



# Baggage fees, operational performance and customer satisfaction in the US air transport industry



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## ABSTRACT

In recent years, there has been a “de-bundling” trend in the US airline industry, where specific services that used to be included in a ticket fare are now priced separately. Although a major reason for these fees is to raise revenues for the airlines, the fees may also impact the operations of carriers. Among the new fees implemented by most US carriers is a payment for checked baggage. This paper analyzes the association of baggage fees with airline operational service outcomes, as measured by flight delays, mishandled baggage rates and the rate of customer complaints. Using data from the US domestic air transport market over the period 2004–2012 and estimating a series of equations, our results show that, on average, an increase in baggage fees is associated with a decrease in the mishandled baggage rate and to a reduction in the percentage of delayed flights. No significant association is found between the fees and the rate of customer complaints.

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## 1. Introduction

On May 21, 2008, American Airlines made an announcement that dramatically changed the revenue position of US airlines. American announced that as of June 15th, it would begin collecting a fee of \$15 per checked bag.<sup>1</sup> Although American Airlines was not the first US carrier to charge a fee for a first checked bag, it was the first “legacy carrier” to do so. The other major legacy carriers, United Airlines, US Airways, Northwest Airlines, Continental Airlines and Delta Airlines, quickly followed with baggage fees of their own. Within two years, the fees had been raised to the \$20–\$25 range for the first checked bag, with some carriers charging even more for a second checked bag (Barone et al., 2012). As a result, baggage fees as a percentage of US carrier operating income

increased more than fourfold from 2007 to 2009 (Garrow et al., 2012). By 2010, US carriers were generating \$3.4 billion annually in baggage fees, up from less than \$500 million in the year before American's initial announcement (Tuttle, 2012; US Government Accountability Office, 2010).<sup>2</sup>

Although the imposition of the baggage fees had a dramatic impact on US carrier revenues, this is not the focus of the paper. Our aim is, instead, to analyze the association between the fees, the operational performance of US carriers, and customer satisfaction with their airline experience. As Michael O'Leary, the CEO of Ryanair, has stated (quoted in Allon et al., 2011, pp. 2–3): “[P]aying 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 significantly lower airport and handling costs.” In particular, we examine the association between the baggage fees and the rate of mishandled baggage reports, the percentage of delayed flights, and the rate of airline customer complaints.

If the baggage fees discourage passengers from checking their

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<sup>1</sup> See, for example, Barone et al. (2012). Up until American's initiative, only certain low-cost carriers (LCCs) (e.g., Spirit Airlines) charged fees on the first checked bag in the United States. Other LCCs, most notably Southwest Airlines and JetBlue, continued to offer “free” checked bags.

<sup>2</sup> US carriers collected some baggage fee revenues prior to American's announcement; for example, for third checked bags and for overweight bags.

bags, then they should be associated with fewer mishandled baggage reports. Indeed, the [US Government Accountability Office \(2012\)](#) reports a steady decline in the number of mishandled baggage reports beginning in 2008. We examine the association between the imposition of baggage fees and the number of mishandled baggage reports per 1000 passengers.

The imposition of baggage fees can also have an effect on the percent of delayed flights. The loading, offloading, and transfer from one flight to another of checked baggage takes time to perform and may lead to operational delays. In addition, as [Wu \(2005\)](#) states, late arriving baggage disrupts the operations of an airline causing delays that may be propagated throughout the airline's network; for example, inbound aircraft may be forced to wait for delayed departing aircraft to clear gates, and thus may be delayed as well. To the extent that the baggage fees reduce the number of checked bags, then they may also be associated with fewer delayed flights. However, on the other hand, the fees have resulted in more carry-on (cabin) baggage ([US Government Accountability Office, 2010](#); [Halsey III, 2012](#)) and the increased amount of cabin baggage can prolong passenger loading of aircraft, thus contributing to delays. [McCartney \(2010\)](#) noted this two years after the initial imposition of baggage fees by the US legacy carriers, observing that, "more flights are delayed when customers struggle to cram bags into full bins and airline workers have to send bags that don't fit down to cargo compartments." More recently, as [Tuttle \(2014\)](#) states, the legacy carriers have begun to more strictly enforce carry-on baggage rules in order to avoid passengers, "hogging the overhead bin space, and generally making the boarding process a time-consuming nightmare." Thus, it is an empirical question as to whether the baggage fees are associated with an increase or decrease in flight delays.

Finally, anecdotal evidence suggests that airline passengers dislike baggage fees (e.g., [Waters, 2011](#)). This dislike may lead to greater numbers of customer complaints. On the other hand, if operational efficiency increases due to fewer checked bags, customer complaints may decrease. Therefore, again, it is an empirical question as to whether the baggage fees are associated with greater or fewer numbers of customer complaints.

