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The Impact of Baggage Fees on Passenger Demand, Airfares, and Airline Operations in the US

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Introduction

- On May 1, 2008, American Airlines became the first major US carrier to introduce a fee (\$15) for a first or second checked bag on a US domestic flight. Other major US carriers soon followed.
- In 2010, most major carriers increased their baggage fees to the \$20-\$25 range per bag allowing US carriers to generate \$3.4 Billion in checked baggage revenues that year.
- By 2016, this had increased to \$4.2 Billion, about 3.4% of total airline revenues.
- Clearly, checked baggage fees have become a major revenue source for US airlines.



Agenda

- Three research papers related to baggage fees:
- First paper – examines the impact of the fees on route-specific passenger demand and airfares.
- Second paper – examines the impact of the fees on airline operational performance.
- Third paper – studies the impact of the fees on the behavior of individual passengers.



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Paper #1

Scotti, D. and Dresner, M., “The Impact of Baggage Fees on Passenger Demand on US Air Routes,” *Transport Policy*, Vol. 43, 2015, pp. 4-10.



Imposition of Baggage Fees

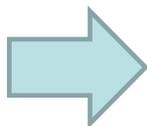
Table 1

Initial values and year-end 2010 values for baggage fees.

Source: Barone et al. (2012).

Airline	Initial 1st bag fee-2008	1st bag fee (online)-2010
American	\$15	\$25
United	\$15	\$23
US Airways	\$15	\$23
Northwest	\$15	N/A
Continental	\$15	\$23
Delta	\$15	\$23
AirTran	\$15	\$20
Alaska Air	\$15	\$20

Southwest Airlines and JetBlue Airways are missing from the list.





Holdout Airlines and Before/After Comparison

- The availability of data from the holdout airlines allows us the opportunity to better demonstrate the impact of the baggage fees on market outcomes.
- Moreover, we gathered data for the period (2007-2010) that spans the time when the fees were first imposed (2008), which again helps to allow us to isolate the impact of the fees.



Data

- Collected data on (approx.) 1,000 origin and destination routes for the first quarter of each year in our dataset.
- Chose routes in which at least one of the baggage fee-charging carriers competed with Southwest, the key non-fee airline.



Model

- Estimated a 2-equation simultaneous (3SLS) model:
- Demand Equation (Route Level):

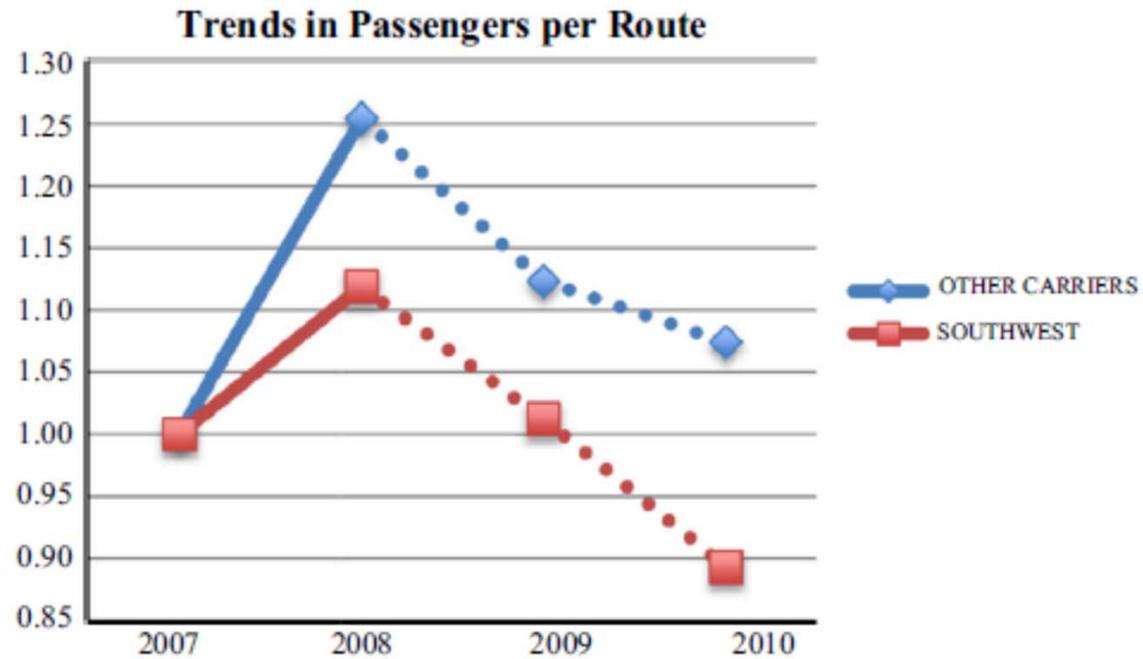
$$\begin{aligned} PASS = & \delta_0 + \delta_1 POP_{OD} + \delta_2 INC_{OD} + \delta_3 FARE + \delta_4 BAG_FEE \\ & + \delta_5 TOURIST + \delta_6 MAS_{OD} + \sum_{t=1}^3 YEAR_t + \sum_{i=1}^8 AIRLINE_i \end{aligned}$$

