RELATIONSHIP BETWEEN AIRLINE SERVICE PERFORMANCE AND CUSTOMER COMPLAINTS FOR LEGACY NETWORK CARRIERS AND LOW-COST CARRIERS IN THE USA

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Abstract
Complaints to third-party entities like government agencies reflect a high level of customer dissatisfaction. Such complaints in the airline industry typically reflect a failure to redress first-stage complaints and often attract negative publicity. This paper examined the relationship between passenger complaints filed with the U.S. Department of Transportation (DOT) and airline quality from 2006-2019 for leading legacy network carriers and low-cost carriers. Operational performance data (punctuality, oversales, and mishandled baggage) and complaints reported to DOT were used as proxy for airline quality. Regression analysis showed punctuality had a negative effect and oversales had a positive effect on rate of complaints for both types of carriers. Mishandled baggage had no effect on complaint rate for discount carriers and negative effect on complaint rate. Implications of these results are discussed.

Keywords: *Consumer, complaints, service, quality, airlines*

JEL Classification: *R52, R58, Z32, Z39*

I. INTRODUCTION

Service failures result in dissatisfied customers and sometimes complaints. There is broad consensus that dissatisfied customers have a significant adverse impact on a business. Complaints represent a manifestation of dissatisfaction with a product or service. Customers who complain represent a small subset of dissatisfied customers (Day et al, 1981; Gardner Jr., 2004; Huppertz, 2000). From an airline's perspective, providing good service quality promotes competitive advantage and increases the prospect of enjoying ongoing passenger patronage and loyalty (Steven, Dong, and Dresdner, 2012). Additionally, responding effectively to complaints from a service failure provides an opportunity to build loyalty among customers (Huppertz, 2014).

Complaints are also used to inform policy and regulations to protect consumer interests and provide customer welfare in sectors like the airlines industry where customer satisfaction has been historically low and often reflected in low rankings on the American Customer Satisfaction Index rankings (Morgan, 2018). After the enactment of the Airline Deregulation Act of 1978, airlines were no longer subject to economic regulation of critical aspects like airline rates, routes, and services. However, to ensure consumer protection, the U.S. Department of Transportation (DOT) continues to have broad authority to investigate unfair or deceptive practices. The DOT monitors airline practices for compliance and invites airline passengers to file complaints with it if they were unfairly treated. These complaints are compiled and widely disseminated along with several operational metrics in the DOT's Air Travel Consumer Report (ATCR). ATCR data has been used widely as proxy for quality of airline service in academic literature (e.g., Bowen and Headley, 2019; Mott and Avery, 2015; Whitman, 2014).

The purpose of the study is to examine the relationship between airline service performance and passenger complaints. Specifically, it investigates the effect of three measures of airline service performance on complaints filed by passengers to the DOT: punctuality, mishandled baggage, and oversales (overbooking). These measures of performance are reported by individual carriers (airlines) to the DOT and published in the ACTR along with complaints filed by passengers. Consumer complaints filed directly with airlines or agencies like the Better Business Bureau are not included. We look at data for three leading legacy network carriers (LNCs) and the three biggest low-cost carriers (LCCs) from 2006 to 2019 to examine the relationship between service performance and complaints.

LCCs, also known as discount carriers and LNCs have different business models (Hofer et al, 2008). LNCs are known as full-service carriers and are

typically associated with larger scale of operations, higher fares, and full service (meal service, airport lounges, better cabin service etc.). In contrast, LCCs started out as small intrastate airlines that started expanding to inter-state routes after deregulation. LCCs use a low-cost model in a no-frills type of service. While differences between the two types of carriers are narrowing, there are likely to be lower service expectations from LCCs. Previous research has suggested that passengers in LCCs are less likely to complain than those in legacy network carriers LNCs (Whitman, 2014).

In the following sections, we provide a brief background of LNCs and LCCs, review relevant literature on service performance and consumer complaints, and airline service quality indicators. We propose specific hypotheses on the relationship between these indicators and complaints. We then test our hypotheses using linear regression models with data from ATCRs for 2006-2019. This is followed by discussion of results and implications. The period from 2020-2021 is not included because airline schedules and operations were severely affected during the COVID-19 epidemic.

II. BACKGROUND AND LITERATURE REVIEW

Deregulation of the airline industry in 1978 was a pivotal moment for airlines and passengers. The government stopped regulating key economic and operational aspects of airline carriers such as routes, fares, and services (Cook, 1996). During the regulated phase, the DOT determined the fares and the destinations for different carriers. However, carriers that flew intrastate did not come under the purview of these regulations. This allowed LCCs like Southwest Airlines to operate within Texas with relatively cheap fares and limited amenities. Deregulation of the U.S. airline industry freed carriers to fly any route and the freedom to set prices. It set the stage for an increasingly competitive marketplace and growth of LCCs. LCCs offer generally low fares in exchange for eliminating many traditional onboard passenger services associated with network carriers (Baker, 2014). With deregulation, LCCs had the freedom to choose interstate routes and directly competed with LNCs in many routes. Their business models are markedly different from those of the LNCs. They rely on realizing cost efficiencies and unbundled service offerings with flights operating from point-to-point. In contrast, LNCs adopted a hub-and-spoke system to improve their efficiency and increase coverage (Cook, 1996). The growth of LCCs, notably Southwest Airlines, PEOPLExpress, and JetBlue Airways significantly influenced the industry in terms of increased competition, better connections, and in many cases, lower prices (Hofer et al 2008). There were several LCCs that were launched in the 1990s. Some of them like ValuJet experienced a lot of success, while others like PEOPLExpress failed.

