

# **Financial Distress and Customer Satisfaction**

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June 2008

## 1. Introduction

Many companies in the United States are facing issues due to financial distress. In 2005, over two million companies filed for bankruptcy (American Bankruptcy Institute, 2006), while many more had financial difficulties. According to Dothan (2006), financial distress can lead to a loss in market share, decreases in productivity, reductions in capital expenditures and even to the sale of assets at depressed prices.

The reasons for financial distress are manifold, and can span from mismanagement of assets, to economic downturns, to a lack of customer focus. Financial distress is also likely to affect a company's dealings with its customers. Firms operating under financial pressure are often forced to change tactics. Generally, these businesses are faced with two distinct choices – to cut costs or to increase revenues or a combination of the two (Hofer, 1980). Cost cuts – especially in wages – may result in dissatisfied employees leading to less than optimal performance which, in turn, can easily translate into lower customer service levels. Alternatively, companies can attempt to increase their revenues, for example by focusing on improving customer service to retain and attract customers (Scherrer, 2003). Either approach – cost cutting or revenue enhancement – can be directly linked to changes in customer service management.

Customer service is a firm decision variable that measures the relationship between the final customer and a firm. It refers to the extent to which a company is able to meet customer expectations and needs and is of strategic importance to profit maximizing organizations. Customer service implies that businesses strive to “continually

enhance customer experience and satisfaction, to deliver quality in a competitive marketplace” (Spencer-Matthews & Lawley, 2006, p. 218).

An example of the effect of financial distress on customer service comes from the airline industry. US Airways filed for bankruptcy in September 2004. As a result of its financial difficulties, US Airways reduced costs by laying off employees (Anonymous, 2002, 2005). However, these labor reductions contributed to US Airways’ “Valentines Day Massacre”. After the snow storm on Valentine’s Day 2007, thousands of misplaced and stranded bags in Philadelphia resulted in upset customers across the country (Schlossberg, 2007). Contributing to this service failure was a lack of motivated employees due to salary cuts for long-term employees and low starting salaries for new hires (Belden & McCoy, 2007).

In contrast, CERT is an example of a company that used improved customer service as a means to combat financial distress (Lainas, 1999). By the mid-90s, this British third party logistics provider (3PL) faced severe financial conditions. A new management team introduced the goal of providing exceptional customer service and ingrained customer service into the company’s mission. Since 1995, the company has grown tremendously and still states on its website its goal is to provide “the highest levels of customer service at no compromise!” (CERT, 2006).

These two examples show the different ways financial distress can impact a firm’s business conduct; specifically, its approach to customer service. It is this relationship between financial distress and customer service that is the focus of this paper. While previous research has examined how customer service impacts financial performance

(e.g. Behn & Riley, 1999; Dresner & Xu, 1995; Ittner & Larcker, 1998), research investigating the opposite relationship is scarce. The study, therefore, adds to the literature by addressing this issue; i.e. how a firm's financial distress impacts customer service.

The paper provides new insights for both academia and business professionals about the impact of financial distress on customer service. To the authors' knowledge, this research is the first to demonstrate, empirically, the reaction of firms in the airline industry to financial distress and the effect of financial distress on customer service. The findings of this study can be used to guide companies experiencing financial distress in their approach to customer service. This research can direct managers to better understand industry practices and, hence, help them focus their customer service efforts in turning their firms around in times of financial distress.

The next section provides an overview of the literature in the field of customer service and financial distress. The proposed relationship between financial distress and customer service is discussed resulting in the development of the research hypotheses. In Section Three, the methodology of this study is explained in detail. The fourth section presents the findings of the regression models. Finally, Section Five provides the conclusions.

## **2. Literature Review**

### *2.1. Customer Service*

Companies in today's economy have long realized the potential for providing good customer service. It is considered one of the major determinants of competitive advantage (Boyaci & Ray, 2006; Parasuraman, 1998). According to Parasuraman (1998), customer service supplements a company's core offering and entails an organization's ability to deliver customer needs and requirements. A common metaphor in this context is the "flower of service". The actual product or service is seen as a flower with petals (Lovelock, 1994). The deliverable is the center of the flower while the petals present elements of customer service.

Companies intending to stay competitive must compete for customers and market share. Several studies have investigated the relationship between customer service and firm performance (e.g. Baker, Marn, & Zawada, 2001; Behn et al., 1999; Wiles, 2007). Heskett, Jones et al. (1994) developed a model called the 'Service-Profit-Chain' that hypothesized that customer service leads from satisfaction to loyalty and eventually to profits. Customer satisfaction, resulting from good customer service, is of major importance in customer loyalty (Anderson, Fornell, & Lehmann, 1994; Ellinger, Daugherty, & Plair, 1999) and hence repeat purchases (Cho, Im, Hiltz, & Fjermestad, 2003; Suzuki, 2000). Satisfied customers will spread the word, and positive word-of-mouth is vital for most service companies (Dick & Basu, 1994). Generally, this research stream finds support for a positive relationship between customer service and firm

performance indicating that better customer service translates into better financial performance.