- Fare Equation (Route Level):

$$\begin{aligned} FARE = & \delta_0 + \delta_1 DIST + \delta_2 PASS + \delta_3 BAG_FEE + \delta_4 TOURIST + \delta_5 HHI \\ & + \sum_{t=1}^3 YEAR_t + \sum_{i=1}^8 AIRLINE_i \end{aligned}$$

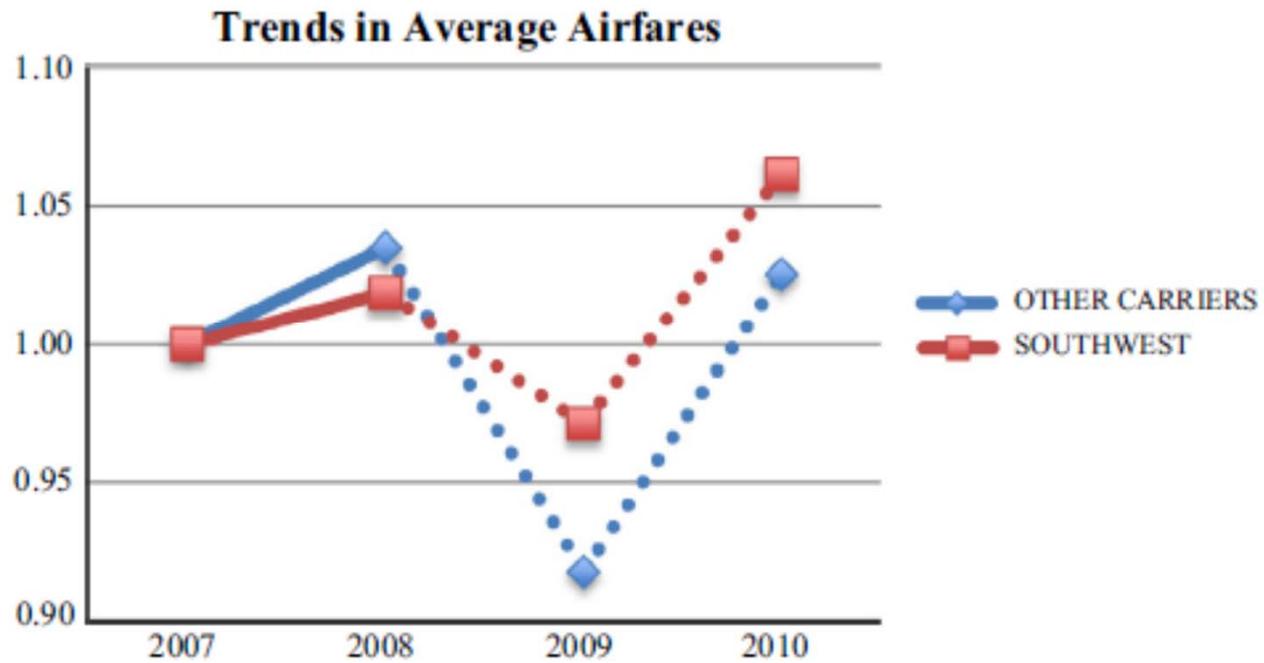


Trends in Passenger Traffic





Trends in Airfares



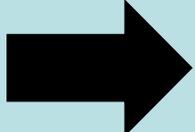
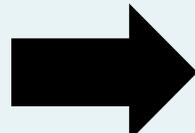


Passenger Estimation Results

Variable	Coef.	$P > z $
PASS		
POP _{OD}	0.2642	0.000
INC _{OD}	0.9858	0.000
FARE	-3.1132	0.000
BAG_FEE	-0.0105	0.005
MAS _{OD}	-0.6819	0.000
TOURIST	0.7342	0.000



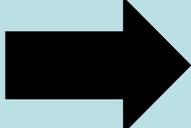
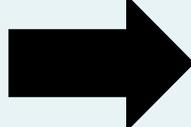
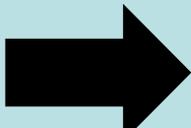
Impact of Baggage Fees

1% Increase in Baggage Fees		0.01% Decrease in Passenger Traffic
1% Increase in Airfares		3.30% Decrease in Passenger Traffic
1% Increase in Baggage Fees		0.004% Decrease in Airfares

Imposition of baggage fees resulted in only a small decline in passenger traffic and fares.