In order to examine the relationship between baggage fees and mishandled baggage reports, flight delays and customer complaints, we use data from the US domestic air transport market over the period 2004–2012 and estimate a series of equations. This period covers four years prior to the first baggage fee announcement and four years following the initial imposition of baggage fees by the legacy carriers. In addition, we include observations from both carriers that have imposed the fees (e.g., the legacy carriers) and carriers that have not imposed the fees at the time of our analysis (Southwest Airlines and JetBlue Airways).<sup>3</sup> Our results show that, on average, the imposition of checked baggage fees is associated with a decrease in the mishandled baggage rate and a reduction in the percentage of delayed flights. No significant relationship is found between the fees and the rate of customer complaints. These results thus support the finding that the checked baggage fees are associated with improved airline operations, but not necessarily with increased customer satisfaction.

### 1.1. Literature review

Given the relatively recent imposition of airline baggage fees (at least by the larger, legacy carriers), there has been little research

conducted on their relationship to operational and financial outcomes. [Allon et al. \(2011\)](#) examine the imposition of the baggage fees from a public policy perspective. They ask whether the fees make society better or worse off. Using a theoretical modeling approach, they conclude that to the extent that the unbundling of the baggage fees from the airline fares can better match desired services with the willingness of customers to pay for those services, then society is better off. The fees allow those customers that do not require the baggage service to avoid paying for the service, so these individuals are undoubtedly better off. In addition, since the number of checked bags declines, airlines can enjoy lower costs and pass some of these savings onto all of their customers in the form of lower fares.

[Hamilton et al. \(2010\)](#) view the issue of baggage and other ancillary fees from a managerial perspective. They suggest a number of advantages to unbundling ancillary services or products from the primary product: First, a firm can charge a lower price for the primary product, and this is the price on which customers may focus. Thus, the product will appear to be more attractive from a pricing standpoint. Second, the lower price may help the firm when consumers comparison shop; for example, on websites that aggregate offerings from multiple firms. Third, the unbundling of the ancillary services or products makes the pricing policy of the firm more transparent, and transparency is a desired trait for some customers. On the other hand, the authors point out that customers may be annoyed by the additional fees and that the fees may discourage purchases. Along these lines, Southwest Airlines, which does not charge baggage fees (for first or second checked bags), claims that the company generated \$1 billion in additional revenues in 2009 from former customers of baggage-fee charging competitors ([Garrow et al., 2012](#)).

[Barone et al. \(2012\)](#) use an event study to examine the effect of newly announced baggage fees on airline stock prices. Surprisingly, they find that the initial baggage fees announced by the airlines actually resulted in an average 10% decline in stock prices (i.e., mean negative "abnormal" returns of 10%, after accounting for the overall market movement). On the other hand, subsequent fee announcements produced, on average, positive 2.5% mean abnormal returns. When the authors examined all of the announcements together, they found that legacy carriers experienced a small, negative mean abnormal return of 1.1%, while the low-cost carriers (LCCs) did not experience significant abnormal returns from their baggage fee announcements. Finally, competing airlines also experienced negative abnormal returns when the initial baggage fees were announced. The authors attribute these negative returns to general investor unease with the airlines' financial conditions; that is, the need to impose baggage fees was initially perceived by investors as a weakness in the airline industry. Subsequently, investors may have realized the potential revenue gains from the fees and rewarded the carriers with positive returns when the later fees were announced.

[Henrickson and Scott \(2012\)](#) and [Scotti and Dresner \(2015\)](#) examine the impact of baggage fees on airline ticket prices and passenger demand. [Henrickson and Scott \(2012\)](#) find that ticket prices are negatively correlated with baggage fees, leading to the conclusion that airlines substitute baggage fees for higher ticket prices. They also find that Southwest Airlines, which does not impose baggage fees on first and second checked bags, increased their fares on routes in which they compete with the legacy carriers after the legacy carriers imposed their baggage fees. [Scotti and Dresner \(2015\)](#) find that the imposition of baggage fees results in a decrease in passenger demand, but that the elasticity is much smaller than an equivalent increase in ticket fares, leading to the conclusion that carriers can increase total revenues by reducing fares and substituting baggage fees. Similarly, [Brueckner et al.](#)

<sup>3</sup> Note that JetBlue Airways did not charge a fee for a first bag at the time of our analysis, but imposed a fee for a second checked bag. In 2015 JetBlue began charging for a first checked bag.