## *2.2. Financial Distress*

Financial distress and its outcomes are of major importance for companies as it impacts their ability to conduct business as well as to interact with customer and suppliers. First, several studies (e.g. Casey, McGee, & Stickney, 1986; Routledge & Gadenne, 2000) established the empirical link that that free assets positively impact a companies' likelihood to remain in business. Second, companies operating under financial distress are faced with tougher (re)negotiations both with banks (for loans) and suppliers (Evans & Koch, 2007; Wilner, 2000). Banks generally charge higher interest rates to financially distressed organizations in order to account for the added risk for recouping their investments. Similarly, suppliers who sell to the distressed firm regularly require more restrictive terms of payment. Third, customers are more reluctant to engage in relationships with financially distressed companies. The main motivation for this notion is the increased risk: a warranty does not carry the same reassurance; a potential production disruption; and the threat of finding a replacement supplier in case the company is liquidated.

Financial performance and financial distress have been widely investigated in the literature. Generally, financial performance is measured by such factors as the market value of equity (e.g. Ittner et al., 1998; Wiles, 2007), the market share of the firm (Lambert & Sterling, 1987) or the ratio of operating revenue to operating expenses of a company (Dresner et al., 1995). Financial distress has been operationalized by reversing

Altman's Z-score, a measure of the company's financial health (e.g. Hofer, Dresner, & Windle, 2005).

### *2.3. The Airline Industry*

#### *2.3.1. Customer Service in the Airline Industry*

The service industry is one of the fastest growing segments of the U.S. economy (Cunningham & Lee, 2002) and the airline industry is its most prominent example. In order for companies in service industries to compete successfully, they need to deliver services at a given level of quality. Consistent service quality can only be established if means are in place to measure it. The major issues with measuring services are that they are generally intangible, heterogeneous, and production and consumption occur simultaneously (Gourdin & Kloppenborg, 1991).

Airlines that are able to measure and monitor their services can better determine which areas they need to improve in order to compete successfully. Several studies have tried to establish a catalog of service quality criteria for this purpose. Customer service in the airline industry was first examined by Gourdin and Kloppenborg (1991) who determined a set of service quality criteria. The authors distinguished between the passenger, airline, and governmental perspectives, and identified dimensions in which the three overlapped or differed. These dimensions included convenience in departure and arrival times, meaningful flight information, and on-board comfort. Using questionnaire surveys, more recent studies have compared the SERVQUAL<sup>1</sup> model to these airline-

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<sup>1</sup> SERVQUAL is a service quality framework developed to measure the gap between perceived and expected service quality in organizations. It was originally developed by Parasuraman, Berry and Zeithaml (1991, Parasuraman, Zeithaml & Berry, 1988).

specific factors (Cunningham, Clifford, & Lee, 2004; Young, Cunningham, & Lee, 1994). Industry specific measures in the latter studies were grouped into baggage handling, bumping procedures, operations and safety, in-flight comfort, and the ease of connections (Cunningham et al., 2002).

Another stream of research in the airline industry uses objective service performance data rather than customer perceptions to determine the customer service level. The Air Travel Consumer Report (ATCR) data allows studies to use actual performance data on the percentage of flights arriving on-time (within 15 minutes of scheduled arrival), the number of mishandled baggage reports, and the number of filed customer complaints (e.g. Dresner et al., 1995). Other studies have used on-time performance as a single proxy for customer service (Behn et al., 1999; Mazzeo, 2003) arguing that it relates directly to a customer's utility function and hence is a valid measure. Overall, it is generally agreed that the airline consumer reports provide an objective (if incomplete) measure of customer service levels.

### *2.3.2. Financial Distress in the Airline Industry*

Financial distress has been an important subject in airline industry research given the financial problems experienced by airlines. The airline industry's economic development has been especially volatile since the deregulation of the U.S. airline industry in 1978 (Gritta, Chow, & Freed, 2003). Over the past 25 years, more than 140 airlines have filed for bankruptcy protection; sometimes resulting in the stabilization of the firm's health while at other times forcing the airline out of business (Gritta, Adrangi, Davalos, & Bright, 2006).