Impact of Baggage Fees

\$1 Increase in Baggage Fees		Decrease of 0.6 Passengers (from mean of 444)
\$1 Increase in Airfares		Decrease of 7 Passengers (from mean of 444)
\$1 Increase in Baggage Fees		Decrease in Airfares of \$0.11 (from mean of \$197.80)

Imposition of baggage fees resulted in only a small decline in passenger traffic and fares.



Conclusions

- Reduction in passengers resulting from a \$1 increase in airfares was about 9 times the reduction from a \$1 increase in baggage fees.
- The unbundling of baggage fees from airfares appears to have provided airlines with an opportunity to raise ancillary revenues without much decline in ticketing revenues – representing a Win-Win for the fee-charging carriers.



Paper #2

Scotti, D., Dresner, M. and Martini, G., “Baggage Fees, Operational Performance and Customer Satisfaction in the US Air Transport Industry,” *Journal of Air Transport Management*, Vol. 55, 2016, pp. 139-146.



Baggage Fees and Airline Operations

- Are there operational benefits or costs from the imposition of the baggage fees?



Motivation of the Baggage Fees

- Michael O’Leary, CEO of Ryanair:

Paying for checked-in bags ... wasn’t about getting revenue. It was about persuading people to change their travel behavior – to travel with carry-on luggage only ... This helps us to significantly lower airport and handling costs (Allon et al. 2011).

- The purpose of this paper is to determine how service quality outcomes are affected by the checked baggage fees and to see what impact the fees have on customer satisfaction.



Baggage Fee Hold-Outs

- Although all the major network carriers in the US adopted baggage fees, two important low-cost carriers continued to allow free checked bags – Southwest Airlines and JetBlue Airways.
- Data on these two hold-out carriers can serve as a control group when examining the impact of the checked baggage fees.



Note, JetBlue subsequently began charging for bags in 2015.



Research Questions

- What is the impact of baggage fees on flight delays?
- What is the impact of baggage fees on customer complaints?
- What is the impact of baggage fees on mishandled baggage reports?

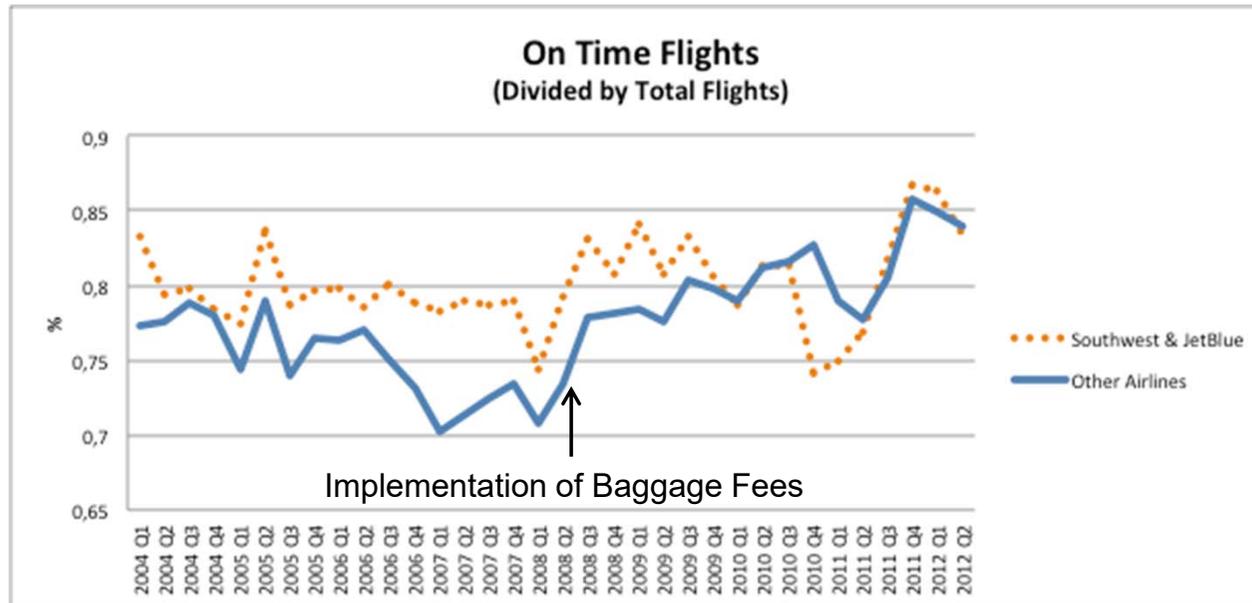


Baggage Fees and Flight Delays

- The imposition of baggage fees may have opposite impacts on flight delays:
 - Baggage fees may lead to fewer flight delays, since less baggage needs to be offloaded from or loaded onto aircraft.
 - On the other hand, baggage fees may lead to increased delays since the fees encourage more passengers to carry cabin baggage which can increase boarding time.



