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Customer satisfaction and service quality in the Chinese airline industry☆

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A B S T R A C T

This paper focuses on studying the relationship between customer satisfaction, measured by customer complaints, and the service quality of Chinese carriers. By using a quarterly unbalanced panel data set covering twelve large and small carriers, our fixed effect Tobit analysis shows that customer complaints rise with increases in the number of damaged bags, but at a declining rate. By contrast, the on-time performance of scheduled flights has no significant effect on customer complaints. Furthermore, non-state or privately owned carriers receive significantly more customer complaints compared with state-owned carriers, and the largest number of complaints are made in the third quarter, which covers the high season of the summer holidays.

1. Introduction

The competitive environment of the Chinese civil aviation market has changed significantly since the mid-2000s. As well as competing on ticket prices, carriers compete with service quality in order to win their customers. Indeed, customer satisfaction is one of the major measures of performance of business corporations such as airlines. Airline companies devote considerable amount of resources in delivering high quality services to raise customer satisfaction and ultimately improve their revenues and profit.

In the literature there is little research concerning customer satisfaction related to the service quality of the airline industry in China, despite this growing importance of service quality in the area of non-price competition. This paper studies service quality factors related to customer satisfaction that are measured by the customer complaints received by the CAAC in China. Customer complaints have been used extensively in the literature as negative feedback and as a measure of customer satisfaction (Behn and Riley, 1999; Dresdner and Xu, 1995; Nagar and Rajan, 2005; Sim et al., 2010; Riley et al., 2003; Steven et al., 2012; Yee et al., 2008).

Our study makes a contribution to the literature in three areas. First, Zhang (2012) focused on a 2006 cross-sectional survey of passengers on only a single route, Shanghai–Guangzhou, that included only three large state-controlled carriers, China Southern Airlines, China Eastern Airlines and Shanghai Airlines. Other major state-owned airlines, as well as non-state controlled or private carriers, were not included. Baggage handling was also not covered. Compared with this, our study is much broader, being based on a quarterly panel data set covering twelve large, small, state controlled and non-state controlled carriers. It is the first study for China that can provide a more comprehensive analysis of the relationship between customer satisfaction and service quality factors, such as on-time performance of scheduled flights and baggage handling. Second, since 2006, the CAAC has been placing more emphasis on the rights of passengers and directing more resources into investigating passenger complaints and encouraging service quality improvements. Consequently, starting in 2009, it designated 15 March as the 'passengers' rights day' in order to persuade the carriers to provide better service quality to their customers. As a result, our study is timely in providing a greater understanding of the key service quality factors that account for variations in the customer complaints received and in helping to plan for future policy measures. Third, our empirical results obtained in this research can provide information for the management of carriers to help them plan for the improvement of their service quality.

This paper is composed of four parts. In the next section, we will discuss the data and methodology which has been adopted. In Section 3, we will report and discuss our empirical results. In the last section, we will conclude our discussion.

2. Data and methodology

An unbalanced panel data set of 12 carriers, namely Air China, China Eastern Airlines, China Southern Airlines, Hainan Airlines,

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Table 1
Customer complaints received by the CAAC from 2004 to 2011.

Complaint types	2004 (%)	2005 (%)	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)
Flight delays	51.50	58	50.94	39.22	32.42	33.51	31.9	28.18
Baggage problems	13.23	16.5	19.69	27.45	35.66	33.47	31.9	30.91
Ticketing problems	8.82	8	10.69	11.37	5.24			
In-flight services	2.40	2.8	5	8.63	2.74			0.45
Flight information	3.21			4.31	8.23			
Check-in services	4.41	6.6	3.13	2.35	4.24			
Cargo problems	1.60	1.1	3.13	1.96	1.75			
Other	7.62	7.1	7.81	4.71	9.73			
Passenger services						9.8	7.36	8.64
Ticketing, booking &check-in						15.1	12.88	11.27
Over-sold tickets						1.63	6.13	2.29
Re-funding						0.82	2.45	6.36
Animal death						0.41		
Services for disabled							1.23	0.45
Ticket price						0.41	0.61	
Flight connection								0.45
Miscellaneous						2.86	5.52	5
Total cases	499	364	320	255	401	245	163	220

1. The information reported is obtained from Statistical Data on Civil Aviation of China 2005–2012.
2. There is a change of classification of complaints by the CAAC starting in 2009. Therefore, the types of complaints are different from the previous years.
3. Over-sold tickets are likely to happen especially during high season and cause customers who cannot board their flights on time. Animal death are cases that animal died during the transportation in aircraft. Re-funding are problems associated in the process of re-funding due to ticket changes or cancellation.