A well established measure for firm financial health used in airline industry research is Altman's Z-Score. It consists of several ratios that are weighted and combined into an overall measure of a firm's financial health. This measure was first developed in the 1960s. Originally derived for manufacturing companies (Altman, 1968), it was later adjusted to apply to service industries as well (Altman, 2002). As indicated, a number of authors have used Altman's Z-Score in assessing the health of airlines. For example, Chung and Szenberg (1996) employed Altman's Z-Score as a measure of airline financial stability in the years following deregulation. Hofer et al. (2005) used a rescaled Altman's Z-Score as a measure of financial distress to test and support their hypothesis that airlines operating under bankruptcy, on average, charge lower ticket prices.

### *2.4. Financial Performance Effect on Customer Service*

Very little work has been done relating financial distress to customer service in the airline industry. Borenstein and Rose (2003) are the most explicit in their findings that "bankruptcy induces modest declines in service levels" in airports. Their paper is the first to address the issue of causality between financial distress and airline operations.

However, a company can gain a lot from understanding the effects its financial performance has on its customer base. In specific, a company that is aware of the effect will be able to more effectively target its measures of improvement; i.e. which customer service aspects to improve.

Negative financial performance (i.e. financial distress) over a period of time results in corporate failure. A substantial amount of literature has dealt with actions firms can take to overcome financial distress and avoid corporate failure by means of

‘turnaround’ strategies (Hofer, 1980; Schendel, Patton, & Riggs, 1976; Smith & Graves, 2005). These strategies stress the importance of strategic and operational change.

The first approach of turnaround strategies is generally to cut costs (Pearce & Keith Robbins, 1994; Pearce & Robbins, 1993; Robbins & Pearce, 1992). Labor costs are often a large percentage of expenditures for firms and reductions in the number of employees and/or cuts in pay can provide relief to financially distressed companies. However, these kinds of cost cuts may introduce uncertainties into the work environment and as a consequence, result in lower employee satisfaction and commitment (Smith et al., 2005). In turn, this is likely to cause a decline in customer service levels. Having fewer employees for the same amount of work may translate into overworked and/or underpaid workers who are less likely to perform according to expected standards. As well, a distressed company’s workers may search for new positions in a more secure work environment (Smith et al., 2005). Finally, employee turnover at distressed firms may lead to an outflow of tacit knowledge resulting in the loss of process and operating capabilities. Hence, it can be argued from the literature that financial distress will contribute to lower customer service levels.

The second approach of a financially distressed company’s turnaround strategy relates to firm recovery (Robbins et al., 1992). Companies that are operating in financially stable situations are generally “bound by habits, procedures, and unreflective practices” (Grinyer & McKiernan, 1990, p. 132) and hence find no need to change the manner of their operations. In contrast, a company operating under financial distress may need to alter its course to increase revenues and hence profits (Pearce et al., 1993).

There are a number of ways a firm can increase revenues; i.e. raise prices, increase sales of existing products, develop new products, etc. A financially distressed firm may not have the financial capabilities to develop new products but may seek to expand revenues by retaining and building its customer base. Customer service and, hence, satisfaction are major determinants of customer loyalty (Anderson et al., 1994; Ellinger et al., 1999) and, as a consequence, repeat purchases (Cho et al., 2003; Suzuki, 2000). Furthermore, satisfied customers will spread the word about a company and positive word-of-mouth may result in additional customers (Dick et al., 1994). Hence, it can be argued that financial distress may trigger a company to invest in better customer service.

These two streams of turnaround literature, hence, argue in opposite directions. While some papers suggest that financial distress leads to lower customer service, it is also possible that financially distressed firms actually increases customer service. To the best of the authors' knowledge, this has not yet been investigated in the literature.

### **3. Methodology**

#### *3.1. Airline Industry*

The relationship between financial distress and customer service is investigated by using data from the airline industry including the Air Travel Consumer Reports (ATCR). The airline industry is a good industry to analyze the research question at hand for a number of reasons. First, the airline industry is one of the largest service fields in the US economy. Second, since the second half of 2005, almost 50% of all US commercial passenger aircraft have been operated by airlines that have filed for

bankruptcy (Isidore, 2005). Hence, the industry has experienced severe financial distress. Third, airlines are generally very specialized in the services they provide resulting in a very clearly defined industry. Finally, there are specific reporting regulations for airlines resulting in relatively complete, publicly available data sets.

### *3.2. Sample*

The data for the customer service measures are extracted from the monthly Air Travel Consumer Reports. ATCR provides detailed reports on on-time performance of domestic US carriers, the number of misplaced bags, the number of bumped customers (ticket over-sales) as well as the number of customer complaints. The data are provided on a monthly or quarterly basis. For the purpose of this analysis, all data are averaged on a quarterly basis.