Trends in On-Time Flights



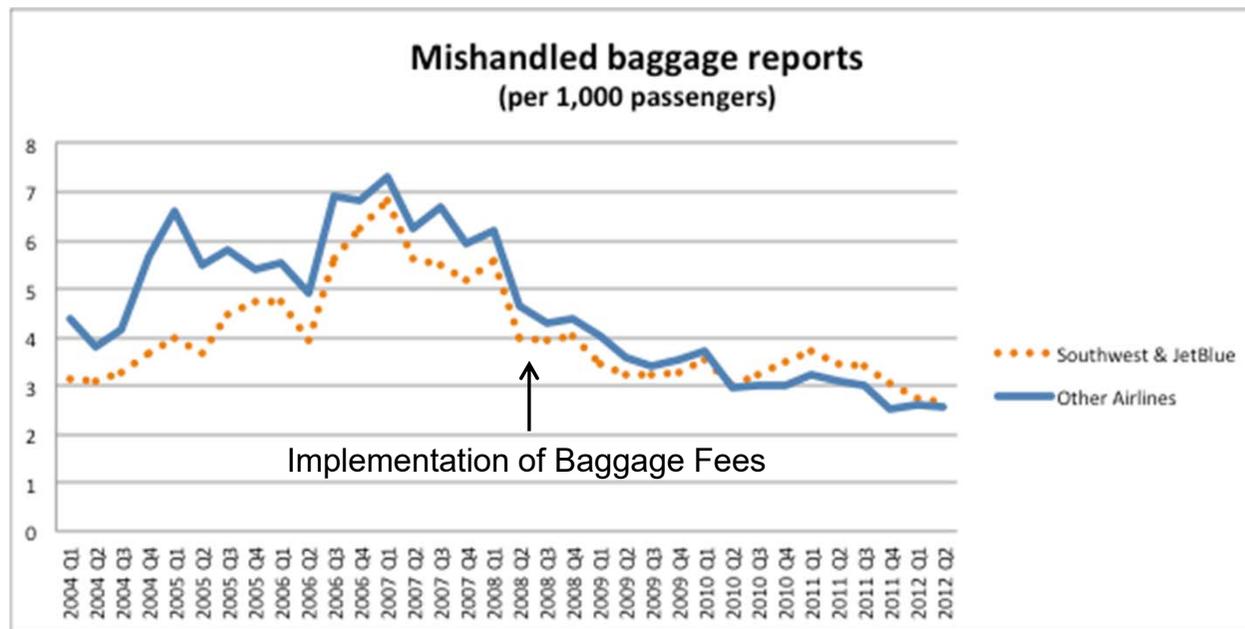


Impact of Baggage Fees on Mishandled Baggage Reports

- Would expect fewer mishandled baggage reports after the imposition of the fee, since fewer passengers will check bags.
- Therefore, in this case, service failures should decrease.



Trends in Mishandled Baggage Reports





Impact of Baggage Fees on Customer Complaints

- Since fewer passengers check bags after fees are imposed, there may be fewer complaints about mishandled bags.
- However, if passengers pay a fee to check their bags, they may have higher service expectations and be more likely to file complaints.



Trends in Customer Complaints Regarding Baggage





Data and Model

- Collected quarterly data on 11 US carriers from 2004 to 2012.

Service Quality Measure (Lost Bag Reports; Customer Complaints, Airline Delays)

$$= \beta_0 + \beta_1 \text{Baggage Fee} + \beta_2 \text{Industry Average OnTime Flights}$$

$$+ \sum_{j=1}^{10} \beta_{2+j} \text{Airline}_j + \sum_{y=1}^8 \beta_{12+y} \text{Year}_y \quad (1) + \sum_{q=1}^3 \beta_{20+q} \text{Quarter}_q + e$$



Dependent Variables

- *Mishandled Baggage Reports* – Reports per 1,000 passengers
- *Customer Complaints* – Complaints related to baggage per 100,000 passengers
- *Airline Delays* – Number of airline-caused delays divided by total airline flights



Independent Variables

- *Baggage Fee* – Online fee charged by an airline for the first checked bag
- *Industry Average On-Time Flights* – Average ratio of on-time flights during a quarter (measure of industry-wide congestion)
- *Airline, year, and quarter* dummies



Results

	Mishandled Baggage Reports	Customer Complaints	Airline Delays
Constant	15.79*	0.67 [^]	0.42*
Baggage Fee	-0.055*	-0.003[^]	-0.001*
Industry Avg. On-time Flights	-13.60*	-0.42	-0.39*
No. of Observations	357	357	357
Pseudo R-Squared	0.75	0.54	0.43

Airport dummies, Year dummies, and Quarter dummies included.