LNCs reacted to the popularity of LCCs with new formats and services that mimicked the discount carriers. Continental Lite was an entity within Continental airlines created in the early 1990s to take on Southwest Airlines. Delta Express was created with an all-coach configuration to connect Florida destinations with the Northeast and Midwest. Most of these failed. There have been several mergers between LNCs. The bigger carriers acquired weaker players to gain access to specific markets, remain competitive, and reduce operational costs. Northwest merged with Delta Airlines in 2008, Continental merged with United Airlines in 2010, and US Airways merged with American Airlines in 2013.

Role of DOT

Prior to deregulation of the airline industry, the Civil Aeronautics Board (CAB), an agency of the federal government of the United States, had regulatory authority over critical aspects of the industry like airline rates, routes, and services. Deregulation in 1978 ended most of the economic regulations. However, the DOT was given authority to monitor airlines' compliance with consumer protection, civil rights, and some economic requirements. These include monitoring and investigation of unfair and deceptive trade practices. Carriers file operational data like on-time performance, flight delays, cancellations, mishandles baggage, and number of passengers who were denied boarding because of oversold flights, monthly. The DOT also receives consumer (passenger) complaints directly on several areas like fares, flight-related problems, baggage, refunds, and customer service. The DOT investigates these complaints and when applicable, take appropriate enforcement action such as, issuing warnings or consent orders and imposing civil penalties. The DOT also aggregates the operational data filed by carriers and customer complaints in the monthly Air Travel Consumer Report (ATCR). The ATCR was first published by the now defunct CAB in March 1971.

ATCR data represents an industry-wide database of performance statistics along with passenger complaints. It started as a report containing only complaint data. Over the years, airlines were required to report operational performance data on issues such as on-time performance, cancellation, tarmac delays, mishandled baggage, mishandled scooters and wheelchairs, issues with animals, and oversales (Department of Transportation, 2021). For policymakers, this database provides an insight to the airline passenger experience and performance of different carriers. It provides a basis for changes in regulations and legislation (Federal Register, 2007). Customers can potentially access this readily available information and make informed choices. News reports in popular media also discuss these reports because the airline sector has high visibility. Even if consumers are unaware of this data, airlines tend to publicize this data to highlight their operational excellence that show

them in a better light relative to their competitors (Spencer, 1999).

Airline quality

The most general description of service quality is the extent to which service provision satisfies customer requirements or expectations (Wang et al, 2011; Wisniewiski, 2001). Service quality of an airline is one of the most important criteria for customers in choosing an airline (Truitt and Haynes, 1994). However, quality is multi-dimensional and can be approached in different ways.

A widely accepted approach to measuring service quality uses SERVQUAL that operationalizes service quality with five dimensions: tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman, Zeithaml, and Berry, 1988). A survey instrument is used to assess consumer expectations and perceptions of a service on these dimensions. Suitability of this scale across industries has been questioned (Caro and Garcia, 2007; Ladhari, 2008). In the airline industry, quality has been studied in different ways. One approach is to use cross-sectional studies to examine customer responses through surveys (De Souza 2015; Park 2007). A popular approach in examining airline quality is through the analysis of ATCR data.

Academic researchers have used ATCR data to examine complaint trends and airline quality. One of the early analysis of this data was done by Bolton and Chapman (1989). They looked at the structure of complaint behavior from ATCR data from October 1987 to August 1988. Factor analysis revealed three factors underlying complaints. These were operational problems, marketing problems, and special situation problems. Operational problems included core service issues such as flight problems, oversales, ticketing, boarding issues, baggage, and customer service. Advertising and fares related to marketing problems. The third factor covered issues like credit and tours. They found a significant negative correlation between operational factors and complaints. Complaints increased when core performance like punctuality went down.

The most publicized use of ATCR data is in the annual Airline Quality Rating (AQR) reports. These reports provide insights into airline industry performance. The AQR is an examination of airline performance that uses a weighted average of on-time record, denied boardings, mishandled baggage, and customer complaints (Bowen, Headley, and Luedtke, 1992). AQR ratings are calculated for each airline in the ATCR and provide an objective means of comparing airline quality across different time periods. Weights used in the calculation of AQR reflect the importance of the criteria in consumer decision-making. On-time record gets the highest weight. The four factors included in calculating AQR scores reflect key customer-oriented aspects of performance in this industry. AQR scores are very popular. However, a serious methodological issue relating to differences in dimensionality of the key variables used to calculate these scores has been raised (Gardner Jr., 2004). Each variable in AQR calculation is measured on a different scale – punctuality is based on percentage, oversales is based on denied boardings per 1,000 passengers, mishandled baggage is based on 10,000 passengers, and complaints rate is based per 100,000 passengers. Gardner Jr. (2004) proposed an alternative approach to use ATCR data using dimensional analysis.

Another approach to address the problem with AQR scores was the Service Disquality Index (Rhoades and Waguespack, 1999). Service Disquality Index (SDI) uses the sum of "quality" problems for an airline (namely, percentage of late flights, total number of complaints, total number of involuntary denied boardings, total number of mishandled bagged, and cancellations) divided by the total number of yearly departures for that airline. SDI can be a proxy for representing the likelihood of a service problem per departure. Higher SDI scores would reflect poorer airline service. Quality between airlines could be compared with this index.

Other researchers have also examined airline service quality using ATCR data. Whitman (2014) used ATCR data to compare propensity to complain between passengers of LCCs and LNCs. In this study he examined the relationship between specific quality problems (e.g., mishandled baggage) and complaints relevant to the specific quality problem. He concluded that passengers of LCCs were less likely to complain about service problems compared to passengers of LNCs. Gursoy et al (2005) performed correspondence analysis to examine relative positioning of different airlines on service quality attributes contained in ATCR. More recently, researchers have examined online review posts to identify airline quality attributes and their effects on satisfaction (Bogicevic et al, 2017; Park, Lee, and Nicolau, 2020). This approach to assess airline quality does not include operational performance of airlines.