(2013) find that following the imposition of checked baggage fees, the average airfare decreases by less than the baggage fee itself leading to a higher full price for passengers that check bags.

Recently, Nicolae, et al. (2016) examined the relationship between the imposition of baggage fees and flight delays. Using route-level data from 2007 to 2009, the authors find that the imposition of the fees is associated with improved on-time performance both for the carriers imposing the fees, as well as for other carriers operating on the route. Our research builds on the results of this paper by examining the impact of the fees on mishandled baggage reports and customer complaints, as well as delays. Moreover, we use a longer time span for our analysis so that we can better examine the association with the increase in baggage fees imposed by many of the legacy carriers and the operational outcomes.

In summary, research on baggage and related ancillary fees has found that the fees have a positive impact on societal welfare, are generally not liked by consumers, have a number of advantages to the airlines, initially resulted in a decline in stock price but more recently have been associated with higher stock returns, substitute for higher ticket fares, allow competing airlines that do not charge the fees to increase their prices, and are associated with fewer flight delays. In the next section, we discuss the data and methodology used to analyze the impact of the baggage fees on operational outcomes and customer satisfaction.

## 2. Data and methodology

The setting for our analysis is the US airline industry where baggage fees were first introduced by the legacy carriers in 2008. Quarterly data were collected for the period 2004 to 2012.<sup>4</sup> When monthly data were available, the data were aggregated or averaged over the three months in the quarter. Data for our three dependent variables, mishandled baggage reports (per 1000 passengers), customer complaints (per 100,000 passengers), and flight delays (ratio of delayed flights to total flights) were gathered for each airline in our dataset from the US Department of Transportation's Air Travel Consumer Report, issued monthly. Table 1 shows the list of the airlines in our dataset and the fees charged for checked bags (information on baggage fees are collected from Barone et al., 2012).<sup>5</sup>

In order to determine the impact of the checked baggage fees on

mishandled baggage claims, flight delays, and customer complaints, a 3-equation model was estimated as follows for airline<sub>j</sub> in year<sub>y</sub> and quarter<sub>q</sub>:

$$\begin{aligned} \text{Mishandled Baggage Reports}_{jyq} = & \beta_0 + \beta_1 \text{Baggage Fee}_{jyq} \\ & + \sum_{j=1}^{10} \beta_{1+j} \text{Airline}_j \\ & + \sum_{y=1}^8 \beta_{11+y} \text{Year}_y \\ & + \sum_{q=1}^3 \beta_{19+q} \text{Quarter}_q + e_1 \end{aligned} \tag{1}$$

$$\begin{aligned} \text{Customer Complaints}_{jyq} = & \alpha_0 + \alpha_1 \text{Baggage Fee}_{jyq} \\ & + \sum_{j=1}^{10} \alpha_{1+j} \text{Airline}_j + \sum_{y=1}^8 \alpha_{11+y} \text{Year}_y \\ & + \sum_{q=1}^3 \alpha_{19+q} \text{Quarter}_q + e_2 \end{aligned} \tag{2}$$

$$\begin{aligned} \text{Airline Delays}_{jyq} = & \gamma_0 + \gamma_1 \text{Baggage Fee}_{jyq} + \sum_{j=1}^{10} \gamma_{1+j} \text{Airline}_j \\ & + \sum_{y=1}^8 \gamma_{11+y} \text{Year}_y + \sum_{q=1}^3 \gamma_{19+q} \text{Quarter}_q + e_3 \end{aligned} \tag{3}$$

where:

- *Mishandled Baggage Reports* is the first dependent variable and is measured as mishandled baggage reports per 1000 enplaned passengers for a given carrier. In order to normalize this variable, we divide the carrier-specific figure by the quarterly sample average for mishandled baggage reports per 1000 enplaned passengers.
- *Customer Complaints* is the second dependent variable and is measured as the number of customer complaints related to baggage per 100,000 enplaned passengers for an airline. These complaints are filed with the US Department of Transportation.<sup>6</sup> In order to normalize this variable, we divide the carrier-specific figure by the quarterly sample average for customer complaints per 100,000 enplaned passengers.
- *Airline Delays* is the third dependent variable and is measured as the number of airline-caused flight delays divided by total airline flights for a given airline.<sup>7</sup> In order to normalize this

**Table 1**  
Airlines and baggage fees in dataset.

Airline	Baggage Fee – 2008 (USD)	Baggage Fee – 2010 (USD)
AirTran (FL)	15	20
Alaska (AS)	15	20
American (AA)	15	25
Continental (CO)	15	23
Delta (DL)	15	23
Frontier (F9)	15	15
JetBlue (B6)	0	0
Northwest (NW)	15	N/A
Southwest (WN)	0	0
United (UA)	15	23
USAirways (US)	15	23

<sup>4</sup> Due to data availability at the time our model was estimated, only the first and second quarters of 2012 data were collected.

