Airline Pricing, Price Dispersion, and Ticket Characteristics On and Off the Internet

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Web Appendix

I. Data description, construction of variables, and expected effects

We describe below the variables used and how they were constructed. The final data set used for the analysis has been assembled from three different data sets. The first data set includes contemporaneous online and offline transaction data from the fourth quarter of 2004. However, our period includes some of the peak travel period, particularly Thanksgiving, Christmas, and New Years. To avoid pricing problems during these peak travel periods, we dropped transactions for travel during Thanksgiving week. We also kept transactions that included departure and return through December 22, 2004, but excluded the remainder of the year. Thus we do not include itineraries involving travel during the last week of the year, since pricing can be different for these periods.

This transaction data comes from one of the major computer reservation systems. Unfortunately, due to confidentiality reasons, they did not provide us with ticket restriction information. To overcome this limitation, we collected computer reservation system data by gathering that data from a local travel agent. Travel agent systems can access historical data for up to a year. However, due to the time difference between the actual period for which we had data and the data that we could collect, we could obtain only a subset of the prices and ticket characteristics for fares offered during the last quarter of

2004. The remaining data was taken out of the reservation system in an apparently random manner. We matched our transaction data to the travel agents data to obtain the restrictions on the individual tickets. Both data sets contained data on city-pair, airline, date of departure and fare. In addition, the original data set contained the date of return while the second contains advance purchase and other restrictions. In matching the data we ensured that all restrictions found in the second data set were satisfied by the travel information detailed in the first data set. Further, to overcome, the data limitation problem arising from the sub-set of the data that we could collect, we adopted a matching rule. If two prices from the data sets matched within two percent, we considered it a match. Hence we assume that for a ticket priced at $150 it is a match with a ticket priced between $147 or $153, provided the ticket was the same regarding other matching criteria including carrier, booking class, cabin, travel and stay restrictions, and advance purchase requirements.

Following Borenstein (1989) and Borenstein and Rose (1994), we exclude first and business class itineraries. Given the high proportion of itineraries involving direct travel, we exclude the small number of itineraries with a stop-over (approximately 2%). The prices are for roundtrip fares. We double fares for one-way itineraries. We exclude itineraries with open-jaws and circular trips. This study includes tickets which are operated by American Airlines, Continental, Delta, Northwest, US Airways, United Airlines, Frontier, Air Tran, Spirit, Alaska, America West, Sun Country, Frontier Airlines, and American Trans Air.

We include the following variables:

Market share: equals the share of passengers accounted by a carrier on a route. T-100 segment data is used to calculate this share. If there is not a complete umbrella effect from the market power of a dominant firm, then holding the market concentration constant, an increase in market share is expected to increase the prices (expected sign: positive).

Herfindahl Index (HHI): equals the sum of squares of the market shares of the carriers on a route. To the extent that the dominant firm's high prices create an umbrella that allows a few firms in a concentrated market to collude easily, then increases in the concentration will increase prices. If however, a dominant firm on a route has a competitive advantage owing to cost structure, advertising, marketing or other means, then it could possibly reduce the profit maximizing prices of the other firms (expected sign: ?).

Hub: equals 1 if either endpoint airport of the route is a hub airport for the operating carrier (expected sign: positive).

Slot restricted airport: equals 1 if any endpoint airport has restricted slots. This includes LGA, JFK and DCA (expected sign: positive).

Online: equals 1 if the ticket was bought online and 0 if purchased offline (expected sign: negative).

Internet share: equals the share of all online transactions to the total transactions on a route (expected sign: negative).

*Internet share*Online:* equals internet share interacted with the online dummy (expected sign :?).
Search21: equals the share of all tickets purchased three or more weeks in advance. This variable is used as an instrument for the share of online transactions.

Internet_instrument_ref: equals the share of online transactions at the endpoint airports excluding the route in consideration, i.e. it is the average share of online purchases on other routes originating at the endpoint airports. This variable is used as an instrument for the share of tickets purchased online.

Advance purchase requirement (multiple variables): each variable equals 1for its particular advance purchase requirement, including variables for 1, 3, 5, 7, 10, 14, 21, and 30 days (expected sign: negative).

Non-refundable: equals 1 if the ticket is non-refundable (expected sign: negative).

Days prior to departure ticket purchased: equals the number of days before departure the ticket was purchased. Given our data, there exist very low fares close to departure, including even the day of departure, and high fares well in advance of departure. Hence the relationship between days prior to departure and price paid is indeterminate (expected sign :?).

Saturday stay-over: equals 1 if the itinerary involved a Saturday stay-over. This variable was created using the departure and return dates from the transaction data (expected sign: negative).

Travel Restriction: equals 1 if the ticket required a restriction to travel on particular days. This primarily requires the ticket to be used for particular days of the week, e.g.Tuesday or Thursday (expected sign: negative).

Minimum stay requirement: equals 1 if the ticket required a minimum stay (expected sign: negative).

Maximum stay requirement: equals 1 if the ticket required a maximum stay (expected sign: negative).

Full coach fare class: equals 1 if any segment of the itinerary involved travel in full coach fare class (expected sign: positive).

Roundtrip: equals 1 if the itinerary was for a roundtrip travel (expected sign: negative).

Deviation in load factor: equals the difference between the load factor at time a ticket was purchases and the average load factor at carrier-route level corresponding to that particular number of days prior to departure. We had the flight numbers for each segment of an itinerary. We used this information along with data from the Official Airline Guide (OAG) to calculate the total

aircraft capacity for each flight and date. From our transaction data, we calculated the total number of seats sold on that flight as of the day before an individual transaction. That is, for a ticket involving travel on flight 66 on American Airlines (AA) from DFW-ORD on October 22, 2004, and purchased on October 9th, we calculated the number of seats sold on flight 66 for departure on October 22nd that were sold on or before October 8th. Since we cannot observe the order of transaction taking place on the same day (October 9th), we assume that all tickets purchased October 9th for the October 10th flight will face the load factor observed through October 8th. This is the closest approximation available to calculate the contemporaneous load factor facing an individual ticket at the time of transaction.

To calculate the average load factor, we computed the load factor for all American flights from DFW-ORD for different days in advance of departure. Put differently, we computed the average load factor across all AA flights from DFW-ORD for 1 day prior to departure, 2 days prior to departure etc. For example, the deviation in load factor in the example above would be the actual load factor for flight 66 as of October 9th minus the average load factor of AA flights from DFW-ORD 13 days prior to departure. Positive load factor deviations indicate that a particular flight is facing higher demand, creating more scarciaty, and likely resulting in higher prices (expected sign: positive)

*Departure **and** return at peak time:* equals 1 if the individual itinerary involves **both** departure and return at a peak time (between 8-10am or 3-7pm). Given the flight numbers, we use information from OAG to determine the local departure time (expected sign: positive)

*Departure **or** return at peak time:* equals 1 if the individual itinerary involves **either** departure or return during peak time (between 8-10am or 3-7pm), but not both (expected sign: positive)

Departure and return at off-peak time: equals 1 if the individual itinerary involves departure and return at a off-peak time where peak time lies between between 8-10am or 3-7pm. This is treated as a reference group in our analysis.

Low cost carrier on route: equals 1 if a low cost carrier (other than Southwest) operates on that route. The presence of the low cost carrier is expected to increase competition, driving the prices down (expected sign: negative).

Southwest: equals 1 if Southwest Airlines operates on that route. Southwest presence should increase competition (expected sign: negative).

Distance (in logs): equals the non-stop nautical mileage between the endpoint airports on a route (expected sign: positive).