This data set is complemented with quarterly, company-specific information from the Intermodal Transportation Database provided by the Bureau of Transportation Statistics (BTS)/Department of Transportation. BTS provides detailed information about carrier balance sheets and operating statements. Additionally, the Office of Aviation Analysis provides quarterly Airline Financial Reviews that include information about load factors.

### *3.3. Data*

The final data set is defined by the availability of data and consists of a panel that includes information over a period of 23 quarters for more than 20 airlines. The customer service specific information is available from second quarter of 1998 to the third quarter of 2006. Financial data are gathered from the first quarter of 1998 to the third quarter of

2006, although the number of airline companies that report information in each quarter varies.<sup>2</sup>

Table 1 provides an overview of the descriptive statistics of the customer service variables for each airline during the time period. About one third of these airlines (6) provided detailed information over the whole period of investigation while the others reported partial statistics.

– Insert Table 1 about here –

In terms of on-time performance, the data measure the number of flights that arrived within 15 minutes of the originally scheduled arrival time. Overall on-time performance across all airlines averaged almost 78% (77.95%) of all flights during the 1998-2006 time frame. Hawaiian Airline performed best over the observed period with an average on-time performance of more than 94%. Atlantic Southeast Airlines on the other hand performed worst: on average more than 27% of its flights arrived late.

The second variable in Table 1 relates to the number of reported mishandled bags per 1,000 passengers. On average, across all airlines, about 5.5 bags were reported lost or damaged or arrived late for every 1,000 passengers. Again, Hawaiian Airlines performed best over the reported period of time. Hawaiian's average number of mishandled bags was 3.2 per 1,000 passengers. On the other extreme, Atlantic Southeast Airlines again performed worst: on average, it mishandled 15.2 bags per 1,000 passengers.

Ticket over-sales refers to the number of passengers that involuntarily could not board the flight on which they had booked a ticket due to over-booking by the airline. On

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<sup>2</sup> All airlines that earn at least 1% of total domestic scheduled-service passenger revenues are required to provide information about their performance. Additionally, some other carriers voluntarily disclosed this information.

average, 1 passenger per every 10,000 was refused boarding on a flight. Independence Airlines performed best in this category. Only 6 in every 10 million passengers were denied boarding.<sup>3</sup> On the other extreme, Atlantic Southeast Airlines denied boarding to every 2,500<sup>th</sup> passenger – almost four times the average for the period under study.

Complaints refer to the number of officially filed complaints (to the Department of Transportation) per 100,000 passengers. On average, the airlines received almost 1.3 complaints per 100,000 passengers. The best performer in this category was Aloha Airlines. Overall, this airline only received 0.75 complaints per million customers (0.075).<sup>4</sup> On the other extreme, Trans World Airlines received 2.75 complaints per 100,000 passengers, more than twice the industry average.

### *3.4. Model specification*

Although complaints was originally included as a measure of customer service, I find – in line with Dresner et al.'s (1995) study – that the number of complaints are heavily determined by on-time performance, the number of ticket over-sales and the number of mishandled bags. Hence, in the further analysis, I focus on customer service as measure by on-time performance, ticket over-sales and mishandled baggage.

Seemingly unrelated regression (SUR) is used to estimate the three customer service measures simultaneously (Zellner 1962) since the measure of customer service

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<sup>3</sup> However, it should be kept in mind that the data set only reports five observations for this airline. The results might reflect the fact that this start-up airline operated at a lower load factor than most of its competitors.

<sup>4</sup> This result was based on only three observations.

are likely to have highly correlated error terms.<sup>5</sup> The following models were estimated simultaneously:

$$Overtime = \alpha_0 + \alpha_1 LagZscore + \alpha_2 Loadfactor + \alpha_3 Coupons + \alpha_4 Passengers + \sum \gamma_i Time + \sum \eta_j Airline + \varepsilon$$

$$\log Bags = \beta_0 + \beta_1 LagZscore + \beta_2 Loadfactor + \beta_3 Coupons + \beta_4 Passengers + \sum \gamma_i Time + \sum \eta_j Airline + \varepsilon$$

$$\log Bumped = \chi_0 + \chi_1 LagZscore + \chi_2 Loadfactor + \chi_3 Coupons + \chi_4 Passengers + \sum \gamma_i Time + \sum \eta_j Airline + \varepsilon$$

### 3.5. Measures

#### 3.5.1. Dependent Variables

The three customer service measures are dependent variables as described above: On-time performance (*ontime*), mishandled baggage (*bags*), and ticket over-sales (*bumped*). While the distribution of *ontime* is reasonably normal, the distributions of *bags* and *bumped* are highly skewed. The natural logarithms of these variables are, therefore, used in the analysis in order to achieve more normal distributions. Table 1 provides an overview of the number of observations per airline per customer service measure as well as the overall number of observations. The descriptive statistics for all dependent and independent variables are provided in Table 2.