* = $p < 0.01$; [^] = $p < 0.05$



Predicted Operational Improvements with Baggage Fees

Baggage Fee for First Checked Bag	Mishandled Baggage Reports (per 1,000 passengers)	Customer Baggage Complaints (per 100,000 passengers)	Flight Delays (divided by total flights)
\$0	4.60	0.24	0.13
\$15	3.78	0.19	0.11
\$23	3.34	0.16	0.10



Conclusions and Implications

- Baggage fees not only generate revenues for carriers, but they appear to result in operational improvements and fewer customer complaints – Michael O’Leary from Ryanair appears to be correct.
- Airlines may be able to improve their operations and increase customer satisfaction by imposing baggage fees.



Paper #3

- Cho, W and Dresner, M., “The Impact of a Baggage Fee Waiver on Airline Choice: Evidence from the Washington-Baltimore Region,” forthcoming *Transportation Research A*.



Research Questions

- What is the impact of the imposition of the baggage fees on passenger choice of airline?
- How do passenger and trip characteristics moderate this impact?



Contribution

- We use data on individual passengers so that we are better able to assess passenger response to the baggage fees by class of passengers.
 - Trip purpose – leisure vs. business
 - Trip length and distance



Models and Data

- Estimate conditional logit and mixed logit models with the dependent variable coded 1/0 depending on whether the passenger chose to fly with Southwest or JetBlue.
- Primary source of data comes from surveys of 6,192 originating passengers from the three Washington-Baltimore area airports in 2007 (year before the imposition of the fees) and 2009 (year after the imposition of the fees) across 169 competitive O&D routes.



Impact of BFW – Segmented by Trip Length

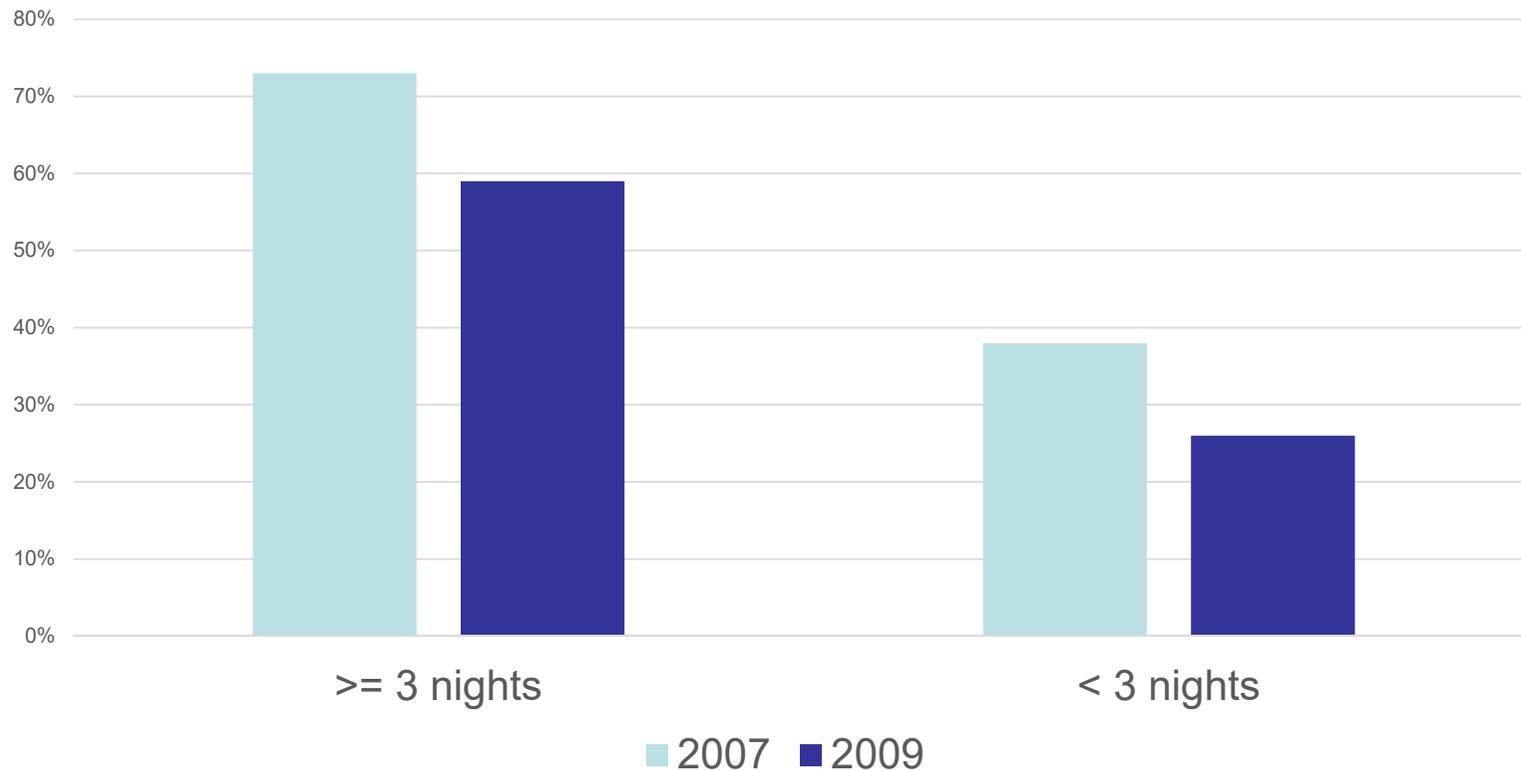
Dep. Var. = Airline Choice 1 = SW or JetBlue 0 = Other Carriers	Sample 2a		Sample 2b	
	(>= 3 nights)		(< 3 nights)	
NONSTOP	1.537	***	1.544	***
FLIGHTFREQ	0.035	***	0.037	***
ONTIME	2.819	***	2.108	***
FARE	-0.011	***	-0.008	***
FARE_NonLCC	0.007	***	0.006	**
MARKETprsnc	0.148		0.383	
BFW	0.452	***	-0.373	**