<sup>5</sup> Table 1 shows the online baggage fee value for a first checked bag. In addition, we note that some airlines charged a slightly higher fee when checked baggage service is purchased at an airline counter rather than online.

<sup>6</sup> Alternatively, Eqs. (1) and (2) could be estimated with checked bags rather than passengers as the denominator for the dependent variables (i.e., mishandled bags per 1000 checked bags, or baggage-related complaints per 1000 checked bags). Unfortunately this information was not available. Note that for some airlines, the number of complaints may be slightly underestimated since, as specified in the Air Travel Consumer Report (i.e., the document used as source of our data), carriers are listed in the monthly report only if the US Department of Transportation (DOT) receives five or more complaints (in all categories) in that month.

<sup>7</sup> The US DOT classifies flight delays into five categories: air carrier delay, aircraft arriving late, security delay, national aviation system delay, and extreme weather. We calculated our delay variable based on delays from the first category. Sensitivity analysis conducted using a wider definition of delays produces similar results to those reported for our base case estimations.

**Table 2**  
Descriptive statistics.

	Mean	Min	Max	Pearson's correlation indices			
				1	2	3	4
1. Mishandled Baggage Reports	0.94	0.45	2.21	1.00			
2. Customer Complaints	0.92	0.00	5.16	0.57	1.00		
3. Airline Delays	1.00	0.42	2.86	0.25	0.22	1.00	
4. Baggage Fee	14.74	0.00	50.00	-0.04	0.20	-0.11	1.00

variable, we divide the airline-specific figure by the quarterly sample average for percent of airline-caused delayed flights.

- *Baggage Fee* is our main explanatory variable of interest. It is measured by the listed charge for two passenger checked bags.
- *Airline<sub>j</sub>* are dummy variables for all but one airline in our dataset. The base carrier is American Airlines. These variables are included in the model in order to control for airline operational characteristics (e.g., length of haul; hubs served) that may impact the performance outcomes.
- *Year<sub>y</sub>* are dummy variables for years 2005–2012. The base year is 2004. These variables are included in our model since performance outcomes may change from year to year due to environmental conditions, passenger demand, or other factors.
- *Quarter<sub>q</sub>* are dummy variables for quarters 2, 3 and 4 (the first quarter of the year is the base case) to account for seasonal factors that may affect the performance outcomes.

The three equations in the model were estimated using ordinary least squares (OLS).<sup>8</sup>

Descriptive statistics for our dataset are presented in Table 2. Note that baggage fees are negatively correlated with mishandled baggage reports and with delays and have a positive correlation with customer complaints. Other descriptive statistics appear reasonable.

### 3. Results

Before we present the results from our OLS estimations, we provide trend analyses for the three performance measures of interest. These analyses are shown in Figs. 1–3. Fig. 1 shows a noticeable decline in mishandled baggage reports since 2008, the year when the baggage fees were initially imposed by the legacy carriers. However, mishandled baggage reports also declined for Southwest Airlines and JetBlue Airways, the two airlines that did not impose the baggage fees (JetBlue for one bag and Southwest for two bags). Therefore, there could be other factors, such as the economic decline that also began in 2008, that could be contributing to the reduced rate of mishandled baggage reports. It should be noted, however, that although the rate of baggage reports declined for both JetBlue and Southwest, as well as for the other carriers, up until 2010 Southwest and JetBlue had a lower rate of mishandled baggage reports than their competitors. After 2010, the other carriers (i.e., those carriers that charged baggage fees) had a lower rate.<sup>9</sup> Thus, the decline in mishandled baggage reports of the baggage-fee charging carriers relative to Southwest and JetBlue could be an indication that the baggage fees may be related to improved operating outcomes.

Fig. 2 shows the trends in baggage-related customer complaints

for JetBlue and Southwest versus the other US carriers. Both before and after the baggage fees were imposed, JetBlue and Southwest had a lower rate of complaints than the other carriers. From the figure, there does not appear to be a baggage fee impact on the rate of complaints. Finally, Fig. 3 shows trends in the rate of on-time arrivals (i.e., on-time flights/total flights) for JetBlue and Southwest versus the other carriers. Prior to 2010, JetBlue and Southwest had a better rate of on time arrivals than did their competitors. In more recent years, however, these carriers have not seemed to enjoy an advantage in on-time arrivals. Therefore, the baggage fees may be related to better on-time arrival rates for the fee-charging carriers relative to Southwest and JetBlue.

