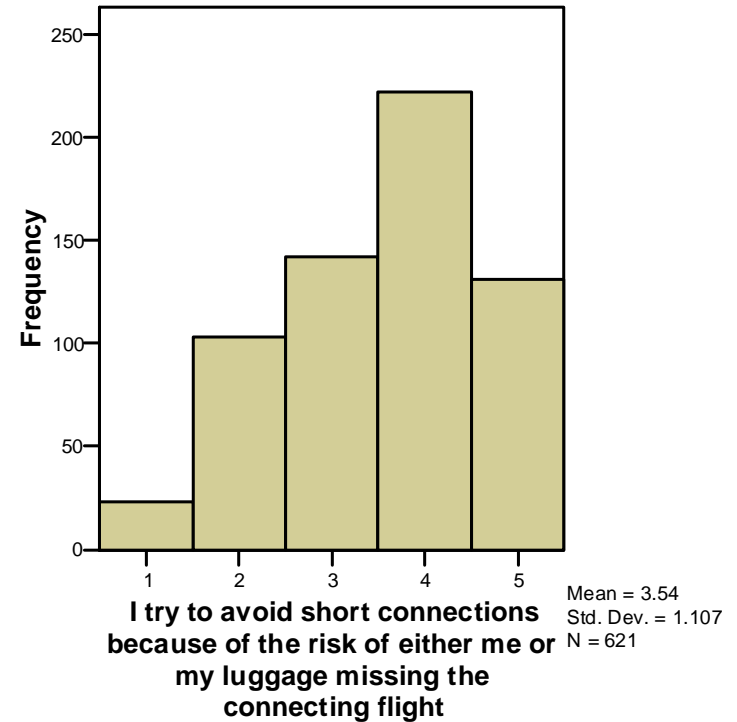


Results: Attitudes toward rush and risk as captured in the rating exercise



1:strongly disagree

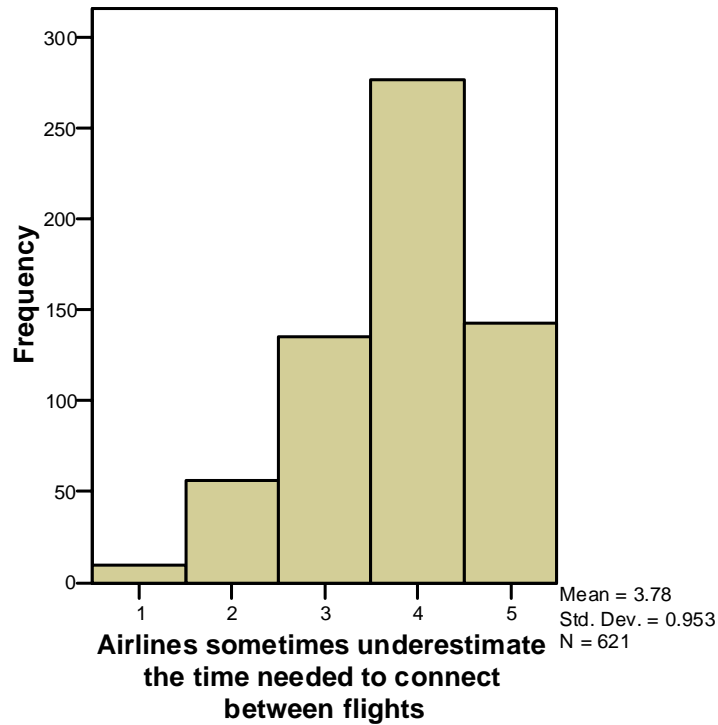
5: strongly agree



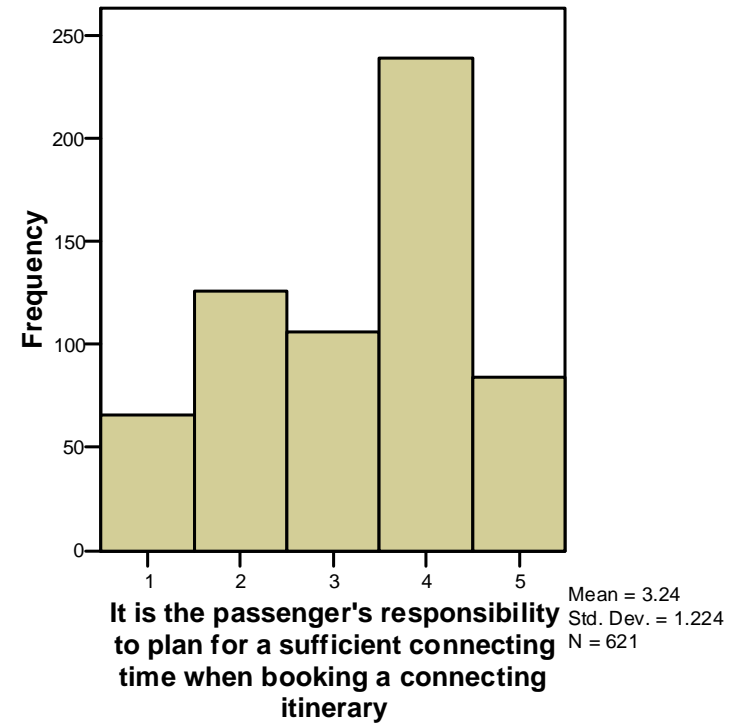
1:strongly disagree

5: strongly agree

Results: Trust into airlines' scheduling capability



1:strongly disagree 5: strongly agree



1:strongly disagree 5: strongly agree



Preliminary Conclusions of Choice Model

- **Based on preliminary analysis, our hypothesis on the utility of connection times is validated (at MCT+30 and MCT +75)**
- **Frequent flyer status affects preferences substantially**
- **Level of service (nonstop vs. connecting) remains very important in itinerary choice**
- **Trying to avoid certain aircraft types (prop) affects business travelers more strongly**
- **Night departures (midnight to 5am) have a highly negative impact on business travelers**

■ With fixed timetable

- Airlines could increase fleet commonality by moving lower booking class passengers/specific socio-demographic cohorts to longer transfer times (instead of flying an A300 into the peak and 320 offpeak, they could use an A321 all day)

■ With changed timetable

- Don't put strongest O-D on minimum connecting time
- Give riskaverse passengers better options (90 minutes instead of 45/240 minutes)
- Depeaking will lead to better resource utilization

■ Longer transfer times would in both cases lead to

- Fewer irregularities (misconnected passengers)
- Fewer ad hoc services (ramp direct service, hub transfer center, etc.)
- Fewer outbound delays (yes, sometimes airplanes are held for passengers)
- Higher concession revenues for airports (which could be translated into lower airport fees for airlines)