The baggage fee waiver attracts passengers traveling for longer periods to SW and JetBlue; i.e., passengers more likely to check bags.

Note: Airline dummies included in estimation.



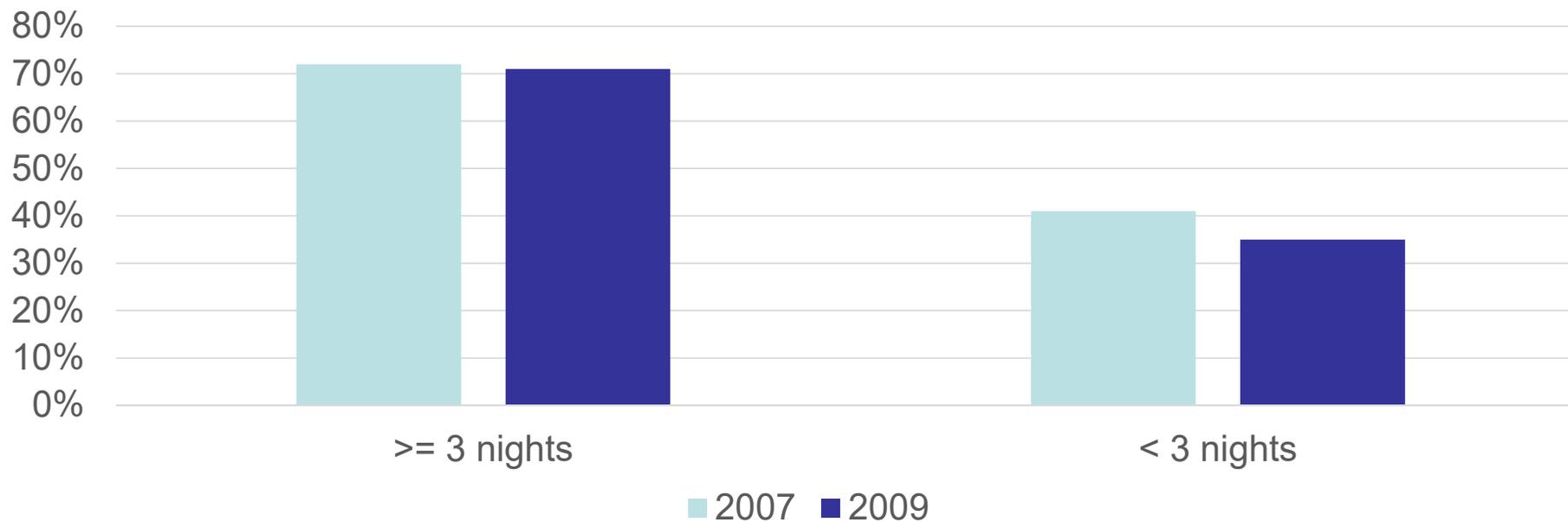
Percentage of Passengers Checking Bags on **Fee-Charging** Carriers by Trip Length - 2007-2009



- Both long trip and short trip passengers reduced checked bags after fees were introduced.
- Decline was proportionately higher for short trip passengers.