– Insert Table 2 about here –

#### 3.5.2. Independent Variables

The main independent variable for this study is financial distress. Altman's Z-Score is used to measure the financial health of an airline. Following Hofer et al. (2005),

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<sup>5</sup> OLS regression results are reported in Appendix A.

the revised Z-Score (*Zscore*) (Altman, 2002) for service companies is employed in this study, consisting of a weighted combination of the following financial ratios:  $X1$ , working capital/total assets;  $X2$ , retained earnings/total assets;  $X3$ , earnings before interest and taxes/total assets; and  $X4$ , book value of equity/total liabilities.<sup>6</sup> The inverse of this scale is used in order to measure distress rather than financial health of a company. High (positive) scores indicate financial distress in a company while low (negative) scores are a sign of financial health. The Z-Score variable is lagged (*LagZscore*) by one quarter so that financial distress and customer service levels are not simultaneously determined.<sup>7</sup> Table 2 shows that the mean for the main independent variable is positive (0.75), ranging from a maximum of 85.82 to a minimum of -3.77. According to Altman (2000), the cut-off value to determine whether the firm is in financial distress or not is -2.6 for non-manufacturing firms. This results in only 9 ‘healthy’ observations of the total 378 observations (~2.38%). These data indicate the severity of the financial difficulties the U.S. airline industry experienced during the 1998 to 2006 time period.

### 3.5.3. Control Variables

In the analysis, I control for a number of other factors that may influence customer service levels. All control measures in this study are company-specific. Although the main independent variable is lagged, I use current period observations for the control variables as they are likely to have a more immediate effect on the dependent variable.

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<sup>6</sup>  $Z = 6.56*X1 + 3.26*X2 + 6.72*X3 + 1.05*X4$

<sup>7</sup> Other estimations without the Z-Score lagged provide similar results to our model.

First, I control for company size; i.e., total number of passengers (*'passengers'*) per quarter carried by an airline.<sup>8</sup> An airline's size is likely to affect the complexity of its operations. Larger airlines may have more complex hub structures, thus increasing the likelihood of lost bags due to stop-overs and delayed flights, for example. On the other hand, larger airlines are also more likely to have the means to implement sophisticated forecasting models and operations management tools that should result in lower numbers of bumped customers and fewer delayed flights. So the net impact of airline size on the customer service variables cannot be predicted *a priori*.

Low cost carrier (*'LCC'*) may also be a proxy for the complexity of airline operations as low cost carriers generally do not operate with a complex hub structure and are likely, therefore, to have fewer misplaced bags, better on-time performance, etc. This variable is coded as binary. Low cost carriers includes: Airtran Airways, American Trans Air, America West Airlines, Frontier Airlines, JetBlue Airways, and Southwest Airlines.<sup>9</sup>

The average number of legs per trip is included (*'coupons'*) and is measured as the average number of legs per itinerary by an operating airline in a quarter. Since customers usually buy roundtrip tickets, the mean for *coupons* should be at least 2. The mean for the sample is 3.47 (see Table 2). The data are available on a flight-by-flight basis and are averaged for this study. It can be assumed that this variable will have a

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<sup>8</sup> This variable is re-scaled by dividing passengers by 100,000 in order to provide coefficients in a reasonable range.

<sup>9</sup> The same list as Hofer et al. (2005): This study investigated the error terms of actual operating expenses per average seat mile (ASM) regressed on average trip length. The authors assumed that the error terms reflect "all differences in operating costs that cannot be attributed to differences in average stage length, and can be viewed as indicators of operating efficiency" (Hofer et al., 2005, p.331). Using this method, the authors identified 12 carriers as low cost carriers, 7 of which are also present in the data set underlying this study.

significant effect on the number of mishandled bags (i.e., more transfers, more misplaced bags).

Finally, I include load factor (*'load factor'*) as a control variable. Load factor refers to the percentage of seats filled per plane (ranging from 0 to 100) and is measured on a quarterly basis. Load factor may influence delayed flights and the number of bumped customers.

Table 3 shows the correlations between the variables. The correlation between on-time performance and a firm's last quarter's financial distress is statistically significant and positive. The two other dependent variables are not significantly correlated with the measure for financial distress. In terms of the dependent variables, *bags* is significantly and negatively correlated with *ontime*. This is in line with the literature review as it indicates that customer service levels are correlated. As more planes arrive on-time, the number of lost bags decreases and vice versa.