Passenger Complaints

Complaints are an expression of dissatisfaction with a product or service (Resnik and Harmon, 1983; Oliver, 1986). It is widely recognized that majority of dissatisfied customers do not complain (Tax and Brown, 1998; Goodman and Newman, 2003). The airline industry has its fair share of complaints emanating from poor quality of service. Some of these complaints are filed directly with the airline and third-party organizations such as the Better Business Bureaus. Only a small proportion of complaints are likely filed with the DOT (Waguespack and Rhoades, 2014). Some estimates indicate airlines receive ten times the number of complaints filed directly with DOT. The focus of this study is on passenger complaints filed with the DOT and summarized in ATCR.

A service failure occurs when customers perceive that the initial service delivery falls below their expectations or "zone of tolerance" (Holloway and Beatty 2003). In this regard, Hirschman (1970) states that apart from accepting a service failure and remaining loyal, customers have two options: exit the relationship or communicate their dissatisfaction (i.e., voice). Typically, voice refers to a complaint to the firm, but Hirschman (1970) acknowledges that customers may not do so when they believe complaining is futile so they can simply do nothing and presumably make the best of it.. Hence, another form of voice has been added: Communicating one's dissatisfaction by spreading negative word of mouth, which can be more detrimental as it occurs beyond a business control. Further, it can seriously damage a business image and prevent other customers from using its services (Hogan, Lemon, and Libai 2003). Of all these alternatives, many believe that it is within the firm's best interest to encourage customers to directly voice their complaints. The mass adoption of social media has empowered customers to electronically share their negative feelings with many others (Balaji, Khong, and Chong 2016). The airline industry is particularly prone to service failures (Palmer and Bejou 2016) including, for example, delays, lost luggage, or unfriendly service.

The DOT encourages air passengers to resolve any service issues with airline staff at the airport. If that does not work, passengers are encouraged to file a complaint with the respective airline. It is only when passengers are not satisfied with the response from airlines that they are encouraged to file complaints with DOT. The complaints filed with airlines are not shared with DOT and hence are not public knowledge. The DOT categorizes complaints into twelve categories. These are: flight problems (delays, cancellations etc.), oversales, fares, refunds, baggage, customer service, disability, advertising, discrimination, animals, and others. In this study, we focus on the overall rate of complaints. In this study, we have looked at all complaints, without disaggregating them.

III. HYPOTHESES

Punctuality

Several studies have used dimensions of timeliness as measurement of quality (Chen and Gayle, 2013; Elliott and Roach, 1993; Gill and Kim, 2016; Greenfield, 2014; Mayer and Sinai, 2003; Mazzeo, 2003; Prince and Simon, 2015; Rupp et al, 2006; Yimga, 2016). Timeliness is an important attribute of quality and on-time performance is a dimension of timeliness. It is logical to expect that passengers would be dissatisfied when their plans are disrupted due to lack of punctuality.

A flight is said to be delayed when an airline flight takes off and/or lands later than its scheduled time. The Federal Aviation Administration (FAA) considers a flight to be delayed when it is 15 minutes later than its scheduled time. On-Time Performance (OTP) is a widely accepted method of understanding punctuality for different modes of public transport, including aviation. It provides a standardized means of comparing how well one service provider operates according to its published schedule compared to another. Punctuality is generally considered to be one of the industry standard indicators for air transport service quality. On-time performance (OTP) is also greatly perceived by public and is often the most important factor in choice of airline for passengers. OTP influences not only punctuality reputation of an airline but also public perception and satisfaction of passengers with the airline. All other things being equal, customers will prefer an airline with a consistent record of dependability (Berdy and Gershkoff, 2000).

Increased congestion at hub airports affects on-time airline performance to the detriment of customer satisfaction and may have substantially negative repercussions for airlines in a hypercompetitive environment of the airline industry. With respect to passengers, a delay can be classified as either a hard or soft cost to the airline with a hard cost referring to rebooking, compensation and care for passengers; soft costs, while harder to identify, could be a loss of a disgruntled passenger travelling with the airline again in the future or the rebooking of a passenger onto a competitor's on-time flight (Cook et al, 2009; 2012). In fact, passengers experiencing a delay and especially a service failure have usually an immediate emotional reaction. Negative emotions usually prevail. Displeasure, uncertainty, and disappointment are some of the emotions the passengers experience that become stronger as the time passes and especially when there is lack of information about the reasons or the duration of the delay (Taylor, 1994; Casado Diaz and Más Ruíz, 2002). Delays are a common source of complaints from airline passengers (Dresner and Xu, 1995). We propose the following hypotheses:

H_{1a}: Punctuality is negatively associated with complaints for legacy airlines.

H_{1b}: Punctuality is negatively associated with complaints for low-cost airlines.

Mishandling of baggage

Another proxy of airline quality is mishandled and lost baggage. Airlines have been improving technology to reduce instances of mishandled baggage. However, when this does happen, it irks airline travelers. The way the airlines resolve this problem can be a potential source of dissatisfaction. Delayed or lost baggage can be a trigger for complaints against the airline given the inconvenience it causes.

Providing excellent service for baggage handling becomes one of the important factors to improve passengers' satisfaction quality (Fitantri, Madhani and Widiastuti, 2017). Airline passengers expect their baggage on the assigned carousel when they reach their destination. The level of satisfaction can be measured through whether or not the

performance provided by the airline met or exceeded expectations desired by passengers. Service failure can be defined as any transaction resulting in a problem and service falling short of the customer's expectation of the level of service. Taking this argument one step further, some customers may have recovery expectations and some customers may have failure expectations. For instance, many customers recognize that consumption entails some potential for dissatisfaction (Murray and Schlacter, 1990). Therefore, to determine what will be done in the event of a failure, they inquire about warranties, exchange and refund policies (McCullough, Berry, and Yadav, 2000). However, the situation can be quite different when a passenger gets to the destination and their luggage has not, no clothes for a business meeting, no clothes to attend a wedding, no equipment to showcase at a trade show or no bathing suit for the beach etc. can be difficult for the airline to resolve. Mishandled baggage would be a cause for dissatisfaction, and therefore, the following two hypotheses are adopted for this study about mishandled baggage:

H_{2a}: Mishandled baggage is positively associated with complaints for legacy airlines.