Percentage of Passengers Checking Bags **BFW** Carriers by Trip Length - 2007-2009



- Little change in bag checking behavior on Southwest and JetBlue for short-trip or long-trip passengers.



Impact of BFW Segmented by Trip Purpose

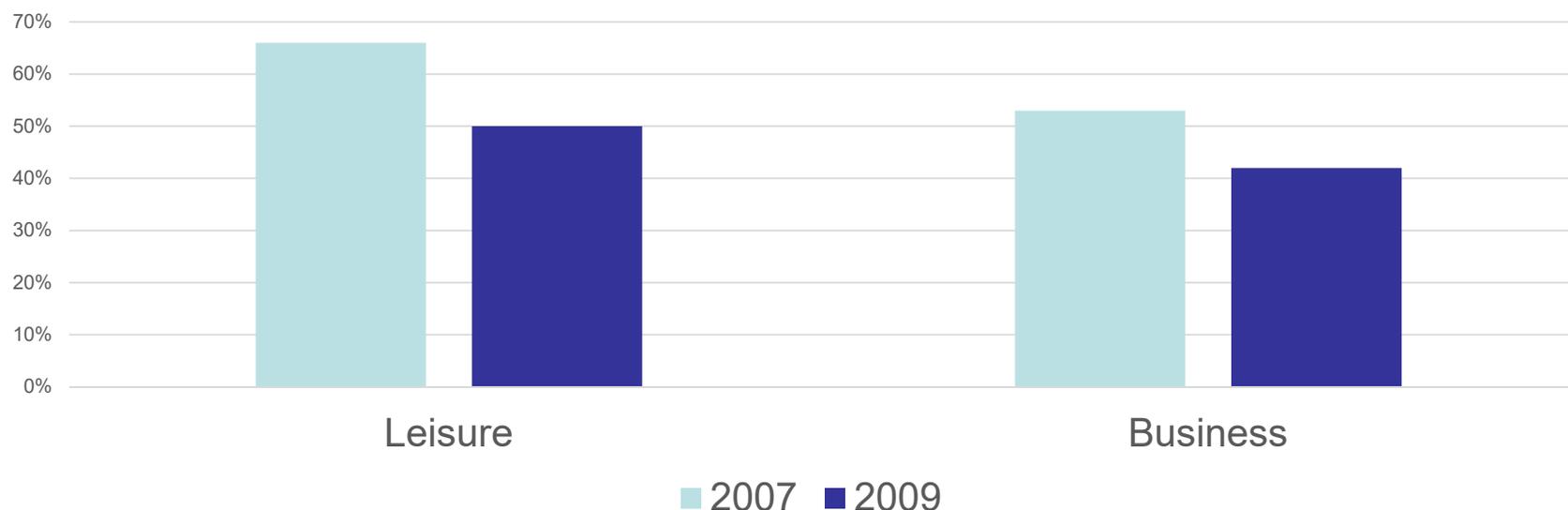
Dep. Var. = Airline Choice 1 = SW or JetBlue 0 = Other Carriers	Sample 4a	Sample 4b
	(Leisure)	(Business)
NONSTOP	1.895 ***	1.113 ***
FLIGHTFREQ	0.032 ***	0.041 ***
ONTIME	3.740 ***	0.972
FARE	-0.018 ***	-0.002
FARE_NonLCC	0.007 ***	0.005 **
MARKETprsnc	0.406 *	-0.174
BFW	0.347 ***	-0.006

The baggage fee waiver attracts passengers traveling for leisure to SW and JetBlue; i.e., passengers more likely to check bags.

Note: Airline dummies included in estimation.



Percentage of Passengers Checking Bags on **Fee-Charging** Carriers by Trip Purpose - 2007-2009



- Both leisure and business passengers reduced checked bags after fees were introduced.
- Decline was proportionately higher for leisure passengers.
- Little change for either leisure or business passengers on the BFW carriers (chart not shown).



Results (so far)

- Baggage Fees:
 - Influenced passengers to check fewer bags.
 - Is proportionately more important for long trip passengers (more likely to check bags).
 - Is proportionately more important for leisure passengers (more likely to check bags).