Tourist share: equals the share of passengers traveling for leisure from the origin to the destination airport. This variable is constructed using the business share index derived by Borenstein (2010), who in turn used the American Travel Survey, 1995. For each airport code, Borenstein (2010) computes two business share indices based on – (a) passengers originating their travel from the specific airport, and (b) passengers whose final destination is the specific airport. These measures are also reported at the metropolitan statistical area (SMSA) and the state level. We consider the SMSA level measure for our

analysis. To compute the business share between the origin and destination airport, we average the business share index at the origin airport and at the destination airport.

For example, the business share at ORD airport with ORD as origin is 0.41 while the business share with Atlanta (ATL) as the destination airport is 0.54. Furthermore, the business share with ORD as a destination equals 0.60 while the share is 0.44 for ATL as origin airport. For our analysis, an itinerary with ORD as origin airport and ATL as the destination airport will be assigned a business share of 0.475, i.e., itineraries originating from ORD *to* ATL on average consist of 47.5 percent of business travelers. Similarly, an itinerary that originates at ATL with ORD as its destination will be assigned a business share of 0.52. The tourist share is one minus the business share (expected sign: negative).

Population (log): equals the natural log of the average population at the two endpoints of the route (Source: US Census 2003). Increased population at the endpoints of a route can create increased demand, raising prices. Conversely, more flights leads to greater competition, lowering prices (expected sign:?).

Per capita income (log): equals the natural log of the average per capita income at the two endpoints of the route (Source: US Census 2003) (expected sign: positive).*Departure day of the week (multiple variables):* each variable equals one for a particular departure day of the week. The omitted variable in the group is Sunday.

Return day of the week (multiple variables): each variable equals one for a particular return day of the week. The omitted variable is Sunday.

We also use instrumental variables to address endogeneity issues pertaining to the market share and HHI variables. We use the variable "geoshare" to instrument for market share and the variable "xtherf" to instrument for HHI. These variables were constructed as described below:

Geoshare: given by $(\sqrt{ENP_{x1}}.\ ENP_{x2})/\ \sum_y (\sqrt{ENP_{y1}}.\ ENP_{y2})$ where y indexes all airlines, x the observed airline and ENP_{y1} and ENP_{y2} are airline y's average enplanements at the two enpoints airports during the fourth quarter of 2004.

Xtherf: is the square of the fitted values of market share (from its first stage regression) plus the rescaled sum of the squared of all other carriers' share. This is given by:

xtherf = (predicted market share)^2 + [(HHI-market share^2)/(1-market share)^2]*(1-predcited market share)^2 . See discussion in Borenstein (1989) and/or Borenstein and Rose (1994).

The rest of this appendix reports additional results referred to in the main text but not reported there. Table A1 compares the descriptive statistics of the matched and all transactions in our data set. Table A2 includes the complete list of the 150 city-pair routes used in the analysis. Finally, Table A3 reports the estimation results of the effects of internet purchase on prices when we include route fixed effects rather than market structure variables such as market share and the Herfindahl index.

Table A4 presents regression results using a restricted set of tickets for particular city-pairs. In particular, we use only roundtrip fares and non-refundable, restricted tickets, and we group tickets according to different groupings of days prior to departure. Fares are also grouped for travel within particular times of the day. These tickets are highly comparable. We then introduce individual dummy variables within these groups for internet purchase. The results show consistent and substantial cost savings for purchase on the internet within these particular groupings.

Table A5 reports results of the sensitivity analysis regarding our ticket matching criteria. In particular, as discussed in the text, Table A5 uses matched tickets where the matching criterion considers a match to be tickets where fares are within five percent of each other. The results in Table A5 clearly suggest that the direct and indirect effects of the internet on average prices are robust even when we include the five percent matched samples. This result confirms the findings reported in the text.

Table A6 replicates the results presented in Table 8 but without rescaling dispersion by dividing by average fares. The results parallel the findings presented in Table 8, though the internet share variable in the final specification maintains the negative relationship with dispersion measure. The effect is however statistically insignificant.

Tables A7 and A8 parallel Table 5 and Table 7 respectively, but use alternative tourist variables. The new tourist variables include separate measures of the share of tourists from origin to destination, and from destination to origin, as compared to the average share of tourist at the endpoint routes. These new tourist measures are statistically insignificant, such that the primarily results presented in Tables 5 and 7, remain unaffected.

Table A9 replicates the IV estimates in Tables 5 and 7. The results suggest that the estimates of the effect of the share of online transactions is sensitive to the choice of instrument. Finally, Table A10 includes a list of the hub airports and airlines.

Table A1: Sample Means for Match versus Unmatched Transactions

Variable	All Transactions (N=1,553,608)	Matched Transactions (N=453,347)
Fare (for roundtrip)	340.965	376.498
Non-refundable	-	0.816
Some travel restriction (e.g. DOW)	-	0.441
Minimum stay requirement	-	0.241
Maximum stay requirement	-	0.211
Satyed over Saturday night	0.229	0.195
Purchased 0 - 3 Days in Advance	0.259	0.257
Purchased 4 - 6 Days in Advance	0.148	0.145
Purchased 7 - 13 Days in Advance	0.200	0.213
Purchased 14 - 21 Days in Advance	0.143	0.155
Purchased > 21 Days in Advance	0.249	0.230
Roundtrip itinerary	0.826	0.766
American	0.316	0.331
Continental	0.076	0.102
Delta	0.204	0.149
Northwest	0.068	0.074
US Air	0.096	0.094
United	0.173	0.180
America West	0.018	0.013
AirTran	0.002	0.002
Frontier	0.017	0.028
Spirit	0.008	0.008
Sun Country	0.006	0.004
Hawaiian	0.001	0.001
America Trans Air	0.003	0.001
Alaska	0.012	0.011
Midwest	0.001	0.001
Monday Departure	0.204	0.210
Tuesday Departure	0.180	0.188
Wednesday Departure	0.163	0.165
Thursday Departure	0.150	0.149
Friday Departure	0.134	0.126
Saturday Departure	0.067	0.059
Sunday Departure	0.102	0.103

Table A2

List of City Pairs Used

Routes	Routes
Atlanta (ATL)-Boston (BOS)	Chicago O'Hare (ORD)-Orange County (SNA)
Atlanta (ATL)-Cincinnati (CVG)	Chicago (MDW)-Detroit (DTW)
Atlanta (ATL)- Fort Lauderdale (FLL)	Cleveland (CLE)-Chicago (MDW)
Atlanta (ATL)-Dulles, DC (IAD)	Cleveland (CLE)-Chicago O'Hare (ORD)
Atlanta (ATL)-Houston (IAH)	Cincinnati (CVG)-Chicago O'Hare (ORD)
Atlanta (ATL)-Los Angeles (LAX)	Columbus (CMH)-LaGuardia (LGA)
Atlanta (ATL)-LaGuardia (LGA)	Dallas (DFW)-Atlanta (ATL)
Atlanta (ATL)-Orlando (MCO)	Dallas (DFW)-Denver (DEN)
Atlanta (ATL)-Memphis (MEM)	Dallas (DFW)-Washington (IAD)
Atlanta (ATL)-Miami (MIA)	Dallas (DFW)-Houston (IAH)
Atlanta (ATL)-New Orleans (MSY)	Dallas (DFW)-Los Angeles (LAX)
Atlanta (ATL)-Chicago O'Hare (ORD)	Dallas (DFW)-Long Beach (LGB)
Atlanta (ATL)-Philadelphia (PHL)	Dallas (DFW)-Kansas City (MCI)
Atlanta (ATL)-Tampa (TPA)	Dallas (DFW)-Chicago O'Hare (ORD)
Baltimore (BWI)-Atlanta (ATL)	Dallas (DFW)-Phoenix (PHX)
Baltimore (BWI)-Cleveland (CLE)	Denver (DEN)-Atlanta (ATL)
Baltimore (BWI)-Dallas (DFW)	Denver (DEN)-Boston (BOS)
Baltimore (BWI)-Fort Lauderdale (FLL)	Denver (DEN)-Washington (DCA)
Baltimore (BWI)-Los Angeles (LAX)	Denver (DEN)-Newark (EWR)
Baltimore (BWI)-Orlando (MCO)	Denver (DEN)-Houston (IAH)
Boston (BOS)-Baltimore (BWI)	Denver (DEN)-New York (LGA)
Boston (BOS)-Charlotte (CLT)	Denver (DEN)-Kansas City (MCI)
Boston (BOS)-Washington (DCA)	Denver (DEN)-Orlando (MCO)