Shanghai Airlines, Shandong Airlines, Shenzhen Airlines, Sichuan Airlines, Xiamen Airlines, Okay Airways, Spring Airlines and Chongqing Airlines, is used. This data set is from the third quarter of 2004 to the first quarter of 2009 (although the complaints and baggage mishandling information of the fourth quarter of 2005 and the second quarter of 2006 is not available as the CAAC did not publish this). The CAAC stopped publishing the information on baggage complaints after the first quarter of 2009. Altogether there are 172 observations in the data set.

The data set is basically derived from three sources. First, as discussed, the quarterly data of customer complaints, baggage handling and information of on-time performance of scheduled flights are obtained from the issues of *China Civil Aviation* (Zhongguo Minyong Hangkong) which directly publish the announcements or press releases of the CAAC, and the website of the CAAC. These complaints are received by the CAAC and their validity has been checked. The number of flights and revenue-ton-kilometer information is obtained from the *Statistical Data on Civil Aviation of China* published by the CAAC. The quarterly weather information of humidity, rainfall and temperature is calculated from the monthly provincial data published in the *China Meteorological Yearbook*.

Following Behn and Riley (1999), Dresdner and Xu (1995), Sim et al. (2010) and Steven et al. (2012), we develop a simple empirical model for studying the relationship between customer services and satisfaction. The variable of customer complaints, $COMPL_{it}$, for the Chinese carrier i in the period t received by the CAAC is used as a proxy for measuring the customer satisfaction for the services offered by the Chinese airlines. Following Steven et al. (2012), we also consider the presence of non-linear relationships between customer satisfaction and the service quality factors and our hypothesis is set up as follows:

H1: Customer satisfaction increases with customer service but at a declining rate.

As some sampled carriers did not receive any complaints for some periods of time, the dependent variable of customer complaints is actually censored. In our case, more than a quarter of the full sample has zero complaints. Given this censoring nature of our data set, we adopt the Tobit model to analyze it:

$$\begin{aligned} COMPL^{*}_{it} &= \alpha + \beta' x_{it} + \varepsilon_{it}, \quad \varepsilon_i \sim N(0, \sigma^2_{\varepsilon}), \\ COMPL_{it} &= COMPL^{*}_{it} \quad \text{if } COMPL^{*}_{it} > 0, \\ &= 0 \quad \text{if } COMPL^{*}_{it} \le 0. \end{aligned} \tag{1}$$

where $COMPL^{*}_{it}$ is the unobserved counterpart of observed customer complaints variable and $COMPL_{it}$ measures the number of customer complaints per 100,000 passengers received by the CAAC against carrier i in quarter t. x_{it} is a vector of independent variables which include variables of baggage mishandling problems, percentage of overall on-time performance of scheduled flights of carriers, individual carrier characteristics, weather conditions and seasonal dummies for the quarterly data. In addition, we also consider a slightly different Tobit model which controls the fixed effect of each individual carrier as the constant term, and α, is replaced by α_i, the fixed effect of carrier i, in equation (1). The independent variables in the Tobit model are explained below.

2.1. On-time performance of scheduled flights

Based on the CAAC published information of the passenger complaints against carriers, delays or cancellation of scheduled flights are one of the two major areas of complaints as reported in Table 1.

Overall on-time performance and baggage problems account for more than 60% of all customer complaints received. Behn and Riley (1999) and Steven et al. (2012) included this variable in their customer satisfaction analysis. As a result, we include the variable of the overall on-time performance of scheduled flights, $ONTIME_{it}$, of carrier i in quarter t in our analysis. It is measured in terms of percentage of on-time arrivals and departures of scheduled flights. Flights are considered as on-time when they land or depart within 15 min of the scheduled time shown in the carriers' computerized reservation system. According to Table 2, the overall on-time performance of all carriers was steadily improving from 79.9% in 2004 to 83.12% in 2007.

However, from 2008 it has been decreasing. In 2009, the CAAC separated carriers into large and small carriers when reporting their on-time performance. Large carriers are usually state-owned carriers such as the big three state-owned carriers, while small carriers include all non-state controlled or private carriers. There