– Insert Table 3 about here –

Although many of the correlations are statistically significant at the 1% level, one correlation in particular stands out: *coupons* and low cost carrier are very highly negatively correlated (-0.717) supporting the contention that low-cost carriers connect fewer passengers at their hubs. Given this high correlation, I do not use both variables in the same model to avoid multicollinearity. I will use the number of coupons rather than the low cost carrier variable, as it is a continuous variable, and hence provides a richer source of information.

## 4. Results

### 4.1. SUR Model

Table 4 displays the regression results for the SUR model. The results indicate that the lagged Z-Score has a highly significant effect on on-time performance and the number of mishandled bags, but no significant effect on the number of ticket over-sales (bumped customers). Specifically, these results imply that as an airline's financial distress increases, on-time performance increases, while the number of mishandled bags decreases. The findings lend support to the argument that financially distressed companies are more likely to have better on-time and baggage handling performance in order to turn their company around (i.e. attract customers).<sup>10</sup>

– Insert Table 4 about here –

In terms of other results, in all three of the models, the control variable, load factor, is highly significant. As load factor increases, on time performance increases while the number of mishandled bags and number of over-sold tickets decrease. These findings are all indicating that airlines that achieve higher fill rates generally have better organizational and operational skills resulting in better customer service.

The size variable *'passengers'* is also statistically significant in all three models. Larger airlines have higher on-time performance and lower numbers of mishandled bags but higher ticket over-sales. These findings are contradictory: although larger airlines seem to be better able to manage on time arrivals and handle baggage, they also appear to

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<sup>10</sup> The results are very similar to those found in the OLS regression.

manage the number of over-bookings less well than smaller airlines. This indicates that operational efficiency might increase with size, but smaller airlines seem to have fewer bumped customers.

The control variable '*coupons*' is highly significant in the model of mishandled bags (1% level) and marginally significant (10% level) for the other two models. As expected, an increase in the number of legs in an itinerary results in an increase in the number of mishandled bags. Also in line with expectations, I find that as the number of legs on a trip increases, on-time performance of the airline decreases. Fewer legs, and hence the option to have more direct control over actual passengers on a particular flight, reduces the number of bumped customers.

#### *4.3. Application of Results*

Following, I provide an overview of how the results may be interpreted. Using the seemingly unrelated regression results, I predict on-time performance, mishandled bags and over-sold tickets assuming that all independent variables are consistent across time and airlines. From Table 5, it can be observed that the average lagged Z-Score (across all airlines and time periods) equals 0.47. This translates into an estimated on-time performance of 77.7% and in 5.0 mishandled bags per 1,000 passenger – for an airline in any given quarter. An airline that has a Z-Score 1 standard deviation above average (i.e. performs better than industry average) would, on average, achieve an on-time performance of only 76.9%, while an airline that performs 1 standard deviation below the average Z-score has a better-than-average on-time performance of 78.5%. Similarly, an airline that in terms of Z-Score performs 1 standard deviation below industry average

would lose 5.1 bags (per 1,000 passengers). An airline that is financially more distressed, with a Z-Score of 1 standard deviation above industry average, is predicted to lose only 4.8 bags (per 1,000 passengers).

– Insert Table 5 about here –

The second part of Table 5 displays the estimated on-time performance of selected airlines assuming that the other independent variables, such as load factor and number of coupons per itinerary, are at the mean for all airlines. ATA was chosen as an example because it had the lowest financial performance. American Eagle performed at about the industry average, while Skywest was the financially healthiest company in this data set. The results indicate that the spread between best and worst performer in the airline industry – keeping all other factors constant – accounts for a difference in on-time performance of about 4 percentage points (77% to 81%), and about 0.9 mishandled bags (per 1,000 passenger).

## **5. Conclusions**

The paper examines the relationship between financial distress and customer service levels using data from the airline industry. The results indicate, perhaps surprisingly, that financial distress is positively associated with the customer service measure of on-time performance and number of mishandled baggage. However, I do not find significant results for financial distress impacting ticket over-sales. These results, overall, are very robust.

A possible explanation for the positive association between financial distress and customer service (i.e., on-time performance and number of mishandled bags) is that

financially stable organizations may be unlikely to change their winning strategies. A company in financial distress, on the other hand, needs to change its organization in order to turn around. One option to increase revenues is to attract new customers and retain existing ones. Hence, a good reputation and creates opportunities for future revenues.

Both on-time performance and number of mishandled bags are customer service measures that an airline can address (e.g., by increasing scheduled flight times). Also, with additional training, ground personnel can be schooled in order to provide more efficient handling of bags, hence resulting in fewer lost bags. However, impacting actual number of ticket over-sales may be more complicated as it could require the adjustment of computer optimized yield management programs.