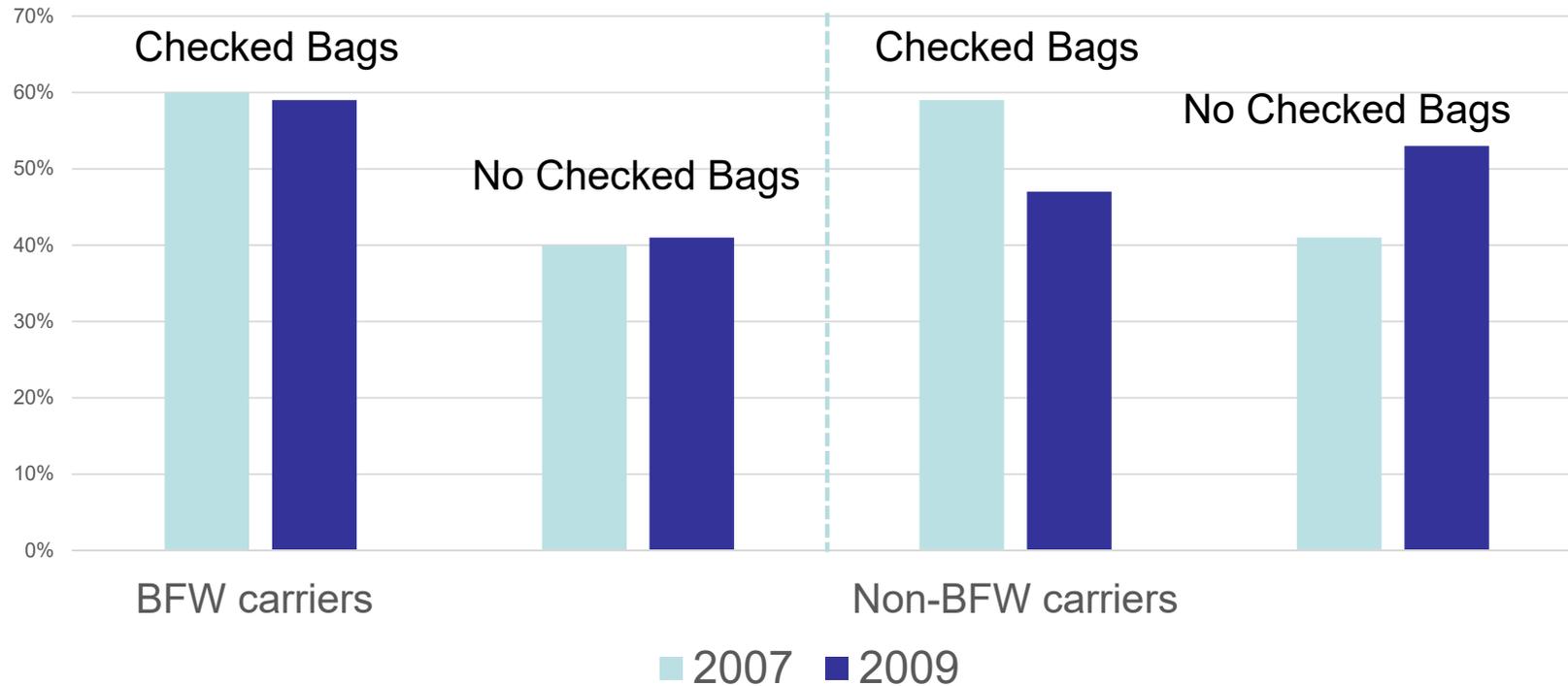


Putting it all Together

- What happened to the baggage-checking passengers when the major carriers imposed baggage fees?
- Did these passengers stick with the fee-charging carriers and just choose not to check bags?
 - In this case, one would expect a decline in baggage checking at the fee-charging carriers from 2007 to 2009 and little change in the percent of passengers at the BFW carriers checking bags.
- Did these passengers divert to the BFW carriers?
 - In this case, one would expect an increase in the percent of passengers checking bags at the BFW carriers from 2007 to 2009, along with a decline in baggage checkers at the fee-charging carriers.



Percentage of Passengers Checking Bags - 2007-2009



No increase in bag checkers at the BFW carriers. Baggage checkers appear to have chosen to remain loyal to the fee-charging carriers and to just not check bags.



Conclusions

- Baggage fees changed the behavior of passengers on carriers that began assessing the fees in 2008.
- Fewer passengers on the fee-charging carriers checked bags.
 - Proportionately greater for leisure passengers.
 - Proportionately greater for long-trip passengers.
- Passengers appeared to stick with the fee-charging carriers and change their behavior, rather than defect to the BFW carriers.



Implications

- The baggage fees seem to have produced a Win-Win-Win (Triple Win!!!) result for the fee-charging carriers:
 - Win 1 – Produced extra revenue for the carriers.
 - Win 2 – Resulted in fewer checked bags (reduced baggage handling costs and reduced customer complaints).
 - Win 3 – Did not appear to result in passengers defecting to the BFW carriers.



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Thank You!!!