Table A2

List of City Pairs Used

Routes	Routes
Boston (BOS)-Dallas (DFW)	Denver (DEN)-Portland (PDX)
Boston (BOS)-Detroit (DTW)	Denver (DEN)-Philadelphia (PHL)
Boston (BOS)-Los Angeles (LAX)	Denver (DEN)-Phoenix (PHX)
Boston (BOS)-Philadelphia (PHL)	Denver (DEN)-St. Louis (STL)
Boston (BOS)-Pittsburgh (PIT)	Denver (DEN)-Tampa (TPA)
Boston (BOS)-Fort Myers (RSW)	Detroit (DTW)-Atlanta (ATL)
Boston (BOS)-Tampa (TPA)	Detroit (DTW)-Baltimore (BWI)
Charlotte (CLT)-Orlando (MCO)	Detroit (DTW)-Dallas (DFW)
Chicago O'Hare (ORD)-Boston (BOS)	Detroit (DTW)-Newark (EWR)
Chicago O'Hare (ORD)-Baltimore (BWI)	Detroit (DTW)-Fort Lauderdale (FLL)
Chicago O'Hare (ORD)-Charlotte (CLT)	Detroit (DTW)-Las Vegas (LAS)
Chicago O'Hare (ORD)-Denver (DEN)	Detroit (DTW)-Orlando (MCO)
Chicago O'Hare (ORD)-Washington (IAD)	Detroit (DTW)-Chicago O'Hare (ORD)
Chicago O'Hare (ORD)-New York (LGA)	Fort Lauderdale (FLL)-Boston (BOS)
Chicago O'Hare (ORD)-Miami (MIA)	Fort Lauderdale (FLL)-Chicago O'Hare (ORD)
Chicago O'Hare (ORD)-Minneapolis (MSP)	Hartford (BDL)-Washington (DCA)
Chicago O'Hare (ORD)-New Orleans (MSY)	Hartford (BDL)-Chicago O'Hare (ORD)
Chicago O'Hare (ORD)-Omaha (OMA)	Honolulu (HNL)-Los Angeles (LAX)
Chicago O'Hare (ORD)-Ft. Myers (RSW)	Houston (IAH)-New Orleans (MSY)
Chicago O'Hare (ORD)-San Diego (SAN)	Houston (IAH)-Chicago O'Hare (ORD)
Las Vegas (LAS)-Burbank (BUR)	New York (LGA)-Cincinnati (CVG)
Las Vegas (LAS)-Los Angeles (LAX)	New York (LGA)-Dallas (DFW)
Las Vegas (LAS)-Chicago O'Hare (ORD)	New York (LGA)-Detroit (DTW)

Table A2

List of City Pairs Used

Routes	Routes
Long Beach (LGB)-Dallas (DFW)	New York (LGA)-Houston (IAH)
Los Angeles (LAX)-Denver (DEN)	New York (LGA)-Palm Beach, FL (PBI)
Los Angeles (LAX)-Detroit (DTW)	Oakland (OAK)-Denver (DEN)
Los Angeles (LAX)-Houston (IAH)	Oakland (OAK)-Seattle (SEA)
Los Angeles (LAX)-Miami (MIA)	Ontario (ONT)-Denver (DEN)
Los Angeles (LAX)-Chicago O'Hare (ORD)	Orlando (MCO)-Washington (DCA)
Los Angeles (LAX)-Philadelphia (PHL)	Orlando (MCO)-Dallas (DFW)
Los Angeles (LAX)-Reno (RNO)	Orlando (MCO)-New York (LGA)
Los Angeles (LAX)-Tampa (TPA)	Palm Beach (PBI)-Boston (BOS)
Miami (MIA)-New York (LGA)	Philadelphia (PHL)-Chicago O'Hare (ORD)
Miami (MIA)-Boston (BOS)	Philadelphia (PHL)- Palm Beach (PBI)
Miami (MIA)-Newark (EWR)	Phoenix (PHX)-Minneapolis (MSP)
Milwaukee (MKE)-Minneapolis (MSP)	Phoenix (PHX)-Ontario (ONT)
Minneapolis (MSP)-Denver (DEN)	Pittsburgh (PIT)-New York (LGA)
Minneapolis (MSP)- Dallas (DFW)	Pittsburgh (PIT)-Chicago O'Hare (ORD)
Minneapolis (MSP)-Detroit (DTW)	Portland (PDX)-Las Vegas (LAX)
Minneapolis (MSP)-Los Angeles (LAX)	Portland (PDX)-Los Angeles (LAX)
Minneapolis (MSP)-New York (LGA)	Portland (PDX)-Oakland (OAK)
Minneapolis (MSP)-Chicago (MDW)	St. Louis (STL)-Los Angeles (LAX)
Newark (EWR)-Minneapolis (MSP)	Sacramento (SMF)-Los Angeles (LAX)
Newark (EWR)-Chicago O'Hare (ORD)	Salt Lake City (SLC)-Denver (DEN)
Newark (EWR)-Atlanta (ATL)	San Francisco (SFO)-Boston (BOS)
Newark (EWR)-Boston (BOS)	San Francisco (SFO)-Dallas (DFW)

Table A2 List of City Pairs Used	
Routes	**Routes**
Newark (EWR)-Los Angeles (LAX)	San Jose (SJC)-Denver (DEN)
New Orleans (MSY)-New York (LGA)	Tampa (TPA)-New York (LGA)
New York (JFK)-Los Angeles (LAX)	Washington (DCA)-Atlanta (ATL)
New York (LGA)-Boston (BOS)	Washington (DCA)-Dallas (DFW)
New York (LGA)-Cleveland (CLE)	Washington (DCA)-LaGuardia (LGA)
New York (LGA)-Charlotte (CLT)	Washington (DCA)-Chicago O'Hare(ORD)

Table A3: The Effects of Online Purchase when Route Fixed Effects are Included

	Log(Roundtrip Fare)
Online	-0.104721
	(0.001390)**
Non-refundable	-0.30945
	(0.001818)**
Days prior to departure ticket purchased	-0.000429
	(0.000027)**
Advance Purchase Restriction	
[Omitted: No advance purchase requirement]	
1-day	-0.286935
	(0.003683)**
3-day	-0.052705
	(0.001789)**
5-day	-0.568815
	(0.013985)**
7-day	-0.189261
	(0.001399)**
10-day	-0.244412
	(0.003096)**
14-day	-0.284518
	(0.001553)**
21-day	-0.312351
	(0.003223)**
30-day	-0.136751
	(0.007743)**
Other Ticket Characteristics	
Roundtrip	-0.063665
	(0.002252)**
Saturday stay-over	-0.127202
	(0.001866)**
Full coach fare class	0.384465
	(0.002010)**
Travel day restriction	-0.271436
	(0.001041)**
Minimum stay required	-0.02342
	(0.001497)**

Table A3 (continued)

Maximum stay restriction	-0.042554
	(0.001511)**
Hub	0.030634
	(0.002786)**
Deviation in load factor	0.216778
	(0.006816)**
Time of day	
Departure and return at peak time	0.041737
	(0.002013)**
Either departure or return at peak time, but not both	0.016737
	(0.000951)**
Departure day of the week fixed effects	Yes
Return day of the week fixed effects	Yes
Carrier Fixed Effects	Yes
Route Fixed Effects	Yes
Constant	6.049027
	(0.006700)**
Obervations	453347
R2	0.71