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Table 1: Descriptive Statistics for the Different Customer Service Measures per Airline

<b>Airline</b>	<b># of Obs.</b>	<b>On-Time Performance (%)</b>	<b>Mishandled Bags (per 1,000 passengers)</b>	<b>Ticket Over-Sales (per 10,000 passengers)</b>	<b>Complaints (per 100,000 passenger)</b>
<b>ATA Airlines</b>	7	81.929	3.800	2.584	0.764
<b>AirTran Airways</b>	12	74.925	3.461	0.646	0.795
<b>Alaska Airlines</b>	31	73.035	4.274	1.199	1.055
<b>Aloha Airlines</b>	1	82.467	5.487	0.080	0.109
<b>America West Airlines</b>	28	75.230	4.306	0.797	2.908
<b>American Airline</b>	31	77.778	5.002	0.500	1.885
<b>American Eagle Airlines</b>	20	76.006	9.633	0.775	0.886
<b>Atlantic Southeast Airlines</b>	12	70.725	15.563	4.218	0.634
<b>Comair Inc.</b>	9	77.815	10.381	1.518	1.199
<b>Continental Air</b>	31	79.129	4.145	1.239	1.626
<b>Delta Air Lines</b>	31	78.441	4.744	1.093	1.526
<b>Frontier Airlines</b>	6	81.244	4.990	0.353	0.510
<b>Hawaiian Airlines</b>	9	95.011	3.163	0.070	0.508
<b>Independence Airlines</b>	4	77.338	4.456	0.008	1.417
<b>JetBlue Airways</b>	12	76.428	3.995	0.020	0.315
<b>Mesa Airlines</b>	3	73.700	10.326	1.740	1.537
<b>Northwest Airlines</b>	31	78.424	4.814	0.589	1.804
<b>Skywest Airlines</b>	9	81.141	9.800	0.617	0.555
<b>Southwest Airlines</b>	31	80.930	4.469	1.253	0.317
<b>US Airways</b>	27	77.022	5.210	0.444	1.820
<b>US Airways Merged<sup>11</sup></b>	4	78.350	7.821	0.933	1.487
<b>United Air Lines</b>	29	75.809	5.643	0.748	2.254
<b>Total # of Observations</b>	378				
<b>Grand Mean</b>		77.625	5.547	0.956	1.414

<sup>11</sup> US Airways is mentioned twice (US Airways and US Airways Merged) due to the merger of American West Airlines and US Airways in the third quarter of 2005. American West bought US Airways but decided to continue operating under the name of US Airways. In order to avoid misrepresentations in the data, observations after the merger are treated as an independent company.

**Table 2: Descriptive Statistics**

	<b># of Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>Z-Score (inverse)</b>	378	0.65	6.59	-3.77	85.82
<b>On-Time Performance (in %)</b>	378	77.63	6.20	52.07	96.70
<b>Mishandled Baggage (per 1,000 passengers)</b>	378	5.55	3.05	2.17	21.85
<b>Ticket Over-Sales (per 10,000 passengers)</b>	378	0.96	1.09	0.00	11.79
<b>Complaints (per 100,000 passengers)</b>	378	1.41	1.32	0.11	9.06
<b>Load Factor</b>	378	73.43	6.22	52.95	91.50
<b>Low Cost Carrier (1 = LCC)</b>	378	0.26	0.44	0.00	1.00
<b>Coupons (per itinerary)</b>	378	3.49	0.30	1.88	4.21
<b>Passengers (in 100,000)</b>	378	103.13	77.71	0.37	273.53

Table 3: Correlation Table

	Lagged Z-Score	On-Time Performance	Mishandled Baggage	Ticket Over-Sales	Complaints	Load Factor	Low Cost Carrier	Coupons	Distance
<b>On-time Performance</b>	0.125 **	1							
<b>Mishandled Baggage</b>	-0.047	-0.330 ***	1						
<b>Ticket Over-Sales</b>	0.097	-0.204 ***	0.366	1					
<b>Complaints</b>	0.060	0.000	0.000		1				
<b>Load Factor</b>	-0.047	-0.453 ***	-0.019	-0.058		1			
	0.362	0.000	0.707	0.258					
<b>Low Cost Carrier</b>	0.028	0.217 ***	-0.109 **	-0.128 **	-0.193 ***		1		
	0.586	0.000	0.035	0.013	0.000				
<b>Coupons</b>	0.060	0.038	-0.260 ***	-0.034	-0.104 **	-0.005		1	
	0.245	0.461	0.000	0.509	0.044	0.924			
<b>Distance</b>	-0.099	-0.001	0.250 ***	0.027	0.286 ***	-0.120 **	-0.690 ***		1
	0.053	0.978	0.000	0.605	0.000	0.020	0.000		
<b>Passenger</b>	0.171 ***	0.188 ***	-0.537 ***	-0.201 ***	0.114 **	0.519 ***	0.077	-0.219	
	0.001	0.000	0.000	0.000	0.027	0.000	0.133	0.000	
	-0.100 *	0.059	-0.278 ***	-0.126 **	0.164 **	-0.042	-0.143 ***	0.124 **	0.268 ***
	0.053	0.251	0.000	0.014	0.001	0.420	0.005	0.016	0.000