H_{2b}: Mishandled baggage is positively associated with complaints for low-cost airlines.

Oversales

The third proxy for airline quality is oversales or overbooking when a passenger is "bumped" because the airline had booked more passengers on a flight than available seats. Overselling limited seating space is standard practice among airlines. This practice is widely applied in the service industry to hedge against undesirable situations, such as cancellations and no-shows. However, during the implementation of overbooking, service providers may turn down some customers when the number of arrivals exceeds their capacity on the target date. Oversales (i.e., selling more tickets than available seats) is pervasive in the airline industry (Amaruchkul and Sae-Lim, 2011). It can reduce the waste of seats and maximize airlines' profits, but it also brings potential risk. When the number of arrival passengers exceeds flight capacity, some passengers are denied boarding. Airlines compensate these passengers (denied-boarding compensation) in most cases. According to U.S. DOT reports, typically less than two per cent of passengers ticketed on a U.S. domestic flight are denied boarding on that flight. To mitigate the potential inconvenience to passengers, airlines typically look for volunteers willing to transfer to later flights, raising the level of compensation offered until enough passengers willing to delay their travel have been found.

A common remedy for offloading is to provide monetary compensation (Pizam, 2017). If passengers are offloaded voluntarily, a mutually agreed amount is offered; but when they are denied boarding involuntarily, the compensation regulations apply. As a result, less than two per cent of passengers who are denied boarding on oversold flights are bumped involuntarily. It is a legal practice to account for no-shows and cancellations to allow airlines to improve their load factors and reduce revenue losses (Guo, Dong, and Ling, 2016). Yet, it is difficult to forecast no-shows and cancellations, leaving an uncertain number of surplus customers needing to be offloaded or bumped (Wehner, L´opez-Bonilla, and Santos, 2018). Although overbooking helps service providers increase the utilization of their finite capacity, this strategy can also be a double-edged sword because some customers are denied service when the number of arrivals exceeds the capacity. Such denial is a terrible experience for customers (Zhang et al, 2010; Lindenmeier and Tscheulin, 2008). Service providers also incur disrepute and economic losses when they have no choice but to refuse customers. Affected customers may feel treated unfairly and potentially vent their anger on social media, which can result in viral crises or negative word of mouth. A widely covered offloading incident involved a doctor being dragged off an overbooked United Airlines plane in 2009. It received around 4 million views on Facebook, bestowing unwanted notoriety on the airline and a decline of US$1.4 billion in market capitalization (Benoit, 2018). This study proposes the following hypotheses about oversales:

H_{3a}: Oversales is positively associated with complaints for legacy airlines.

H_{3b}: Oversales is positively associated with complaints for low-cost airlines.

The hypotheses are depicted in Figure 1.

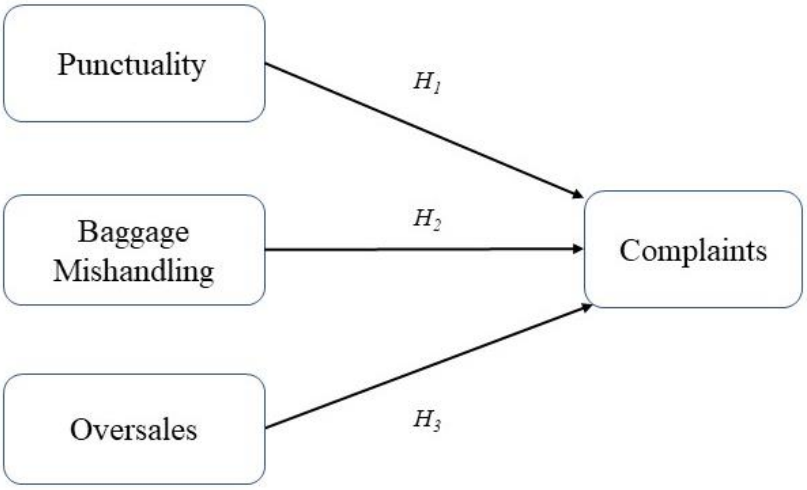

Figure 1: Research Model

IV. METHODOLOGY

This study involves a quantitative secondary analysis of data drawn from the U.S. Department of Transportation (DOT) monthly Air Travel Consumer Reports (ATCR). The DOT requirement is based on the criteria that an airline handled at least 1% or more of the total domestic scheduled-service passenger revenues for the year. This research study utilizes data from U.S. DOT from 2006 to 2019. Previous research has used the ATCR data to investigate performance and customer satisfaction for US airlines (Dresner and Xu 1995; Mellat-Parast et al. 2015). The authors included both low-cost carriers and network carriers which were selected after consulting prior literature investigating the effect of service failures in the airline industry (Britto, Dresner, and Voltes 2012; Mellat-Parast et al. 2015; Wittman 2014) and verifying that the ATR website included the customer reviews for the particular carrier. Data for three LNCs (American Airlines, United Airlines, and Delta Airlines) and three LCCs (Southwest Airlines, JetBlue Airways, and Frontier Airlines) are used. Several factors led to a surge of complaints against airlines over the last twenty years, lost baggage and airlines full of passengers were stuck on the tarmac for more than eight hours without proper care was given widespread publicity, which in turn led to increased consumer awareness concerning airline quality and the means to file complaints. In this model, punctuality, mishandled baggage, and overbooking are independent variables, with rate of passenger complaints as the dependent variable. To test the hypotheses, regression analysis was performed, statistical mean, standard deviation and percentages were also used in the analysis.