Notes

Standard errors in parentheses

* significant at 5%; ** significant at 1%

Table A4: Difference in Online and Offline Fares for Non-refundable Restricted Tickets for various Departure Times and Purchases in Different Intervals Prior to Departure

	JFK to Los Angeles Log(Roundtrip Fare)	Chicago to Laguardia Log(Roundtrip Fare)	Chicago to Newark Log(Roundtrip Fare)
All Tickets			
Itineraries with travel between 7am and 10am			
Ticket purchased 0-6 days in advance	6.165419	5.991072	5.770171
	(0.013683)**	(0.012688)**	(0.011988)**
Ticket purchased 7-13 days in advance	5.734108	5.750062	5.598535
	(0.012288)**	(0.013744)**	(0.018986)**
Ticket purchased 14-21 days in advance	5.820028	5.528249	5.526098
	(0.012446)**	(0.012624)**	(0.015743)**
Ticket purchased more than 21 days in advance	5.770392	5.436871	5.508109
	(0.011091)**	(0.010071)**	(0.015855)**
Itineraries with travel between 3pm and 7pm			
Ticket purchased 0-6 days in advance	6.196227	6.025615	5.813036
	(0.013142)**	(0.009960)**	(0.008268)**
Ticket purchased 7-13 days in advance	5.771168	5.778374	5.637051
	(0.014238)**	(0.011226)**	(0.012886)**
Ticket purchased 14-21 days in advance	5.832808	5.62334	5.549783
	(0.014305)**	(0.011260)**	(0.010239)**
Ticket purchased more than 21 days in advance	5.763934	5.534208	5.513635
	(0.013327)**	(0.009080)**	(0.010652)**
Itineraries with travel after 7pm			
Ticket purchased 0-6 days in advance	6.199329	5.965377	5.715623
	(0.015775)**	(0.013106)**	(0.012501)**
Ticket purchased 7-13 days in advance	5.765093	5.796022	5.611923
	(0.017146)**	(0.015785)**	(0.019281)**
Ticket purchased 14-21 days in advance	5.81956	5.500899	5.533
	(0.017750)**	(0.014488)**	(0.021317)**
Ticket purchased more than 21 days in advance	5.754573	5.430678	5.484469
	(0.017642)**	(0.015270)**	(0.019901)**
Itineraries with travel between 10am and 3pm			
Ticket purchased 0-6 days in advance	6.201432	5.951976	5.739074
	(0.013221)**	(0.011720)**	(0.010668)**
Ticket purchased 7-13 days in advance	5.763562	5.73499	5.595607
	(0.012915)**	(0.013740)**	(0.017369)**
Ticket purchased 14-21 days in advance	5.837788	5.484029	5.526229
	(0.012478)**	(0.011038)**	(0.013040)**
Ticket purchased more than 21 days in advance	5.77852	5.430725	5.472953
	(0.011245)**	(0.008804)**	(0.011774)**

Table A4 (continued)

Online Tickets			
Itineraries with travel between 7am and 10am			
Ticket purchased 0-6 days in advance	-0.203804	-0.315907	-0.198367
	(0.041303)**	(0.070675)**	(0.036141)**
Ticket purchased 7-13 days in advance	-0.106567	-0.356215	-0.164045
	(0.032437)**	(0.051022)**	(0.047202)**
Ticket purchased 14-21 days in advance	-0.188821	-0.175364	-0.245236
	(0.031656)**	(0.055286)**	(0.063376)**
Ticket purchased more than 21 days in advance	-0.078173	-0.191449	-0.216727
	(0.025706)**	(0.023800)**	(0.047230)**
Itineraries with travel between 10am and 3pm			
Ticket purchased 0-6 days in advance	-0.276473	-0.182151	-0.173927
	(0.041520)**	(0.044779)**	(0.029080)**
Ticket purchased 7-13 days in advance	-0.208359	-0.365967	-0.170838
	(0.035811)**	(0.052034)**	(0.047810)**
Ticket purchased 14-21 days in advance	-0.186139	-0.110516	-0.217119
	(0.035223)**	(0.032946)**	(0.036403)**
Ticket purchased more than 21 days in advance	-0.0949	-0.146978	-0.158441
	(0.026208)**	(0.022159)**	(0.028373)**
Itineraries with travel between 3pm and 7pm			
Ticket purchased 0-6 days in advance	-0.227148	-0.201668	-0.240239
	(0.044592)**	(0.045139)**	(0.026525)**
Ticket purchased 7-13 days in advance	-0.155034	-0.296699	-0.105941
	(0.042056)**	(0.040680)**	(0.041371)*
Ticket purchased 14-21 days in advance	-0.122632	-0.236105	-0.206877
	(0.035952)**	(0.029153)**	(0.034433)**
Ticket purchased more than 21 days in advance	-0.038693	-0.259001	-0.207502
	-0.029569	(0.017595)**	(0.024393)**
Itineraries with travel after 7pm			
Ticket purchased 0-6 days in advance	-0.198441	-0.373986	-0.167766
	(0.046255)**	(0.043908)**	(0.033388)**
Ticket purchased 7-13 days in advance	-0.110171	-0.371133	-0.135234
	(0.040304)**	(0.056091)**	(0.053936)*
Ticket purchased 14-21 days in advance	-0.15842	-0.145678	-0.216589
	(0.033729)**	(0.037295)**	(0.068228)**
Ticket purchased more than 21 days in advance	-0.005709	-0.142298	-0.286613
	-0.032506	(0.032524)**	(0.044726)**
Carrier Fixed Effects	Yes	Yes	Yes
Observations	7938	8042	8645

Notes

Standard errors in parentheses

* significant at 5%; ** significant at 1%

Table A5: Internet Purchases, Internet Share, and Potential Savings from Internet Purchase in High-Low Internet Usage market for Transactions Matched within Five Percent Range

