An investigation of service quality, customer satisfaction and loyalty in China's airline market

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ABSTRACT

Customer loyalty is a source of competitive advantage and an important intangible asset to any organisations, but empirical evidence from China's airline market regarding the determinants of passenger satisfaction and loyalty is lacking. This paper investigates the service quality of four major airlines in China's domestic market and explores the links between their service quality and customer satisfaction, as well as the conditions under which airlines can retain existing passengers. In line with previous studies, service quality variables are significant factors influencing customer satisfaction levels. However, satisfactory service was not found to result in higher customer loyalty among business travellers. In comparison to Hainan Airlines, passengers who travelled with Air China, China Southern and China Eastern were more likely to switch to an alternate carrier, indicating lower levels of brand loyalty. In addition, the frequent flyer programs (FFPs) have been largely a failure for the four major airlines in terms of increasing customer loyalty, as revealed in this study. It is necessary to draw distinctions between business and leisure travellers when studying the determinants of customer satisfaction and customer loyalty. Ticket pricing had a positive and significant effect on passengers' overall satisfaction and in turn strengthened customer loyalty among leisure travellers, but achieved no impact on the satisfaction and loyalty of business passengers. Some demographic variables such as gender, income and education are statistically significant for one group of passengers but not for another in the probit models estimated. It is suggested that different marketing strategies may be used to target different market segments to improve customer loyalty.

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1. Introduction

China has been the second largest aviation market in the world in terms of the volumes of passengers and air cargo moved in its domestic market since 2007. In 2014 the whole industry handled 392 million passengers and 5.9 million tonnes of air cargo, a 10.7% and 5.9% increase from the previous year, respectively (Civil Aviation Administration of China, 2015). China's airline market is a growing market underpinned by a huge population and rapid economic growth. IATA (2014) forecasts that China will overtake US as the largest air passenger market by around 2030 as measured by traffic to, from and within a country.

However, until the late 1990s most Chinese airlines, which emerged from the monolithic Chinese government-owned carrier CAAC,[1] had failed to establish brand images and develop favourable reputations among consumers. With more and more foreign airlines flying to China in the 1990s, Chinese consumers had begun to question why the state-owned Chinese airlines could not provide services similar to their foreign counterparts, especially in the events of flight delays and cancellations. As a result, Chinese airlines were forced to make strides in many service aspects since the late 1990s. For example, the introduction of telephone and internet booking services, issuing of guidelines on handling flight delays and cancellation, and the monitoring and regular review of queue times at the check-in counter and boarding gate. Air China was the first

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[1] CAAC (Civil Aviation Administration of China) was an airline operator and a government regulatory body. It now refers to the General Administration of Civil Aviation of China, a government regulatory agency responsible for the oversight and administration of the civil aviation industry.

Chinese carrier that introduced the frequent flyer program (FFP) in 1994 in order to retain customers and differentiate their services from competitors, followed by China Eastern and China Southern in 1998. Other airlines quickly followed suit and almost all the airlines had their FFPs in place in the early 2000s. Despite these efforts, it has been found in a survey conducted in 2006 that Chinese travellers were not significantly influenced by airline brands when making a travel decision (Zhang, 2012).

There have been a series of airline mergers and consolidations since the early 2000s, resulting in four dominant airline groups in China's domestic market, namely, Air China, China Southern Airlines, China Eastern Airlines, and Hannan Airlines. Together they maintained a market share of about 90% in the following decade in terms of the goods and people carried. Chow (2014) claimed that the competitive environment of China's airline industry has changed significantly since the mid-2000s. The domestic airlines compete against each other not only by offering competitive prices, but also service quality aiming to improve customer satisfaction and increase customer loyalty. In fact, high quality customer service has become another significant differentiating factor between an airline and its competitors, especially in a deregulated operating environment. Although much literature has been devoted to air transport service quality and passenger satisfaction, little is known about what makes a passenger loyal (Dolnicar et al., 2011). An excellent work by Vlachos and Lin (2014) examined the determinants of business traveller loyalty towards full-service airlines in China. They found that reputation, in-flight service, FFP, and aircraft type had significant impacts on airline loyalty. However, the factors driving leisure traveller loyalty were not examined by this study. In addition, Vlachos and Lin (2014) argued that there is no consensus in terms of the definition customer loyalty and passenger loyalty in their study was measured with three separate variables: overall satisfaction, recommendation intention, and repurchase intension. Nevertheless, many studies have treated the two as different variables. Although the vast majority the literature suggests a direct, positive relationship between customer satisfaction and customer loyalty (Wang, 2014; Hussain et al., 2015), a key finding in Dolnicar et al. (2011) is that an attempt to improve customers' satisfaction has not proven to have a big impact on loyalty. Chen (2012) noted that past empirical evidence has shown the existence of difference in the strength of the relation between customer satisfaction and loyalty.

This research aims to examine the impacts of service quality, airline brand, and passenger demographics on customer satisfaction. We will also explore the relationship between customer satisfaction and customer loyalty as well as the roles of service quality and demographic variables in explaining customer loyalty in China's airline industry, a topic that has been rarely studied in previous literature as far as we can understand. This study makes two main contributions. First, it adds to the very limited research on China's airline services, customer satisfaction and loyalty, and provides empirical evidence for the relationship between customer satisfaction and customer loyalty in the Chinese context. Lai et al. (2009) pointed out that cultural factors influence the ways in which customers become loyal and thus it is important to assess loyalty formation in different cultures. Second, the findings of this research will not only provide airline management with useful information on how to develop non-price competition strategies to retain customers, but also reveal the highly valued service items appreciated by passengers, which will help airlines in deciding how to allocate their scarce resources. The next section will review relevant literature and briefly describe the profiles of Air China, China Southern, China Eastern and Hainan Airlines whose service quality will be examined in this study. Section 3 will discuss the data collection and methodology. Section 4 presents the results and findings. Section 5 concludes this article.