Variables

The operationalization of the three independent variables is consistent with prior research (Dresner and Xu 1995; Mellat-Parast et al. 2015). Punctuality is the percentage of operated flights arriving on time. A flight is counted as "on time" if it operated less than 15 minutes after the scheduled time shown in the carriers' Computerized Reservations Systems.

Mishandled baggage is reported as the rate of mishandled-baggage reports per 1,000 passengers by airline. The rate is based on the total number of reports each carrier received from passengers concerning lost, damaged, delayed or pilfered baggage. Oversales (overbooking) is the number of passengers who hold confirmed reservations and are denied boarding ("bumped") from a flight because it is oversold. These figures include only passengers whose oversold flight departs without them; they do not include passengers affected by cancelled, delayed or diverted flights. It is reported as involuntary denied boarding per 10,000 passengers. Complaints are reported across twelve categories in ATCR. The total number of complaints per 100,000 passengers for each carrier is used for analysis.

V. RESULTS

Means and standard deviations for the focal variables are shown in Table 1. The top performing airline in LNC category from 2006 to 2019 was Delta Airlines with highest punctuality (M_{Delta} = 81.94) and lowest complaint rate (M_{Delta} = 1.10). For LCCs, Southwest had the best performance with a punctuality rate of 79.74 and a complaint rate of 0.34 (Table 1).

Table 1: Mean and Standard Deviation of airline service scores 2006 to 2019

Airlines	*Punctuality*		*Oversales*		*Mishandled Baggage*		*Passengers Complaints*	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Legacy airlines								
Delta Airlines	81.94	3.95	0.67	0.76	3.59	2.04	1.10	0.55
American Airlines	76.40	3.63	0.64	0.21	4.52	1.74	1.76	0.60
United Airlines	77.85	4.18	0.83	0.54	4.03	1.35	2.10	0.79
Low-cost airlines								
Frontier Airlines	76.51	3.47	1.00	.54	3.27	1.31	2.57	2.24
Southwest Airlines	79.74	2.53	0.86	0.34	3.82	0.93	0.34	0.11
JetBlue Airways	74.20	2.51	0.12	0.26	2.73	1.33	0.91	0.23

Punctuality rates for LNCs improved over this period while rates for LCCs declined a little, largely because of poorer performance from Frontier Airlines (Figure 2).

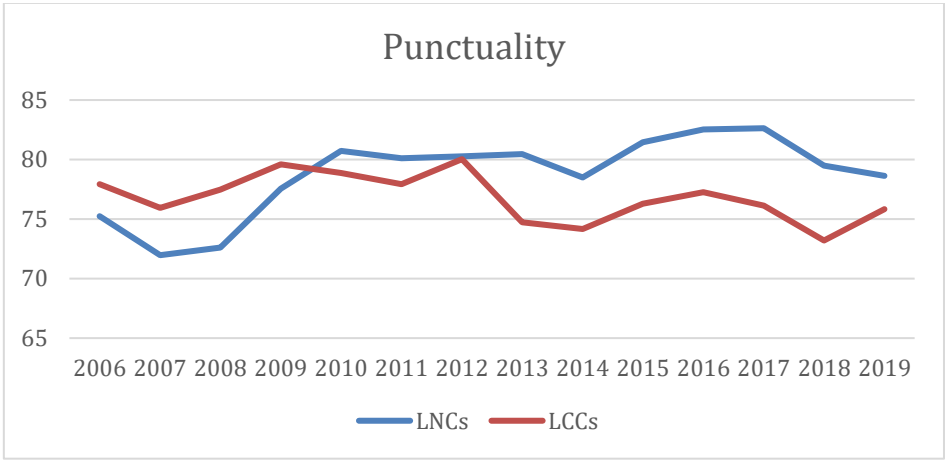

Figure 2: Punctuality record of LCCs and LNCs

Oversales broadly show a declining trend for both types of carriers (Figure 3). The number of denied boarding are a very small percentage of total number of passengers. For LCCs, the highest was 1.17 per 10,000 passengers. For LNCs, the highest was 1.32 per 10,000 passengers.

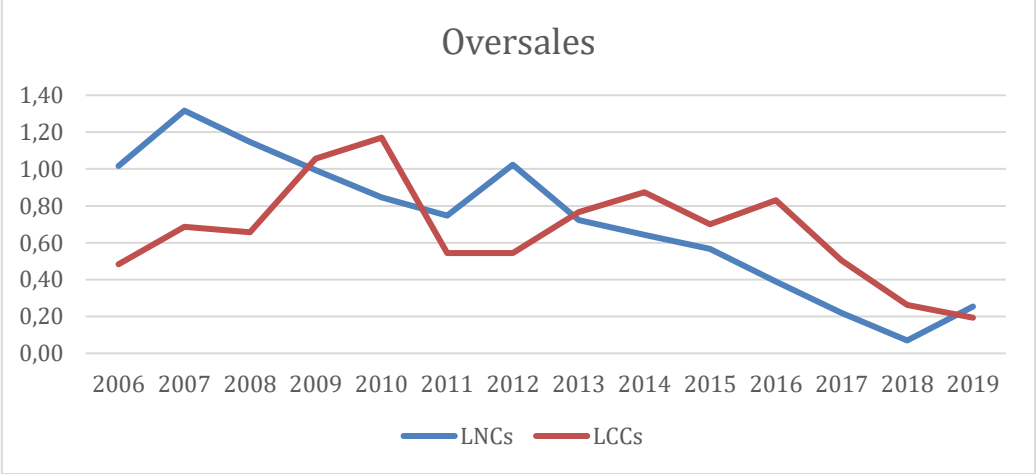

Figure 3: Oversales record of LCCs and LNCs

Mishandled baggage rates came down dramatically for LNCs and LCCs till 2018. However, there was a sharp increase in these rates in 2019 (Figure 4).