	Log(Roundtrip Fare) [OLS]	Log(Roundtrip Fare) [IV]	Log(Roundtrip Fare) [OLS]	Log(Roundtrip Fare) [IV]	Log(Roundtrip Fare) [OLS]	Log(Roundtrip Fare) [IV]
Market Structure Variables						
Market share	0.108947	0.289332	0.106893	0.271738	0.104684	0.270823
	(0.088853)	(0.320541)	(0.087004)	(0.311675)	(0.086881)	(0.310780)
HHI	-0.006851	-0.297902	-0.032048	-0.275652	-0.029759	-0.274125
	(0.117478)	(0.339551)	(0.114673)	(0.325427)	(0.114703)	(0.324334)
Hub	0.096584	0.079719	0.094958	0.079371	0.09499	0.079271
	(0.040552)*	(0.053881)	(0.038194)*	(0.053897)	(0.038053)*	(0.053682)
Slot restricted airport	0.115191	0.11974	0.112818	0.115938	0.11262	0.115682
	(0.047657)*	(0.053271)*	(0.047589)*	(0.053642)*	(0.047509)*	(0.053542)*
Online	-0.147928	-0.143947	-0.138834	-0.137729	-0.184876	-0.173618
	(0.008825)**	(0.011054)**	(0.008414)**	(0.011541)**	(0.025934)**	(0.030669)**
Share of online transactions			-0.672911	-0.482975	-0.714467	-0.515099
			(0.171448)**	(0.245124)*	(0.181883)**	(0.253184)*
Share of Online transactions * Online					0.199648	0.155697
					(0.116602)	(0.129311)
Advance Purchase Restriction						
[Omitted: No advance purchase requirement]						
1-day	-0.483881	-0.479298	-0.45037	-0.456485	-0.449209	-0.455634
	(0.061544)**	(0.063749)**	(0.054770)**	(0.057526)**	(0.054632)**	(0.057391)**
3-day	-0.034051	-0.030014	-0.026799	-0.025526	-0.025959	-0.024881
	(0.036054)	(0.036219)	(0.036155)	(0.035963)	(0.036166)	(0.035970)
5-day	-0.664818	-0.654004	-0.617971	-0.623205	-0.618466	-0.623696
	(0.052284)**	(0.056565)**	(0.045631)**	(0.051716)**	(0.045669)**	(0.051800)**
7-day	-0.200913	-0.198966	-0.197476	-0.196899	-0.196719	-0.196318
	(0.025868)**	(0.026231)**	(0.025087)**	(0.025447)**	(0.024995)**	(0.025367)**
10-day	-0.283269	-0.275424	-0.283633	-0.277241	-0.282203	-0.276152
	(0.027121)**	(0.027492)**	(0.027842)**	(0.027685)**	(0.027930)**	(0.027764)**
14-day	-0.262825	-0.256441	-0.265296	-0.259365	-0.264173	-0.258501
	(0.024176)**	(0.024529)**	(0.023948)**	(0.024215)**	(0.023924)**	(0.024178)**
21-day	-0.297841	-0.294373	-0.292864	-0.29156	-0.291577	-0.290575
	(0.031492)**	(0.032384)**	(0.031073)**	(0.031908)**	(0.030901)**	(0.031778)**
30-day	0.020263	0.023446	0.014213	0.018568	0.016786	0.020574
	(0.068904)	(0.066266)	(0.066522)	(0.064929)	(0.066241)	(0.064778)
Other Ticket Characteristics						
Non-refundable	-0.267112	-0.272802	-0.264857	-0.270087	-0.264578	-0.269853
	(0.053574)**	(0.054587)**	(0.053228)**	(0.054221)**	(0.053230)**	(0.054218)**
Days in advance ticket purchased	-0.001203	-0.001228	-0.000999	-0.001077	-0.001023	-0.001095
	(0.000190)**	(0.000191)**	(0.000190)**	(0.000193)**	(0.000186)**	(0.000189)**
Saturday stay-over	-0.121602	-0.120617	-0.118228	-0.118383	-0.118911	-0.118919
	(0.012365)**	(0.012381)**	(0.012253)**	(0.012234)**	(0.012233)**	(0.012243)**
Travel restriction	-0.307739	-0.311005	-0.303023	-0.306811	-0.302926	-0.306714
	(0.024523)**	(0.024345)**	(0.024393)**	(0.024301)**	(0.024375)**	(0.024285)**
Minimum stay required	0.007025	0.010778	0.005109	0.008909	0.005061	0.008878
	(0.024135)	(0.025262)	(0.024134)	(0.025026)	(0.024138)	(0.025030)
Maximum stay restriction	0.03056	0.035297	0.033853	0.036893	0.034247	0.037195
	(0.022751)	(0.022984)	(0.022870)	(0.023050)	(0.022828)	(0.023032)
Full coach fare class	0.378935	0.387208	0.381543	0.387223	0.381005	0.386758
	(0.058607)**	(0.059256)**	(0.059205)**	(0.059613)**	(0.059320)**	(0.059694)**
Remaining Ticket Characteristics						
Roundtrip	-0.084162	-0.085571	-0.088161	-0.088532	-0.088619	-0.088909
	(0.010687)**	(0.012007)**	(0.010523)**	(0.012098)**	(0.010462)**	(0.012037)**
Deviation in load factor	0.251437	0.247129	0.248503	0.245954	0.2479	0.245506
	(0.031849)**	(0.031807)**	(0.032031)**	(0.031902)**	(0.031962)**	(0.031838)**
Time of Day						
Departure and return at peak time	0.056162	0.057006	0.056242	0.057034	0.056053	0.056893
	(0.011928)**	(0.012391)**	(0.011734)**	(0.012168)**	(0.011714)**	(0.012143)**
Either departure or return at peak time, but not both	0.026479	0.026804	0.026665	0.026913	0.026597	0.026862
	(0.006245)**	(0.006512)**	(0.005891)**	(0.006196)**	(0.005883)**	(0.006189)**

Table A5 (continued)

Other Route Specific Characteristics						
Low cost carrier on route	-0.092208	-0.09071	-0.070628	-0.075629	-0.069899	-0.075084
	(0.036295)*	(0.036190)*	(0.035364)*	(0.036051)*	(0.035306)*	(0.036041)*
Southwest	-0.178171	-0.167792	-0.150618	-0.149668	-0.152044	-0.150797
	(0.047774)**	(0.047766)**	(0.047066)**	(0.047857)**	(0.047015)**	(0.047842)**
Distance (log)	0.369898	0.365224	0.409703	0.393628	0.41056	0.394216
	(0.027532)**	(0.032974)**	(0.028755)**	(0.034190)**	(0.028772)**	(0.034230)**
Tourist route	-0.27631	-0.31859	-0.066743	-0.162892	-0.06479	-0.161539
	(0.184355)	(0.179989)	(0.184583)	(0.174872)	(0.184338)	(0.174567)
Population (log)	-0.033671	-0.037811	-0.045746	-0.045212	-0.045687	-0.045115
	(0.020977)	(0.020713)	(0.021533)*	(0.021537)*	(0.021483)*	(0.021497)*
Per capita income (log)	0.199893	0.204486	0.093746	0.128247	0.091549	0.126625
	(0.158825)	(0.157821)	(0.160661)	(0.160642)	(0.160613)	(0.160593)
Departure day of the week						
Monday	0.007198	0.007229	0.007084	0.007152	0.007141	0.007197
	(0.005482)	(0.005511)	(0.005405)	(0.005431)	(0.005395)	(0.005423)
Tuesday	0.012397	0.012751	0.011371	0.01197	0.011531	0.012096
	(0.006687)	(0.006771)	(0.006630)	(0.006643)	(0.006614)	(0.006632)
Wednesday	0.014389	0.014917	0.013948	0.014498	0.013842	0.014413
	(0.007577)	(0.007608)	(0.007533)	(0.007533)	(0.007528)	(0.007526)
Thursday	0.021755	0.022613	0.021371	0.022191	0.021354	0.022177
	(0.008911)*	(0.008904)*	(0.008821)*	(0.008808)*	(0.008814)*	(0.008803)*
Friday	0.022573	0.022674	0.02202	0.022173	0.022567	0.022594
	(0.009387)*	(0.009404)*	(0.009265)*	(0.009239)*	(0.009235)*	(0.009216)*
Saturday	-0.069918	-0.068814	-0.069493	-0.068769	-0.069173	-0.068527
	(0.008719)**	(0.008750)**	(0.008608)**	(0.008645)**	(0.008614)**	(0.008646)**
Return day of the week						
Monday	-0.043954	-0.043648	-0.043004	-0.042934	-0.044027	-0.043727
	(0.006066)**	(0.006394)**	(0.006066)**	(0.006405)**	(0.005955)**	(0.006292)**
Tuesday	-0.038784	-0.038525	-0.037665	-0.037674	-0.039104	-0.03879
	(0.007570)**	(0.007816)**	(0.007488)**	(0.007755)**	(0.007275)**	(0.007541)**
Wednesday	-0.043952	-0.043911	-0.042876	-0.043046	-0.044228	-0.044093
	(0.007292)**	(0.007543)**	(0.007181)**	(0.007431)**	(0.006987)**	(0.007241)**
Thursday	-0.0321	-0.032733	-0.030765	-0.031612	-0.032078	-0.032632
	(0.007720)**	(0.007760)**	(0.007599)**	(0.007631)**	(0.007423)**	(0.007439)**
Friday	-0.034937	-0.035507	-0.033119	-0.034039	-0.034428	-0.035055
	(0.007698)**	(0.007768)**	(0.007585)**	(0.007613)**	(0.007403)**	(0.007421)**
Saturday	-0.058952	-0.059359	-0.058212	-0.058736	-0.059328	-0.059605
	(0.007365)**	(0.007471)**	(0.007268)**	(0.007328)**	(0.007127)**	(0.007194)**
Carrier Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	2.295582	2.433031	3.309685	3.12842	3.333416	3.145657
	(1.764577)	(1.746973)	(1.780056)	(1.780339)	(1.778562)	(1.778618)
Observations	696188	696188	696188	696188	696188	696188
R-squared	0.56	0.55	0.56	0.56	0.56	0.56