\* sig. at the 10% level, \*\* sig. at the 5% level, \*\*\* sig. at the 1% level

Table 4: SUR Results

	<b>On-Time Performance</b>	<b>Mishandled Baggage (log)</b>	<b>Ticket Over- Sales (log)</b>
<b>Lagged Z-Score</b>	0.134 (2.88)***	-0.007 (2.37)**	0.008 (0.97)
<b>Load Factor</b>	0.452 (6.78)***	-0.048 (11.79)***	-0.066 (5.34)***
<b>Passenger</b>	0.008 (2.32)**	-0.000 (2.02)**	0.001 (2.14)**
<b>Coupons</b>	-1.928 (1.86)*	0.757 (12.06)***	0.317 (1.64)*
<b>Quarter 1</b>	-1.340 (1.59)	-0.018 (0.36)	-0.018 (0.11)
<b>Quarter 2</b>	-1.970 (2.32)**	0.091 (1.76)*	0.216 (1.37)
<b>Quarter 3</b>	-2.734 (3.46)***	0.127 (2.65)***	-0.131 (0.89)
<b>1998</b>	3.039 (2.17)**	-0.779 (9.15)***	-0.909 (3.47)***
<b>1999</b>	2.428 (1.83)*	-0.836 (10.39)***	-1.045 (4.23)***
<b>2000</b>	-1.492 (1.18)	-0.698 (9.06)***	-0.539 (2.28)**
<b>2001</b>	5.939 (4.46)***	-1.033 (12.78)***	-0.917 (3.69)***
<b>2002</b>	9.371 (7.31)***	-1.107 (14.23)***	-1.088 (4.55)***
<b>2003</b>	8.449 (7.05)***	-0.899 (12.37)***	-0.395 (1.77)*
<b>2004</b>	4.178 (3.41)***	-0.538 (7.24)***	-0.563 (2.47)**
<b>2005</b>	2.594 (2.66)***	-0.271 (4.58)***	-0.423 (2.33)**
<b>Constant</b>	48.245 (8.60)***	3.070 (9.02)***	3.747 (3.58)***
<b>Observations</b>	365	365	365
<b>R-Squared</b>	0.35	0.51	0.13

Absolute value of z statistics in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Quarter dummy in reference to Quarter 4 (October to December); Yearly dummy in reference to 2006

**Table 5: Example**

	<b>Lagged Z-Score</b>	<b>Estimated On-Time Performance (in %)</b>	<b>Estimated # of Mishandled Bags (per 1,000 passenger)</b>
<b>Average (mean)</b>	0.47	77.70	4.95
- 1 Standard Deviation	-5.23	76.94	5.10
+ 1 Standard Deviation	6.17	78.47	4.76
<b>Example Airlines</b>			
ATA Airlines	26.73	81.22	4.14
American Eagle	0.54	77.71	4.93
Skywest Airlines	-3.07	77.23	5.05

## Appendix A

Appendix Table 1: OLS Results

	On-time Performance <sup>#</sup>	Mishandled Bags (log) <sup>#</sup>	Ticket Over- Sales (log)	Complaints (log) <sup>#</sup>
<b>Lagged Z-Score</b>	0.141 (5.02)***	-0.004 (2.73)***	0.002 (0.29)	0.020 (3.43)***
<b>Load Factor</b>	0.219 (3.50)***	-0.006 (2.02)**	0.004 (0.55)	-0.030 (3.45)***
<b>Passenger</b>	0.006 (1.56)	-0.001 (3.92)***	-0.002 (1.18)	0.000 (0.59)
<b>Coupons</b>	0.586 (0.55)	0.380 (6.30)***	-0.640 (2.00)**	1.039 (6.45)***
<b>On-Time Performance</b>				-0.079 (6.32)***
<b>Mishandled Baggage</b>				-0.026 (1.19)
<b>Ticket Over-Sales</b>				-0.106 (2.72)***
<b>Constant</b>	58.783 (9.40)***	0.847 (2.45)**	1.521 (1.11)	0.944 (1.02)
<b>Observations (N)</b>	378	378	378	378
<b>R-squared</b>	0.07	0.12	0.02	0.57

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Absolute value of t-statistics in parentheses

<sup>#</sup> Robust Analysis: Robust t-statistics in parentheses

Yearly and quarterly dummy variables not reported