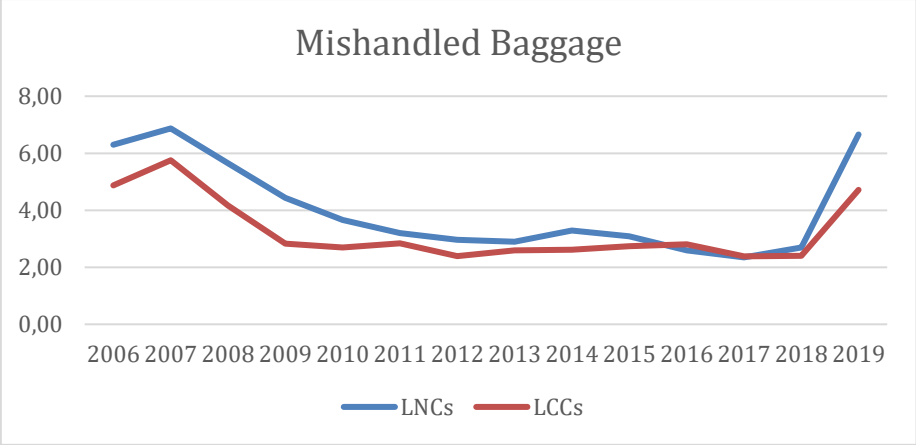

Figure 4: Mishandled Baggage rates of LCCs and LNCs

Rate of complaints for LNCs was relatively stable and declined after 2015. For LCCs, the complaint rate had a rising trend till 2015, after which it declined. The rates for both types of airlines were similar in 2019.

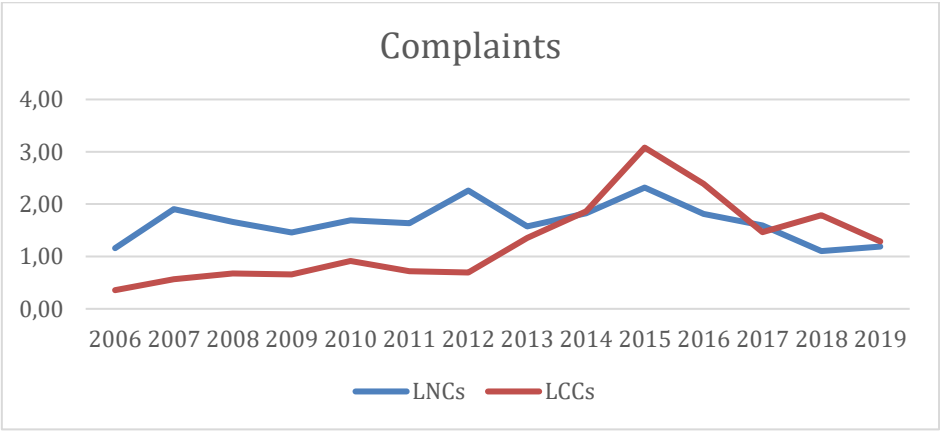

Figure 5: Complaints rates of LCCs and LNCs

Differences between LNCs and LCCs

Means for the focal variables were compared for LNCs and LCCs (Table 2). Punctuality rates and mishandled baggage rates were significantly higher for LNCs. The rate of complaints and oversales (passengers denied boarding per 10,000 passengers) were not significantly different for the two groups. However, there was greater variance in rate of complaints for LCCs compared to LNCs. Complaint rates for Frontier Airways (2.57) was more than that of Southwest (0.34) and JetBlue (0.91). The complaint rate for LCCs would be significantly lower than LNCs, if Frontier data was excluded. Figure 5 shows the comparison of means between legacy and low-cost airlines.

Table 2: Means (and standard deviations) of focal variables

	LNCs		**LCCs**		***p***
	Mean	S.D.	Mean	S.D.	
Punctuality	79.84	4.50	77.20	3.62	.007
Oversales	0.793	0.55	0.734	0.55	n.s.
Mishandled baggage	3.829	1.73	3.224	1.26	.050
Complaints	1.423	0.77	1.228	1.59	n.s.

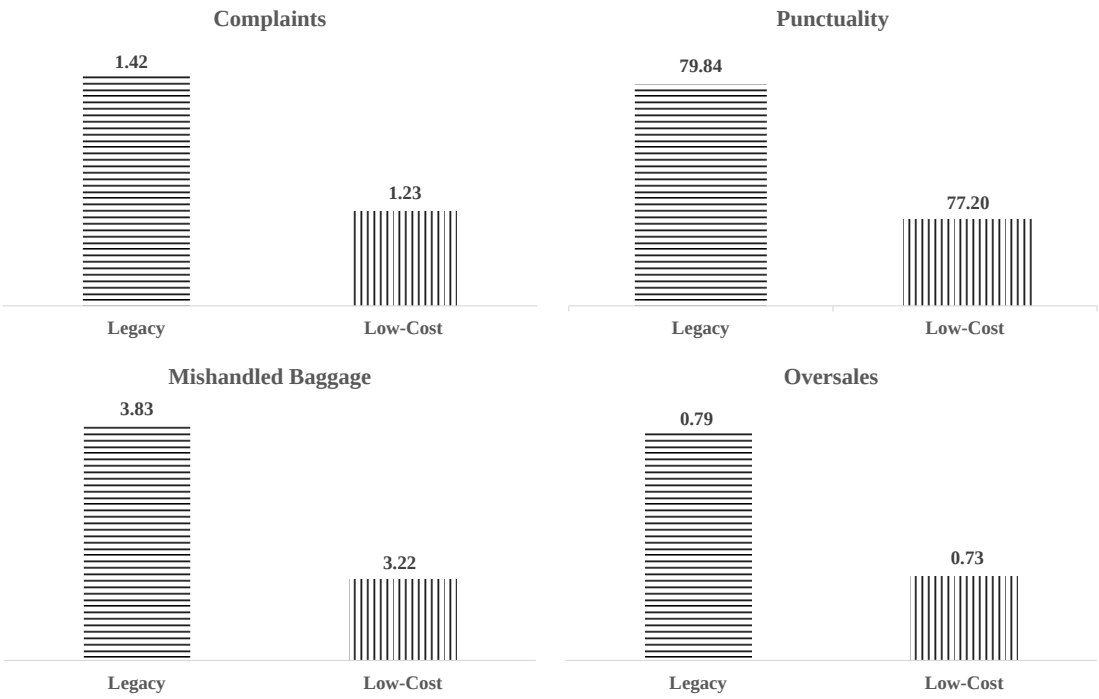

Figure 6: Comparison of means between Legacy (LNCs) and Low-cost carriers (LCCs)