Since there are many factors (other than baggage fees) that may be related to changes in rates of mishandled baggage reports, customer complaints and flight delays, it is best to estimate an econometric model that can control for these other factors. The results from our model are presented in Table 3. The key variable of interest is *Baggage Fee*. The results show that the imposition of baggage fees is associated with a significant decrease in mishandled baggage reports and airline delays (relative to industry norms), after controlling for the other variables in the model. No significant relationship is found with customer complaints.

Based on the estimated coefficients from our model, we can predict how the imposition of an increase in the baggage fees level will be associated with the relative rate of mishandled baggage reports per 1000 passengers, and the relative ratio of delayed flights to total flights. Our estimates suggest that a \$1 increase in the fee level (corresponding to a 6.8% increase in the sample mean) leads, on average, to a reduction of about 0.005 in the relative rate of mishandled baggage reports (corresponding to a 0.5% decrease in the sample mean) and to a reduction of about 0.006 in the relative rate of delayed flights (corresponding to 0.6% reduction in the sample mean).

#### 3.1. Alternate Models and robustness checks

In order to determine the robustness of our results and develop greater insights into the consequences of the imposition of the baggage fees, we estimated our model with a number of alternate specifications. In Alternate Model 1, baggage fees are measured by only the cost of one checked bag (*Bag\_fee\_1st*). It may be since many passengers only check one bag, that the cost of the second checked bag does not change passenger behavior and is not correlated with the operational outcomes of carriers. The results, as shown in Table 4, are consistent with those in our base case; that is the baggage fee is associated with fewer (relative) delays and mishandled bags.

In Alternate Model 2 (Table 5), baggage fees (*Bag\_fee\_1/0*) are coded 1/0; that is 1 if the carrier imposes a baggage fee (on the first checked bag) and 0 if there is no fee (for a first checked bag). The results support those from both our base case and Alternate Model 1; that is, the baggage fee indicator is associated with fewer (relative) delays and mishandled bags.

For Alternate Model 3 (Table 6), instead of using relative

<sup>8</sup> As was noted by a reviewer, when the independent variables in a series of equations are identical, then a Seemingly Unrelated Regression (SUR) model produces the same coefficient estimates as does OLS.

<sup>9</sup> A reviewer points out that operational performance at Southwest Airlines may have been partially due to integration issues with AirTran Airways.

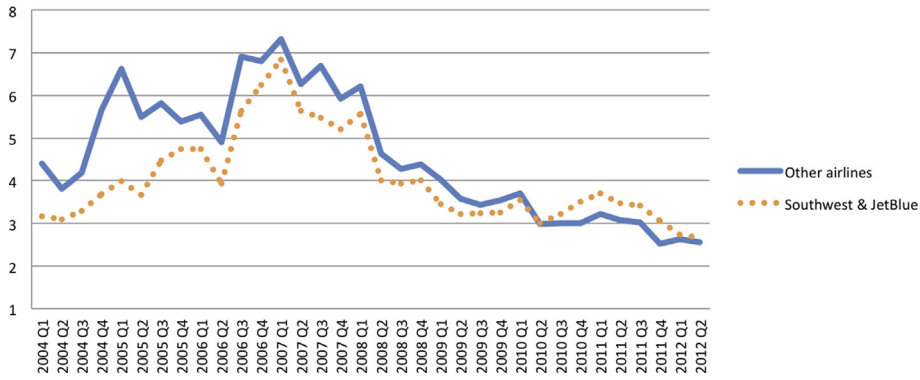


Fig. 1. Mishandled baggage reports (per 1,000 passengers).

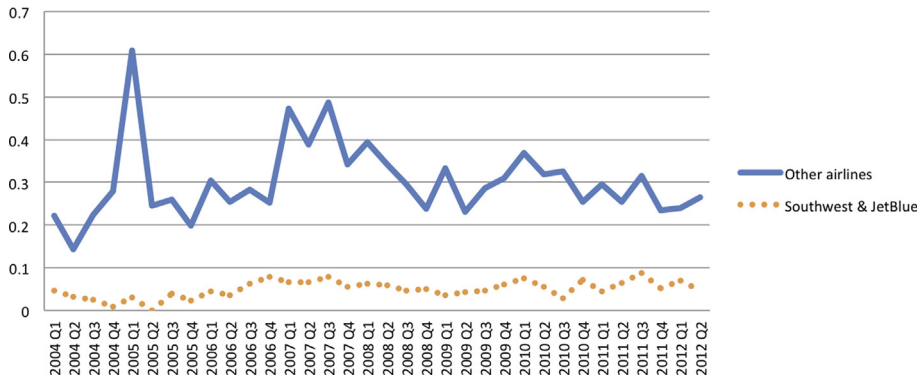


Fig. 2. Customer Complaints Regarding Baggage (per 100,000 passengers).