Notes

Robust standard errors in parentheses

* significant at 5%; ** significant at 1%

Table A6: Regression of the Standard Deviation of Residuals on Market Structure and Internet Usage Variables

	Standard deviation of Residuals	Standard deviation of Residuals	Standard deviation of Residuals	Standard deviation of Residuals
	[OLS]	[IV]	[OLS]	[IV]
Market share	0.067639	0.085528	0.066397	-0.037776
	(0.016471)**	(0.029986)**	(0.016696)**	(0.036381)
HHI	-0.084014	-0.083368	-0.083374	0.027841
	(0.023784)**	(0.040280)*	(0.023901)**	(0.039805)
Internet share	-0.122978	-0.115944	0.205978	-0.028249
	(0.034959)**	(0.039944)**	(0.445839)	(0.043634)
(Internet share)2			-1.135841	
			(1.598977)	
(Internet share)3			1.110419	
			(1.700285)	
Carrier Fixed Effects	No	No	No	Yes
Departure date fixed effects	No	No	No	Yes
	0.254734	0.244497	0.229503	0.209988
	(0.014865)**	(0.018420)**	(0.037239)**	(0.019798)**
Observations	19338	19338	19338	19338
R-squared	0.03	0.02	0.03	0.1

Notes

Robust standard errors in parentheses

* significant at 5%; ** significant at 1%

Table A7: Direct Effects of Internet Purchases

	Log(Roundtrip Fare) [OLS]	Log(Roundtrip Fare) [IV]
Market Structure Variables		
Market share	0.138435	0.21572
	(0.094055)	(0.298783)
HHI	-0.050234	-0.229356
	(0.112679)	(0.310151)
Hub	0.085707	0.080539
	(0.039997)*	-0.05348
Slot restricted airport	0.141528	0.150337
Internet Variable	(0.046511)**	(0.051505)**
Online	-0.122079	-0.120051
	(0.008313)**	(0.010609)**
Advance purchase restriction		
1-day	-0.429199	-0.420293
	(0.074656)**	(0.076775)**
3-day	0.04132	0.044715
	(0.034959)	(0.034891)
5-day	-0.73691	-0.729954
	(0.054133)**	(0.057788)**
7-day	-0.150163	-0.148169
	(0.027952)**	(0.028141)**
10-day	-0.290342	-0.285489
	(0.031316)**	(0.031519)**
14-day	-0.20758	-0.20308
	(0.024965)**	(0.025141)**
21-day	-0.272713	-0.27095
	(0.031100)**	(0.032297)**
30-day	0.061139	0.059271
	(0.075984)	(0.074141)
Other Ticket Characteristics		
Non-refundable	-0.215341	-0.22015
	(0.056842)**	(0.057219)**
Days in advance ticket purchased	-0.000971	-0.000986
	(0.000228)**	(0.000230)**
Saturday stay-over	-0.130883	-0.129586
	(0.012660)**	(0.012562)**
Travel restriction	-0.283642	-0.286631
	(0.023098)**	(0.023133)**
Minimum stay required	0.003574	0.006729
	(0.022994)	(0.024133)
Maximum stay restriction	-0.012594	-0.009368
	(0.023353)	(0.023259)
Full coach fare class	0.468845	0.478194
	(0.056283)**	(0.055757)**
Remaining Ticket Characteristics		
Roundtrip	-0.062161	-0.061609
	(0.012069)**	(0.013704)**
Deviation in load factor	0.210588	0.206472
	(0.035723)**	(0.035757)**
Time of Day		
Departure and return at peak time	0.054521	0.055153
	(0.012765)**	(0.013069)**
Either departure or return at peak time, but not both	0.025297	0.02562
	(0.006340)**	(0.006458)**

Table A7 (continued)

Other Route Specific Characteristics		
Low cost carrier on route	-0.082478	-0.080384
	(0.035274)*	(0.035235)*
Southwest	-0.171286	-0.163277
	(0.052171)**	(0.052504)**
Distance (log)	0.34235	0.342463
	(0.028979)**	(0.033835)**
Tourist share between origin and destination	-0.021272	-0.020472
	(0.184476)	(0.182657)
Tourist share between destination and origin	-0.159123	-0.172067
	(0.089662)	(0.088031)
Population (log)	-0.03806	-0.043136
	(0.021059)	(0.020706)*
Per capita income (log)	0.090125	0.092961
	(0.156129)	(0.154624)
Departure day of the week		
Monday	-0.002805	-0.002603
	(0.006803)	(0.006834)
Tuesday	0.006964	0.007443
	(0.008178)	(0.008215)
Wednesday	0.012401	0.013031
	(0.008550)	(0.008489)
Thursday	0.016291	0.017082
	(0.008841)	(0.008683)
Friday	0.019166	0.01978
	(0.008042)*	(0.007941)*
Saturday	-0.082531	-0.08131
	(0.009556)**	(0.009491)**
Return day of the week		
Monday	-0.037532	-0.037385
	(0.006587)**	(0.006672)**
Tuesday	-0.026048	-0.025866
	(0.007840)**	(0.008078)**
Wednesday	-0.033605	-0.033636
	(0.007256)**	(0.007560)**
Thursday	-0.024905	-0.025386
	(0.007877)**	(0.007924)**
Friday	-0.037591	-0.038184
	(0.007314)**	(0.007364)**
Saturday	-0.076631	-0.076299
	(0.008368)**	(0.008458)**
Carrier Fixed Effects	Yes	Yes
Constant	3.568264	3.672032
	(1.712260)*	(1.682940)*
Obervations	453347	453347
R2	0.56	0.56

Notes

Robust standard errors in parentheses

* significant at 5%; ** significant at 1%

Table A8: Internet Purchase, Internet Share, and Potential Savings from Internet Purchase in High-Low Internet Usage market [Tourist Variable Sensitivity]