Hypotheses testing

Regression analysis was run separately for LNCs and LCCs, with rate of complaints as a dependent variable and punctuality, mishandled baggage, and oversales as independent variables. The overall model was significant for both regressions (LNC: $F_{3,38} = 6.77$, $p < .001$, r-squared = 0.35; LCC: $F_{3,38} = 4.59$, $p < .01$, r-squared = 0.27). The standardized coefficients of the regression are shown in Table 3.

Table 3: Regression results

	Legacy airlines (LNCs)	**Low-cost airlines (LCCs)**
	β	**β**
Punctuality	-.522***	-.527***
Mishandled Baggage	-.521**	n.s.
Oversales	.537***	.311**

Dependent variable: rate of complaints
Note: *** $p < .01$; ** $p < .05$; *n.s. = not significant*

Regression results for LNCs and LCCs were similar for effects of punctuality and oversales. Punctuality (on-time record) had significant negative relationship with complaints for both legacy **(**β = -*.522*, $p < .01$**)** and low-cost airlines **(**β = -*.527*, $p < .01$**)**. Therefore, H_{1a} and H_{1b} are supported. Oversales had a significant positive relationship with complaints for legacy airlines (**β** = -*.537*, **p** < *.001*) and LCCs (**β** = *.311*, **p** < *.05*). Therefore, H_{3a} and H_{3b} are supported.

Mishandled baggage had a significant negative effect on rate of complaints for LNCs (**β** = -*.521*, **p** < *.05*) and no significant effect for LCCs (Table 2). These results are inconsistent with the proposed hypotheses. Therefore, there is no evidence to support H_{2a} and H_{2b}. The results suggest that as more bags are mishandled, overall complaints rate went down for legacy airlines. For LCCs, there was no significant relationship between mishandled baggage and complaints rate. These unexpected results will be further explored in the next section.

Table 4: Summary of hypothesis testing

No.	Hypothesis	Summary Result
1a	Punctuality is negatively associated with complaints for legacy airlines.	Supported
1b	Punctuality is negatively associated with complaints for low-cost airlines.	Supported
2a	Mishandled baggage is positively associated with complaints for legacy airlines.	Not Supported
2b	Mishandled baggage is positively associated with complaints for low-cost airlines.	Not Supported
3a	Oversales is positively associated with complaints for legacy airlines.	Supported
3b	Oversales is positively associated with complaints for low-cost airlines.	Supported

VI. DISCUSSION

The relationship between airline service quality and passenger satisfaction is attracting increased attention from scholars, airlines and other stakeholders. By addressing the issue of service failure, this study makes a unique contribution to the airline service quality literature, that to date, has largely overlooked the issue of relationship of service failure to complaints.

For LCCs and LNCs, punctuality has a negative association with complaint rates. This is consistent with findings from previous studies that punctuality is an important indicator of airline quality. All things being same, greater levels of punctuality would result in smaller rates of complaints. LNCs had a slightly better punctuality record than LCCs. However, for both types of carriers, punctuality had a significant effect on bringing down overall complaint rates. The results of this study affirm that timeliness is an important aspect of quality of airlines (Mazzeo, 2003; Rupp et al, 2006). Airlines have been known to pad their flight schedules to achieve punctuality (Mazzeo, 2003). Delays due to bad weather and other causes not attributable to carriers are less likely to result in complaints. Consumers are more likely to be dissatisfied and consequently complain if they attribute the cause of service failure to the service provider (Blodgett and Granbois, 1992). The actual nature of complaints relating to punctuality would be a worthwhile area of future enquiry.

Oversales that result in involuntary bumping is associated with more complaints for both LNCs and LCCs. Customers would feel aggrieved at not being to fly despite having a valid ticket. Airlines have been successful in bringing the down the rates of oversales in recent years (Figure 3). High oversales can draw the ire of lawmakers and specific regulations are in force to ensure consumer welfare. The DOT website lays out procedures that airlines use to decide bumping passengers in a overbooked flight. Airlines are required to demonstrate transparency in how they deal with problems relating to oversales and provide incentives to passengers to voluntarily give up their seats for a later flight. Compensation is mainly based on ticket price and length of delay in reaching destination due to bumping. Even though oversales is trending down, it is still positively related to rate of complaints. When it occurs, it is clearly attributable to the airline, and in many cases the compensation may not be considered adequate. Managers should look into the nature of complaints in this category to better understand customer grievances and improve how employees handle disgruntled passengers.

There was no evidence to support the hypothesized relationship between mishandled baggage and complaints (H_{2a} and H_{2b}). Mishandled bags had a negative effect on complaint rates for LNCs and no effect on complaint rates for LCCs. Despite rising volume of passengers, mishandled baggage rates have gone down considerably between 2007 and 2018, followed by a sharp spike in 2019 for LNCs and LCCs (Figure 4). This may be attributed to the effect of baggage fees introduced in 2008 on reducing the number of checked bags. Reduction in bags and improvements in technology have also reduced the number of bags that are lost and improved operational performance such as better punctuality and reduced complaint rates (Scotti, Dresner, and Martini, 2016). Mishandled baggage are typically delayed and customers often get compensated adequately, without losing their belongings. Another reason for lack of relationship between mishandled baggage rates and complaint rates could be the effective resolution at the airport itself. Therefore, consumers have no reason to file a complaint with DOT and points to effective service recovery. This may explain the anomalous negative relationship between mishandled baggage and rate of complaints for LNCs and no relationship for LCCs. Future research should look at customer feedback on social media to confirm customers' evaluation of mishandled baggage experiences.