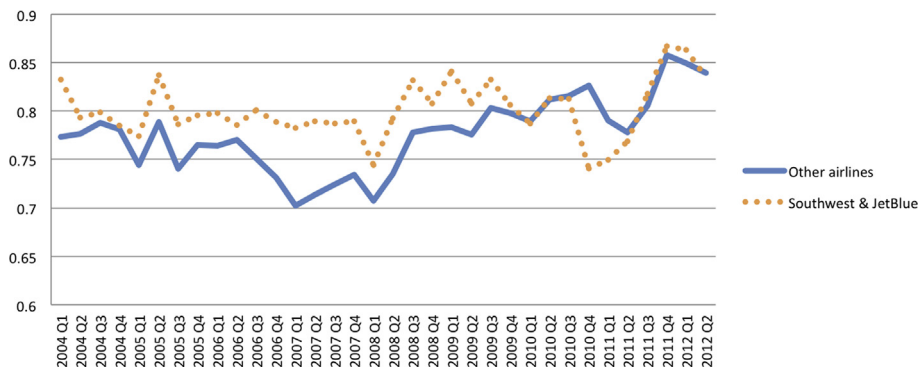


Fig. 3. On Time Flights (divided by Total Flights).

measures for our dependent variables, we use absolute measures (i.e., we do not divide the airline measures by industry averages). In order to control for potential industry effects, we include an additional right-hand-side variable that measures average industry delays (*ind\_delay*), recognizing, as pointed out by a reviewer, that this variable is potentially endogenous to the estimations. Again, our base results are confirmed (with the impact of the baggage fees on the rate of customer complaints marginally significant).

**4. Conclusions, implications and limitations**

The imposition of checked baggage fees has generated billions of dollars in additional revenues for US airlines. However, the revenue effect may underestimate the positive impact of the fees on the

airlines. In this paper, we show that the imposition of the baggage fees is associated with improved operational outcomes for the airlines. In particular, the baggage fees are associated with fewer mishandled baggage reports and a lower rate of airline-caused flight delays. However, in general, no association is found between the imposition of the baggage fees and the rate of customer complaints. This latter result may indicate that passengers have both positive and negative outcomes from the fees – positive in the sense that they are associated with better operational outcomes, but negative in that they are perceived as an additional cost of air travel.

The main managerial implication from this study is that, operationally, the baggage fees appear to be good for the airlines. Not only do they generate revenue for the carriers, but they are associated with improved operational outcomes. Our results indicate

**Table 3**  
Estimation results (t-statistics in parentheses).

	Airline Delays	Mishandled Baggage Rep.	Customer Complaints
Baggage Fee	−0.006*** (−3.13)	−0.005*** (−4.27)	−0.003 (−1.08)
y2005	0.080 (1.46)	0.025 (0.67)	−0.009 (−0.09)
y2006	0.020 (0.37)	0.025 (0.66)	−0.060 (−0.64)
y2007	0.028 (0.51)	0.033 (0.86)	−0.057 (−0.61)
y2008	0.094 (1.57)	0.082** (1.98)	−0.006 (−0.06)
y2009	0.148** (2.03)	0.136*** (2.70)	0.063 (0.51)
y2010	0.140 (1.63)	0.164*** (2.78)	0.062 (0.42)
y2011	0.235*** (2.68)	0.183*** (3.03)	0.152 (1.02)
y2012	0.248** (2.48)	0.177** (2.57)	0.204 (1.20)
AS	−0.049 (−0.80)	−0.208*** (−4.92)	−1.060*** (−10.16)
B6	−0.165** (−2.57)	−0.469*** (−10.59)	−1.163*** (−10.65)
CO	−0.248*** (−4.02)	−0.312*** (−7.32)	−0.489*** (−4.65)
DL	−0.182*** (−3.00)	0.009 (0.20)	−0.050 (−0.48)
F9	−0.224*** (−3.45)	−0.338*** (−7.57)	−1.125*** (−10.20)
FL	−0.472*** (−7.70)	−0.564*** (−13.35)	−0.776*** (−7.45)
NW	0.187*** (2.76)	−0.348*** (−7.47)	−0.614*** (−5.34)
UA	−0.201*** (−3.31)	−0.115*** (−2.74)	0.032 (0.31)
US	−0.164*** (−2.70)	−0.030 (−0.71)	−0.014 (−0.14)
WN	−0.385*** (−5.39)	−0.295*** (−5.99)	−1.389*** (−11.44)
q2	−0.025 (−0.67)	0.026 (1.03)	0.015 (0.25)
q3	−0.006 (−0.17)	0.046* (1.72)	0.021 (0.32)
q4	0.007 (0.17)	0.024 (0.90)	0.042 (0.63)
Constant	1.174*** (19.10)	1.146*** (27.02)	1.523*** (14.57)
R-squared	0.31	0.53	0.60
Observations	357	357	357

\*\*\*p < 0.01; \*\*p < 0.05; \*p < 0.10.

