Chapter 7 Appendix. Potential Benefits of Seamless International Airline Travel

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Airline passengers prefer direct flights over connecting flights, especially for international journeys where the flight times and transfer wait times for connecting flights are considerably longer than those for most domestic flights. We provide a rough estimate of the potential benefits from seamless international travel—that is, travel on the same airline for the entire international journey—that could result from globally deregulated and better integrated airline networks, which would reduce transfer wait times for connecting flights. We compare the difference between the total current disutility that US international travelers incur from transfer wait times for their connecting flights and the lower disutility that they would incur from seamless travel.

We perform the comparison based on a sample of US residents departing the US for an international flight, which we obtain from the Airlines Reporting Corporation (ARC). The ARC data were derived from online credit card transactions for flights booked through travel agencies, including all subsidiaries of Expedia Group and Booking Holdings. We use scheduling data from the Official Airline Guide (OAG) for all flights in 2018 coupled with routing choice data from ARC.

Worldwide scheduling data from OAG were used to construct possible itineraries for the flight routes chosen by individuals in the ARC sample. We considered all individuals in the ARC data who departed the US on an international flight with at most one layover. Transfer wait times were constructed to be at least as long as a minimum feasible transfer wait time, which we assume to be 3 hours to account for the time it takes an international traveler to arrive at the gate for the connecting flight and the time the traveler must wait for the connecting flight to depart from the gate.

For example, consider a traveler flying from the United States to Pisa, Italy, and connecting at London Heathrow Airport (LHR). LHR advises travelers to allow 90 minutes to get to the gate for the connecting flight to Pisa. The traveler then must wait for the flight to Pisa to arrive at and depart from the gate. British Airways offers the only nonstop flight to Pisa from LHR, leaving once a day in the late afternoon. So, it is likely that, on average, a traveler must wait at least 90 minutes before the connecting flight to Pisa arrives at and departs from LHR.

Our sample contains 145 destinations and indicates that a significant share of travelers, nearly 40%, takes connecting flights. We assume travelers' hourly value of transfer wait time is $200, based on Yan and Winston's (2014) analysis of air travelers' carrier and routing choices for US domestic flights. This figure is a conservative estimate for our purposes because travelers are likely to place a higher value on transfer wait time in a foreign airport than in a US airport given that they may be concerned about missing important announcements about their flight or they may be less comfortable waiting in an unfamiliar environment. The total loss in utility from transfer wait time for passengers traveling on each connecting route is computed as the number of passengers on each route multiplied by the average transfer wait time (in hours) on each route multiplied by $200 per hour.[158]

Table A3 presents the economic loss to transferring passengers, total wait time, average wait time, and the total number of passengers for the top 20 airports in terms of economic losses

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[158] The data are representative of the universe of US leisure and unmanaged business travel. To expand our sample to the population, we compared our direct and transfer passenger counts for some large airports with publicly available data reported on their websites. The numbers indicated that we have an approximately 3.5% sample; thus, we inflated our passengers counts assuming our sample accounts for 3.5% of US international travelers. Our assumption is consistent with internal documentation from ARC. Specifically, ARC reports that approximately 35% of domestic travel is booked through travel agencies, of which 20% is sent to a credit card processing company to extract details about the purchaser, which would imply an approximately 7% random sample for domestic travel. ARC also reports that a smaller share of international travel is booked through travel agencies compared with domestic travel. Our tabulations suggest about half as many travelers book through travel agencies for international travel compared with domestic travel.

incurred by connecting international travelers. Based on all the airports in our sample, the total annual economic loss incurred by travelers from transfer wait time amounts to $24.5 billion.

Table A4 shows the underlying source of the loss in terms of the share of travelers transferring at airports with various transfer wait times in 30-minute increments. About 60% of transferring passengers have wait times between 3 and 3.5 hours, 40% of transferring passengers have wait times exceeding 3.5 hours, 20% of transferring passengers have wait times exceeding 4.5 hours, and 7% of transferring passengers have wait times exceeding 8 hours. Thus, travelers' losses are attributable to all travelers experiencing transfer wait times of at least three hours and to many travelers experiencing wait times that are greater than three hours.

Global airline deregulation would give airlines the incentive and ability to provide seamless travel that significantly reduces transfer wait times at international airports because carriers could better align their connecting flights with their originating flights coming from the United States. Of course, no one knows for certain how much airlines could reduce transfer wait time in a globally deregulated environment. A plausible assumption is that airlines could optimize their scheduling and operations such that passengers do not have to spend more than 3 hours to reach their gate and wait for the connecting flight to depart to its final destination. The assumed layover would not put passengers at much risk of missing their connecting flight because the incoming flight was late. Based on this assumption, we replace all the current average transfer wait times that exceed 3 hours in our sample with an assumed value of 3 hours, calculate the total economic loss, and subtract it from the current loss to obtain an annual gain in travelers' welfare of $6.9 billion.[159]

Table A5 shows the counterfactual economic gain from seamless travel, total extra wait time, average extra wait time, and total passengers for the top 20 airports, based on travelers'

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[159] Even if we assume airlines could reduce all transfer wait times to be no more than 4 hours instead of 3 hours, the total gain in travelers' welfare would be $5.4 billion.

potential benefits. Several of those airports currently have average transfer wait times that exceed 4.5 hours, which should not be difficult for carriers to reduce.

The preceding calculation understates the benefits from seamless travel for three reasons. First, it does not include the potential benefits associated with reducing stochastic delay, which could arise if a US traveler misses their connecting flight in a foreign country because the originating domestic flight is delayed or the connecting flight is cancelled. Currently, in such cases, the traveler may have to wait for a connecting flight that departs the next day or possibly in the next few days. A carrier competing in a globally deregulated environment that provides all the flights on an itinerary would have the incentive and ability to adjust its flight schedules and operations to reduce the length and cost of stochastic delay.