The effect of mishandled baggage on complaint rates is counterintuitive and deserves more inquiry. Two possible explanations could be explored further: (i) mishandled baggage does not cross the "dissatisfaction threshold" (Kowalski,1996) to contribute to the overall rate of complaints and (ii) the service failure recovery associated with mishandled baggage may take away any dissatisfaction that resulted from mishandled baggage.

This study found that that commonly accepted operational service performance indicators that are used in AQR computation differ in their effect on rate of complaints by passengers. These complaints represent a small fraction of complaints that are filed with the carriers directly (US Government Accountability Office, 2020). Operational parameters used in calculating AQR and publicized in the media did not find significant mention in online reviews. Complaints in these online reviews were more oriented towards in-flight service, cabin seat comfort, and entertainment (Bogicevic et al, 2017). Therefore, more work that combines multiple sources of data are needed to have a better understanding of airline quality and consequences of service quality problems on complaints.

Managerial Implications

This study's results can provide airline industry managers with a deeper insight into how travelers perceive airline service quality and the effect of operational performance on formal complaints. It is in the interest of the airlines to reduce the number of complaints filed with DOT by redressing customer issues effectively. If customers don't talk about their bad purchase experience, companies will be unaware of their problems (Taleghani et al, 2011). Therefore, companies should build up a complaint culture to improve their services (Potluri and Mangnale, 2011).

Airlines spend both time and money towards improving customer service to buff up their reputation and avoid being ranked “the worst airline in America" from media reports or from AQR reports. A recent study used data from multiple sources including ATCR to reveal the importance of investment in frontline human capital in reducing complaints in the U.S. airline industry (Chauradia et al, 2021).

By improving operational performance and reducing complaints, airlines also reduce scrutiny from regulators and lawmakers. Dresner and Xu (1995) and Steven et al (2012) have both suggested that complaints are negatively related to airline profitability (that is, an increase in complaints will cause profitability to fall in the next period), but more work in this intriguing area is necessary to examine the relationship between service quality and airline financial performance.

Academic Implications

Understanding travelers’ complaining behavior as a reflection of customers’ experiences can assist airlines in identifying the primary characteristics necessary to promote good post-purchase behaviors and minimize negative intents (Brochado et al, 2019). Thus, traveler evaluations not only enable airline businesses to obtain feedback from their customers but also give them a chance to explore new ways to build positive post-purchase intents. To generate high passenger scores and positive word of mouth, airlines should both provide effective customer calls as well as the refund policy and ensure service quality in-ground services in the airports in which they operate to effectively handle traveler’s baggage.

The effect of effort burden on complaint rates is not well understood. Till recently, DOT encouraged passengers to first resolve the service issue with the airline directly. Only when the issue was not resolved to the passenger’s satisfaction was the passenger directed to the DOT complaint form. The Effort Model of complaining behavior (Huppertz, 2014) suggests that simplification of the complaint process will increase complaint rates. More recently, the DOT website has made the complaint form directly available to passengers and no longer asks passengers to complain first to the airline. The relatively large number of complaints in social media, a form of third-party complaining, attests to the idea that low effort to complain will result in greater quantity of complaints (Huppertz, 2014).

An area of interest for academic research is understanding the motivation of the complainants. Dissatisfaction is considered a necessary condition for complaining. However, decision to complain is influenced by situational and personal factors (Blodgett and Granbois, 1992). These complainants have likely exhausted their options for redressal from first-stage complaints (filed directly with airlines) and are emotional when they complain to a third-party like the DOT (Tronvoll, 2011). The type of justice these complainants are seeking would be of interest to researchers in this area. Researchers have looked at distributive, procedural, and interactional justice motivations for complainants (Harris, Thomas, and Williams, 2013). An additional relevant motivation that is often not considered in marketing literature would be desire for retributive justice (Maiese, 2003) where the complainant wants the airline to be punished for its actions or inactions. It is also important to identify and examine the role of other relevant factors that influence the rate of complaints. Examination of data from online customer review sites should be considered.

Limitations

This study relied on quantitative information from ATCRs from US DOT for leading LCCs and LNCs. The data pertains to only domestic operations and therefore, the study cannot be generalized for the entire global airline industry. The study provides insight into effect of specific operational aspects of service quality on passengers' complaints filed with DOT. Only rate of complaints was used for the analysis. Future studies should look into the specific categories of complaints. This study did not include data after the COVID-19 period (i.e., 2020 and 2021). This opens the door of opportunities for future research to investigate this relationship between service quality and traveler’s satisfaction before and after COVID-19 era.

VII. CONCLUSIONS

Airline companies have been focused on the quality provided as a way to differentiate from their competitors (Gursoy et al, 2005; Chen and Hu, 2013). Complaints to DOT represent an extreme level of dissatisfaction that airlines should monitor and understand, especially because these complaints were not redressed earlier by the airlines. While these complaints represent a small fraction of all complaints against airlines, it provides airlines with a better understanding of serious service failure issues that were not addressed successfully by their front-line staff. Airlines should also pay close attention to these complaints because these complaints garner unwanted attention from the media and regulators. The gap between LCCs and LNCs is narrowing. Punctuality rate and oversales had significant effects on complaint rates. Our analysis suggests that airlines appeared to address issues relating to mishandled baggage better than other operational issues in terms of its effects on rate of complaints. Other variables that can improve the predictability of complaint rates need to be explored.

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