**Table 4**  
Estimation results from Alternate Model 1 (t-statistics in parentheses).

	Airline Delays	Mishandled Baggage Rep.	Customer Complaints
Bag_fee_1st	−0.014*** (−4.92)	−0.008*** (−3.80)	−0.008 (−1.51)
y2005	0.080 (1.48)	0.025 (0.65)	−0.009 (−0.09)
y2006	0.020 (0.37)	0.024 (0.64)	−0.060 (−0.64)
y2007	0.027 (0.51)	0.032 (0.84)	−0.058 (−0.62)
y2008	0.077 (1.41)	0.043 (1.10)	−0.019 (−0.20)
y2009	0.173*** (2.69)	0.090** (1.98)	0.068 (0.61)
y2010	0.177** (2.40)	0.104** (2.00)	0.070 (0.55)
y2011	0.271*** (3.64)	0.120** (2.28)	0.160 (1.24)
y2012	0.284*** (3.24)	0.112* (1.81)	0.212 (1.40)
AS	−0.063 (−1.05)	−0.204*** (−4.80)	−1.066*** (−10.24)
B6	−0.244*** (−3.68)	−0.486*** (−10.35)	−1.201*** (−10.45)
CO	−0.256*** (−4.23)	−0.311*** (−7.25)	−0.492*** (−4.69)
DL	−0.188*** (−3.17)	0.010 (0.23)	−0.053 (−0.51)
F9	−0.233*** (−3.70)	−0.327*** (−7.32)	−1.127*** (−10.33)
FL	−0.480*** (−8.03)	−0.558*** (−13.16)	−0.780*** (−7.52)
NW	0.177*** (2.68)	−0.345*** (−7.36)	−0.618*** (−5.39)
UA	−0.203*** (−3.42)	−0.112*** (−2.67)	0.031 (0.30)
US	−0.166*** (−2.79)	−0.028 (−0.66)	−0.015 (−0.14)
WN	−0.412*** (−6.22)	−0.263*** (−5.61)	−1.397*** (−12.15)
q2	−0.030 (−0.82)	0.020 (0.79)	0.012 (0.20)
q3	−0.009 (−0.24)	0.038 (1.43)	0.019 (0.29)
q4	0.011 (0.28)	0.017 (0.65)	0.043 (0.65)
Constant	1.191*** (19.72)	1.148*** (26.85)	1.531*** (14.63)
R-squared	0.34	0.53	0.60
Observations	357	357	357

\*\*\*p < 0.01; \*\*p < 0.05; \*p < 0.10.

that the imposition of a fee on the first checked bag is sufficient to be associated with improved operational outcomes.

A limitation of this study is that it was conducted during a period when the United States experienced a severe recession resulting from a banking crisis and a decline in the stock market in 2008. These two events corresponded in time with the initial imposition of baggage fees by the legacy carriers. Therefore, even though we included time effects in our model, our results may have been confounded by the general decline in the airline

industry. In addition, our research was conducted at the aggregate airline level. Even though we imposed controls in our model, there are many factors that could influence the dependent variables on a flight-by-flight and customer-by-customer basis that were not considered (e.g., airport-specific weather conditions). A more detailed consideration of route-specific factors, such as undertaken by Ramdas et al. (2013), may uncover further factors (i.e., moderating variables) influencing the relationship between baggage fees and the dependent variables. Moreover, there was