	Log (Roundtrip Fare) [OLS]	Log (Roundtrip Fare) [IV]	Log (Roundtrip Fare) [OLS]	Log (Roundtrip Fare) [IV]
Market Structure Variables				
Market share	0.134568	0.246711	0.133587	0.247652
	(0.093730)	(0.301154)	(0.093613)	(0.300540)
HHI	-0.061777	-0.270735	-0.060753	-0.271771
	(0.111276)	(0.310559)	(0.111319)	(0.309718)
Hub	0.087844	0.077331	0.087866	0.077176
	(0.038911)*	(0.053874)	(0.038858)*	(0.053813)
Slot restricted airport	0.140732	0.14916	0.140688	0.149097
	(0.046090)**	(0.051757)**	(0.046054)**	(0.051739)**
Internet Variables				
Online	-0.11834	-0.117733	-0.142682	-0.12666
	(0.008233)**	(0.011207)**	(0.025433)**	(0.028765)**
Share of online transactions	-0.438727	-0.176065	-0.45876	-0.184387
	(0.171187)*	(0.248769)	(0.181168)*	-0.257531
Share of Online Purchases * Online			0.108987	0.040154
			(0.119497)	(0.132997)
Advance purchase restriction				
1-day	-0.414991	-0.414528	-0.41454	-0.414337
	(0.069900)**	(0.074973)**	(0.069803)**	(0.074937)**
3-day	0.045258	0.04663	0.045662	0.046799
	(0.034790)	(0.034809)	(0.034735)	(0.034789)
5-day	-0.698536	-0.71548	-0.699269	-0.715714
	(0.052336)**	(0.059208)**	(0.052329)**	(0.059106)**
7-day	-0.148675	-0.147525	-0.14827	-0.147372
	(0.027674)**	(0.028002)**	(0.027612)**	(0.027970)**
10-day	-0.286604	-0.283845	-0.285997	-0.283612
	(0.032193)**	(0.032152)**	(0.032278)**	(0.032250)**
14-day	-0.209198	-0.203393	-0.208684	-0.203197
	(0.024702)**	(0.025042)**	(0.024685)**	(0.025020)**
21-day	-0.272573	-0.271038	-0.271667	-0.270712
	(0.030834)**	(0.032248)**	(0.030689)**	(0.032106)**
30-day	0.060243	0.058852	0.061589	0.059345
	(0.072508)	(0.072545)	(0.072263)	(0.072523)
Other Ticket Characteristics				
Non-refundable	-0.213722	-0.220038	-0.213646	-0.220025
	(0.056567)**	(0.057016)**	(0.056561)**	(0.057017)**
Days in advance ticket purchased	-0.000863	-0.000944	-0.000879	-0.000949
	(0.000229)**	(0.000227)**	(0.000225)**	(0.000223)**
Saturday stay-over	-0.129078	-0.128754	-0.129542	-0.128918
	(0.012577)**	(0.012496)**	(0.012626)**	(0.012562)**
Travel restriction	-0.280402	-0.28522	-0.280309	-0.285171
	(0.023006)**	(0.023115)**	(0.022985)**	(0.023106)**
Minimum stay required	0.002582	0.006821	0.002658	0.006865
	(0.023297)	(0.024095)	(0.023292)	(0.024090)
Maximum stay restriction	-0.010476	-0.008011	-0.010323	-0.007932
	(0.023574)	(0.023406)	(0.023547)	(0.023412)
Full coach fare class	0.472483	0.479929	0.47227	0.479861
	(0.056477)**	(0.056179)**	(0.056513)**	(0.056157)**
Remaining Ticket Characteristics				
Roundtrip	-0.065048	-0.063306	-0.064542	-0.063149
	(0.012075)**	(0.014017)**	(0.012101)**	(0.014000)**
Deviation in load factor	0.211058	0.206499	0.210505	0.206293
	(0.035980)**	(0.035930)**	(0.035845)**	(0.035811)**
Time of Day				
Departure and return at peak time	0.05487	0.055541	0.05484	0.055541
	(0.012810)**	(0.013152)**	(0.012815)**	(0.013148)**
Either departure or return at peak time, but not both	0.025647	0.025833	0.025613	0.025824
	(0.006272)**	(0.006464)**	(0.006273)**	(0.006463)**

Table A8 (continued)

Other Route Specific Characteristics				
Low cost carrier on route	-0.068815	-0.074855	-0.068432	-0.074685
	(0.035301)	(0.036101)*	(0.035261)	(0.036105)*
Southwest	-0.152912	-0.154956	-0.153748	-0.155192
	(0.051874)**	(0.053607)**	(0.051907)**	(0.053490)**
Distance (log)	0.368345	0.351434	0.368758	0.35158
	(0.030875)**	(0.035568)**	(0.030909)**	(0.035594)**
Tourist share between origin and destination	0.020734	-0.004584	0.022432	-0.00391
	(0.179735)	(0.177484)	(0.179432)	(0.177060)
Tourist share between destination and origin	-0.084561	-0.145487	-0.08467	-0.145497
	(0.089780)	(0.086613)	(0.089770)	(0.086623)
Population (log)	-0.046011	-0.046145	-0.045993	-0.046142
	(0.021507)*	(0.021436)*	(0.021480)*	(0.021426)*
Per capita income (log)	0.021721	0.067091	0.020743	0.066648
	(0.158891)	(0.157588)	(0.158818)	(0.157484)
Departure day of the week				
Monday	-0.002185	-0.002333	-0.002241	-0.002351
	(0.006811)	(0.006879)	(0.006815)	(0.006879)
Tuesday	0.00687	0.007459	0.006775	0.007425
	(0.008178)	(0.008206)	(0.008179)	(0.008205)
Wednesday	0.012426	0.01305	0.01223	0.012978
	(0.008540)	(0.008477)	(0.008550)	(0.008479)
Thursday	0.016443	0.017177	0.016242	0.017103
	(0.008820)	(0.008669)*	(0.008819)	(0.008662)*
Friday	0.018989	0.019571	0.019074	0.019596
	(0.008025)*	(0.007909)*	(0.008010)*	(0.007900)*
Saturday	-0.082562	-0.081382	-0.082605	-0.081401
	(0.009545)**	(0.009484)**	(0.009550)**	(0.009488)**
Return day of the week				
Monday	-0.037713	-0.03739	-0.038389	-0.037637
	(0.006590)**	(0.006672)**	(0.006492)**	(0.006528)**
Tuesday	-0.026094	-0.025758	-0.027015	-0.026092
	(0.007797)**	(0.008070)**	(0.007623)**	(0.007862)**
Wednesday	-0.033152	-0.0333	-0.034012	-0.03361
	(0.007185)**	(0.007544)**	(0.007050)**	(0.007377)**
Thursday	-0.024325	-0.025129	-0.025148	-0.02543
	(0.007812)**	(0.007885)**	(0.007705)**	(0.007721)**
Friday	-0.036471	-0.037716	-0.037244	-0.037997
	(0.007231)**	(0.007292)**	(0.007093)**	(0.007102)**
Saturday	-0.076205	-0.075996	-0.076972	-0.076273
	(0.008292)**	(0.008423)**	(0.008168)**	(0.008292)**
Carrier Fixed Effects	Yes	Yes	Yes	Yes
Constant	4.230217	3.936498	4.240167	3.94143
	(1.743570)*	(1.725614)*	(1.742396)*	(1.724305)*
Obervations	453347	453347	453347	453347
R2	0.56	0.56	0.56	0.56

Notes

Robust standard errors in parentheses

* significant at 5%; ** significant at 1%

Table A9: Internet Purchase, Internet Share, and Potential Savings from Internet Purchase in High-Low Internet Usage Market Sensitivity to Choice of Instrument Variable for Share of Online Transactions