Second, as noted, our assumed value of transfer wait time for international travel is conservative. In the case of stochastic delay, the disutility associated with the unanticipated additional transfer wait time that causes travelers to arrive at their destinations at least a day late could be much greater than the value of the disutility we have assumed for transfer wait time, which is based primarily on frequency delay, because travelers could miss the first day or few days of a long-awaited vacation or an important business meeting.

Finally, seamless travel is likely to reduce the incidence of lost luggage that occurs on connecting flights when luggage transported by the originating airline must be transferred to a different airline, which may depart from a different terminal. Lost luggage, and travelers' exasperation from trying to find it and get it delivered to their hotel or residence, is less likely to occur when the same carrier is transporting the luggage for the entire itinerary.

Table A3. Top 20 Airports in Terms of Annual Economic Losses from Transfer Time

Country	Airport	Annual economic loss ($ billions)	Annual passengers transferring (millions)	Annual wait time (millions of hours)	Average wait time (hours)
United Arab Emirates	Dubai International Airport (DXB)	1.96	2.09	9.81	4.7
South Korea	Incheon International Airport (ICN)	1.53	2.19	7.63	3.5
Turkey	Istanbul Airport (IST)	1.48	1.53	7.41	4.8
Great Britain	Heathrow Airport (LHR)	1.40	2.18	6.98	3.2
United Arab Emirates	Abu Dhabi International Airport (AUH)	1.23	0.85	6.15	7.2
Germany	Frankfurt Airport (FRA)	1.21	1.81	6.06	3.3
China	Hong Kong International Airport (HKG)	1.09	1.57	5.45	3.5
Japan	Narita International Airport (NRT)	0.91	1.47	4.56	3.1
China	Shanghai Pudong International Airport (PVG)	0.87	1.01	4.33	4.3
China	Beijing Capital International Airport (PEK)	0.83	1.03	4.16	4.0
Taiwan	Taiwan Taoyuan International Airport (TPE)	0.82	1.13	4.08	3.6
France	Paris Charles de Gaulle Airport (CDG)	0.81	1.19	4.07	3.4
Netherlands	Amsterdam Airport Schiphol (AMS)	0.79	1.20	3.93	3.3
Qatar	Hamad International Airport (DOH)	0.69	0.44	3.45	7.8
Canada	Pearson International Airport (YYZ)	0.67	0.95	3.33	3.5
Germany	Munich Airport (MUC)	0.65	0.90	3.26	3.6
Singapore	Singapore Changi Airport (SIN)	0.57	0.43	2.85	6.6
Iceland	Keflavík Airport (KEF)	0.51	0.35	2.52	7.2
China	Guangzhou Baiyun International Airport (CAN)	0.49	0.52	2.44	4.7
Switzerland	Zürich Airport (ZRH)	0.48	0.38	2.38	6.2

Table A4. Share of Passengers with Various Transfer Wait Times

Transfer Wait time	Share of passengers
3–3.5 hours	0.601
3.5–4 hours	0.132
4–4.5 hours	0.060
4.5–5 hours	0.042
5–5.5 hours	0.026
5.5–6 hours	0.014
6–6.5 hours	0.022
6.5–7 hours	0.016
7–7.5 hours	0.008
7.5–8 hours	0.007
8+ hours	0.072

Table A5. Top 20 Airports in Terms of Counterfactual Welfare Gain from Reducing Transfer Times to 3 Hours

Country	Airport	Annual economic gain from reducing wait time ($ billions)	Annual transfer passengers (millions)	Annual wait time above 3 hours (millions of hours)	Average wait time above 3 hours (hours)
United Arab Emirates	Abu Dhabi International Airport (AUH)	0.72	0.85	3.59	4.2
United Arab Emirates	Dubai International Airport (DXB)	0.71	2.09	3.54	1.7
Turkey	Istanbul Airport (IST)	0.56	1.53	2.81	1.8
Qatar	Hamad International Airport (DOH)	0.42	0.44	2.12	4.8
Singapore	Singapore Changi Airport (SIN)	0.31	0.43	1.56	3.6
Iceland	Keflavík Airport (KEF)	0.30	0.35	1.48	4.2
China	Shanghai Pudong International Airport (PVG)	0.26	1.01	1.30	1.3
Russia	Sheremetyevo International Airport (SVO)	0.26	0.33	1.27	3.9
Switzerland	Zürich Airport (ZRH)	0.25	0.38	1.23	3.2
Austria	Vienna International Airport (VIE)	0.25	0.27	1.23	4.6
China	Beijing Capital International Airport (PEK)	0.22	1.03	1.08	1.0
South Korea	Incheon International Airport (ICN)	0.21	2.19	1.04	0.5
Poland	Warsaw Chopin Airport (WAW)	0.19	0.38	0.97	2.6
China	Guangzhou Baiyun International Airport (CAN)	0.17	0.52	0.87	1.7
China	Hong Kong International Airport (HKG)	0.15	1.57	0.74	0.5
Taiwan	Taiwan Taoyuan International Airport (TPE)	0.13	1.13	0.67	0.6
Germany	Frankfurt Airport (FRA)	0.13	1.81	0.62	0.3
Belgium	Brussels Airport (BRU)	0.12	0.22	0.61	2.8
Germany	Munich Airport (MUC)	0.12	0.90	0.58	0.6
France	Paris Charles de Gaulle Airport (CDG)	0.10	1.19	0.51	0.4