**Table 5**  
Estimation results from Alternate Model 2 (t-statistics in parentheses).

	Airline Delays	Mishandled Baggage Rep.	Customer Complaints
Bag_fee_1/0	−0.270*** (−4.95)	−0.144*** (−3.74)	−0.123 (−1.30)
y2005	0.078 (1.44)	0.024 (0.62)	−0.010 (−0.11)
y2006	0.017 (0.32)	0.023 (0.60)	−0.061 (−0.66)
y2007	0.024 (0.45)	0.030 (0.80)	−0.059 (−0.63)
y2008	0.090 (1.62)	0.049 (1.24)	−0.018 (−0.19)
y2009	0.210*** (3.06)	0.108** (2.22)	0.071 (0.60)
y2010	0.152** (2.17)	0.089* (1.78)	0.040 (0.33)
y2011	0.240*** (3.42)	0.101** (2.02)	0.126 (1.03)
y2012	0.256*** (3.04)	0.094 (1.58)	0.179 (1.23)
AS	−0.042 (−0.70)	−0.192*** (−4.55)	−1.053*** (−10.19)
B6	−0.226*** (−3.49)	−0.475*** (−10.36)	−1.182*** (−10.53)
CO	−0.246*** (−4.07)	−0.305*** (−7.13)	−0.486*** (−4.64)
DL	−0.179*** (−3.01)	0.015 (0.36)	−0.047 (−0.45)
F9	−0.185*** (−2.98)	−0.300*** (−6.83)	−1.101*** (−10.23)
FL	−0.452*** (−7.61)	−0.542*** (−12.88)	−0.764*** (−7.41)
NW	0.199*** (3.03)	−0.332*** (−7.12)	−0.605*** (−5.29)
UA	−0.192*** (−3.23)	−0.106** (−2.52)	0.037 (0.36)
US	−0.156*** (−2.63)	−0.023 (−0.54)	−0.010 (−0.10)
WN	−0.394*** (−6.09)	−0.252*** (−5.50)	−1.377*** (−12.28)
q2	−0.030 (−0.84)	0.020 (0.78)	0.012 (0.19)
q3	−0.007 (−0.19)	0.038 (1.45)	0.019 (0.29)
q4	0.013 (0.33)	0.018 (0.68)	0.041 (0.63)
Constant	1.175*** (19.57)	1.139*** (26.76)	1.521*** (14.60)
R-squared	0.34	0.53	0.60
Observations	357	357	357

\*\*\*p < 0.01; \*\*p < 0.05; \*p < 0.10.

**Table 6**  
Estimation results from Alternate Model 3 (t-statistics in parentheses).

	Airline Delays	Mishandled Baggage Rep.	Customer Complaints
Baggage Fee	−0.0004*** (−3.59)	−0.034*** (−5.16)	−0.002* (−1.72)
ind_delay	0.112*** (2.67)	12.751*** (4.48)	0.383 (0.96)
y2005	0.011*** (3.67)	1.070*** (5.26)	0.072** (2.53)
y2006	0.007** (2.23)	1.347*** (6.54)	0.025 (0.88)
y2007	0.010*** (2.79)	1.564*** (6.56)	0.115*** (3.46)
y2008	0.010*** (2.93)	0.695*** (3.03)	0.074** (2.29)
y2009	0.013*** (3.27)	0.423 (1.61)	0.090** (2.43)
y2010	0.018*** (3.95)	0.390 (1.26)	0.116*** (2.68)
y2011	0.021*** (4.52)	0.372 (1.18)	0.110** (2.47)
y2012	0.020*** (3.54)	0.508 (1.31)	0.110** (2.02)
AS	−0.002 (−0.69)	−0.997*** (−4.49)	−0.256*** (−8.24)
B6	−0.009*** (−2.75)	−2.177*** (−9.37)	−0.288*** (−8.86)
CO	−0.013*** (−4.00)	−1.458*** (−6.53)	−0.123*** (−3.93)
DL	−0.009*** (−2.90)	0.164 (0.75)	0.0001 (0.00)
F9	−0.012*** (−3.55)	−1.445*** (−6.17)	−0.277*** (−8.45)
FL	−0.024*** (−7.52)	−2.467*** (−11.15)	−0.195*** (−6.31)
NW	0.011*** (2.95)	−1.640*** (−6.72)	−0.144*** (−4.22)
UA	−0.010*** (−3.26)	−0.648*** (−2.96)	0.004 (0.13)
US	−0.008** (−2.38)	0.215 (0.98)	0.012 (0.38)
WN	−0.021*** (−5.52)	−1.613*** (−6.22)	−0.346*** (−9.52)
q2	−0.0001 (−0.07)	−0.396*** (−2.94)	−0.057*** (−3.05)
q3	0.002 (1.02)	0.111 (0.76)	−0.027 (−1.32)
q4	0.001 (0.50)	0.047 (0.32)	−0.054** (−2.58)
Constant	0.031*** (3.02)	2.359*** (3.44)	0.262*** (2.72)
R-squared	0.39	0.75	0.54
Observations	357	357	357

\*\*\*p < 0.01; \*\*p < 0.05; \*p < 0.10.

merger activity within the airline industry during the study period. Since merging carriers may create operational challenges, outcomes from these mergers may be confounded with the results from our estimations.

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