	Instrument for Internet Share: Proportion of transactions three or more weeks prior to departure		Instrument for Internet Share: Share of online purchases on other routes out of the endpoint airports	
	Log (Roundtrip Fare) [IV]	Log (Roundtrip Fare) [IV]	Log (Roundtrip Fare) [IV]	Log (Roundtrip Fare) [IV]
Market Structure Variables				
Market share	0.214162	0.213179	0.236327	0.241716
	(0.303115)	(0.302997)	(0.382517)	(0.382671)
HHI	-0.2201	-0.218783	-0.268925	-0.27615
	(0.307869)	(0.307923)	(0.418440)	(0.418430)
Hub	0.081499	0.081542	0.069499	0.069257
	(0.055200)	(0.055167)	(0.066372)	(0.066647)
Slot restricted airport	0.141823	0.141766	0.161606	0.161921
	(0.052496)**	(0.052472)**	(0.066192)*	(0.066464)*
Internet Variables				
Online	-0.111558	-0.124848	-0.142728	-0.069998
	(0.011343)**	(0.032690)**	(0.016246)**	(0.053699)
Share of online transactions	-0.984546	-0.994746	2.644975	2.702099
	(0.276339)**	(0.284887)**	(0.856315)**	(0.882895)**
Share of Online Purchases * Online		0.059424		-0.325234
		(0.148772)		(0.266615)
Advance purchase restriction				
1-day	-0.391637	-0.391425	-0.491105	-0.492298
	(0.065462)**	(0.065411)**	(0.117151)**	(0.117632)**
3-day	0.052533	0.052737	0.024748	0.023619
	(0.034727)	(0.034695)	(0.037538)	(0.037695)
5-day	-0.649314	-0.6498	-0.954641	-0.952095
	(0.053192)**	(0.052968)**	(0.123234)**	(0.121778)**
7-day	-0.145595	-0.14538	-0.154318	-0.155497
	(0.027625)**	(0.027585)**	(0.031138)**	(0.031252)**
10-day	-0.278694	-0.278376	-0.300179	-0.301928
	(0.033193)**	(0.033324)**	(0.035925)**	(0.035998)**
14-day	-0.208166	-0.207893	-0.187818	-0.189301
	(0.024611)**	(0.024576)**	(0.029493)**	(0.029289)**
21-day	-0.271156	-0.270659	-0.266826	-0.269543
	(0.031762)**	(0.031600)**	(0.040702)**	(0.040183)**
30-day	0.058006	0.058745	0.062306	0.058262
	(0.067720)	(0.067708)	(0.100211)	(0.100888)
Other Ticket Characteristics				
Non-refundable	-0.215053	-0.214999	-0.234555	-0.234859
	(0.056859)**	(0.056865)**	(0.061410)**	(0.061499)**
Days in advance ticket purchased	-0.000749	-0.000758	-0.001706	-0.001658
	(0.000229)**	(0.000224)**	(0.000382)**	(0.000365)**
Saturday stay-over	-0.12631	-0.126574	-0.140667	-0.139228
	(0.012498)**	(0.012504)**	(0.013774)**	(0.013717)**
Travel restriction	-0.278122	-0.278074	-0.311652	-0.311923
	(0.023617)**	(0.023609)**	(0.025047)**	(0.025123)**
Minimum stay required	0.003742	0.003774	0.015426	0.015253
	(0.024723)	(0.024719)	(0.026335)	(0.026356)
Maximum stay restriction	-0.005379	-0.00531	-0.019343	-0.019726
	(0.023733)	(0.023725)	(0.025194)	(0.025205)
Full coach fare class	0.482451	0.482305	0.467437	0.46823
	(0.056763)**	(0.056716)**	(0.058321)**	(0.058210)**
Remaining Ticket Characteristics				
Roundtrip	-0.069224	-0.068943	-0.042666	-0.044199
	(0.014256)**	(0.014211)**	(0.016452)**	(0.016286)**
Deviation in load factor	0.208245	0.207941	0.194339	0.195997
	(0.036553)**	(0.036401)**	(0.036813)**	(0.036709)**

Table A9 (continued)

Time of Day				
Departure and return at peak time	0.056048	0.056029	0.053452	0.053555
	(0.013191)**	(0.013194)**	(0.014959)**	(0.014974)**
Either departure or return at peak time, but not both	0.026432	0.026412	0.024076	0.024181
	(0.006319)**	(0.006318)**	(0.008207)**	(0.008203)**
Other Route Specific Characteristics				
Low cost carrier on route	-0.050616	-0.050435	-0.160183	-0.161214
	(0.037522)	(0.037532)	(0.051570)**	(0.051846)**
Southwest	-0.125645	-0.126173	-0.272311	-0.269476
	(0.053289)*	(0.053067)*	(0.080757)**	(0.079592)**
Distance (log)	0.399178	0.399377	0.19207	0.190907
	(0.034544)**	(0.034551)**	(0.061437)**	(0.061745)**
Tourist share	0.016248	0.016297	-1.147977	-1.148658
	(0.195379)	(0.195358)	(0.323039)**	(0.322784)**
Population (log)	-0.057685	-0.057642	0.001211	0.000997
	(0.022236)**	(0.022211)**	-0.028475	-0.028523
Per capita income (log)	-0.056167	-0.05656	0.521204	0.523562
	(0.160663)	(0.160582)	(0.238863)*	(0.239720)*
Departure day of the week				
Monday	-0.001164	-0.001195	-0.005614	-0.005447
	(0.006968)	(0.006972)	(0.007396)	(0.007404)
Tuesday	0.007236	0.007184	0.009181	0.009465
	(0.008295)	(0.008298)	(0.008827)	(0.008856)
Wednesday	0.012925	0.012818	0.014205	0.014792
	(0.008547)	(0.008566)	(0.009188)	(0.009204)
Thursday	0.017225	0.017115	0.017641	0.018247
	(0.008729)*	(0.008735)	(0.009379)	(0.009371)
Friday	0.019074	0.019122	0.022781	0.022517
	(0.007939)*	(0.007922)*	(0.008909)*	(0.008920)*
Saturday	-0.082085	-0.082112	-0.079713	-0.079566
	(0.009501)**	(0.009502)**	(0.010448)**	(0.010456)**
Return day of the week				
Monday	-0.037833	-0.038203	-0.0366	-0.034576
	(0.006741)**	(0.006549)**	(0.007347)**	(0.007472)**
Tuesday	-0.026011	-0.026517	-0.026351	-0.023585
	(0.008081)**	(0.007808)**	(0.009006)**	(0.009168)*
Wednesday	-0.032651	-0.033125	-0.038054	-0.035461
	(0.007554)**	(0.007286)**	(0.008679)**	(0.008680)**
Thursday	-0.024108	-0.024561	-0.030887	-0.028412
	(0.007946)**	(0.007676)**	(0.008797)**	(0.008846)**
Friday	-0.035677	-0.036103	-0.047178	-0.044852
	(0.007407)**	(0.007111)**	(0.008412)**	(0.008245)**
Saturday	-0.075658	-0.076084	-0.080453	-0.078126
	(0.008434)**	(0.008207)**	(0.010054)**	(0.009996)**
Carrier Fixed Effects	Yes	Yes	Yes	Yes
Constant	5.09052	5.09439	-0.267389	-0.290489
	(1.761583)**	(1.760874)**	(2.491333)	(2.501009)
Obervations	453347	453347	453347	453347
R2	0.56	0.56	0.44	0.44

Notes

Robust standard errors in parentheses

* significant at 5%; ** significant at 1%

Table A10: List of Hub Airports

Airport Code	City	Hub Airline(s)
ABQ	Albuquerque, NM	Southwest
ANC	Anchorage,AK	Alaska
ATL	Atlanta, GA	Delta
BNA	Nashville,TN	American
BOS	Boston, MA	Northwest
BWI	Baltimore,MD	US Air
CLE	Cleveland,OH	Continental
CLT	Charlotte,NC	US Air
CMH	Columbus, OH	America West
CVG	Cincinatti,OH	Delta
DAL	Dallas (Love Field), TX	Southwest
DEN	Denver, CO	United Airlines
DFW	Dallas/Ft.Worth, TX	American, Delta
DTW	Detroit, MI	Northwest
EWR	Newark, NJ	Continental
HOU	Houston (Hobby), TX	Southwest
IAD	Washington(Dulles), DC	United Airlines
IAH	Houston (Intercontinental), TX	Continental
IND	Indianapolis, IN	US Air
JFK	New York (Kennedy), NY	Transworld, Delta
LAS	Las Vega$	America West
LAX	Los Angeles	Delta, US Air
MEM	Memphis, TN	Northwest
MKE	Milwaukee,WI	Northwest, Midwest
MSP	Minneapolis/St. Paul, MN	Northwest
MSY	New Orleans, LA	Continental
ORD	Chicago, IL	American, United Airlines
MCO	Orlando, FL	Delta
PHL	Philadelphia, PA	US Air
PHX	Phoenix, AZ	America West, Southwest
PIT	Pittsburgh,PA	US Air
RDU	Raleigh/Durham, NC	American
SEA	Seattle, WA	Alaska, United Airlines
SFO	San Francisco, CA	United Airlines, US Air
SJC	San Jose, CA	American
SJU	San Juan, PR	American
SLC	Salt Lake City, UT	Delta
STL	St. Louis,MO	Transworld
SYR	Syracuse, NY	US Air