2. Literature review and research background

Quality is one of the key factors influencing a customer's purchasing decisions (Anderson and Zeithaml, 1984). Szwarc (2005) notes that service quality increases customer satisfaction, which enforces customer loyalty and in turn leads to increased corporate profits. Han and Ryu (2009) claimed that tangible physical environment and perceived price are essential elements that determine the level of customer satisfaction, and play a role in enhancing customer loyalty. There has been a growing amount of literature focusing on the relationship between service quality and customer satisfaction and loyalty in the airline industry context including Ostrowski et al. (1993), Curry and Gao (2012), Chen and Hu (2013), and Namukasa (2013), to name a few. However, research in the airline service quality issue within the specific context of China remains sparse and studies on customer satisfaction and loyalty in the second largest aviation market are lacking. The limited studies on China's airline service quality and passenger satisfaction include Zhang (2012), and Chow (2014, 2015). Using stated preference data, Zhang (2012) examined how attributes such as prices, punctuality, schedule delay and the size of network of an airline influenced a passenger's travel decisions on the Shanghai-Guangzhou route. Chow (2014) studied the relationship between customer complaints and the service quality of Chinese carriers. The factor of customer expectation was included by Chow (2015), who found that an improvement in expected on-time performance levels significantly raised passenger complaints.

It is necessary to understand what consumers really want in defining and delivering high-quality service (Zeithaml et al., 1990). Liou et al. (2011) argued that there is no universal definition of service quality, which may take on a different meaning in different industries. The authors pointed out that the concept of service quality is context-dependent and its measurements should reflect the operational circumstances under consideration. Chen and Chang (2005) noted that airlines service is a chain of services in which the entire service delivery can be divided into two stages: ground services and in-flight services. Gourdin (1988) classified airline quality into three aspects: price, safety and timeliness. Ostrowski et al. (1993) considered both ground and in-flight services as well as carrier image. Quite a few studies investigated airline service dimensions that mattered most to passengers including safety, frequency, punctuality, penalty for ticket changes, cabin service and in-flight seat comfortability (Mason, 2001; Gilbert and Wong, 2003; Chen and Chang, 2005; Liou and Tzeng, 2007; Liou et al., 2011; Martin et al., 2011). Airlines that provide better services than their competitors are able to build a solid foundation for customer loyalty (Curry and Gao, 2012).

Satisfaction has been defined as the feeling of pleasure or disappointment when a customer compares a product's perceived performance with his or her prior expectations (Oliver, 1981; Tse and Wilton, 1988). Clearly customer satisfaction is a post-decision experience. Service quality and customer satisfaction are closely related but not interchangeable, although both concepts involve a comparison of expectations of quality and the actual service received. The FFP that was first introduced by American Airlines was a loyalty program with an aim to maintain loyalty among those who travel frequently by rewarding them with free upgrades, free tickets, additional baggage allowances and business lounge access, etc. (Martin et al., 2011). These days the FFP also includes other partners such as banks, hotels and supermarkets. Seelhorst and Liu (2015) found that the FFP membership played a strong role in airline choice, especially for passengers with elite membership. Numerous studies have shown that the quality of pre-flight, in-flight, and post-flight services had a significant effect on customer satisfaction, which as a mediating variable, had a positive effect on

customer loyalty (Anderson and Jacobsen, 2000; Namukasa, 2013; Calisir et al., 2016). Another factor that was found to increase consumer purchase intension is brand equity, which is defined as the incremental utility or value added to a product or service from its brand name (Chen and Chang, 2008). Chen and Chang (2008) and Mikulić and Prebežac (2011) contended that strong brands can increase customers' trust in the products and enable them to better understand intangible factors, which has an important implication for a company's future profits and long-term cash flow. Jeng (2016) noted that brand credibility has a strong impact on consumer choice when there is uncertainty, and the credibility of a brand can provide significant benefits to both consumers and airlines. Dolnicar et al. (2011) found that at the aggregate level, passenger loyalty could be explained by FFP, price, a national carrier status and the reputation of the airlines. However, factors of satisfaction have not emerged as drivers of behavioural loyalty.

Hainan Airlines launched its maiden service in 1993 as a regional provincial carrier based in Hainan. With a purpose of becoming a national trunk airline, Hainan has taken every opportunity since then to expand its network (Zhang and Round, 2009). Involving a number of regional airlines including Shanxi, Chang'a and Xinhua Airlines in the early 2000s, it extended its network to North and Northwest China. In 2007, its two subsidiaries, Tianjin Airlines and China West Air, were established in Tianjin and Chongqing respectively. During the implementation of its expansion strategy, both price and service were effective and frequently used means of attracting customers and acquiring market share. Hainan Airlines has maintained a five-star rating from Skytrax since 2011 for its customer services. As the largest Chinese carrier in terms of the number of passengers carried and the size of the network, China Southern is currently rated as a four-star airline. It was the first Chinese airline that joined a global airline alliance—Skyteam. China Southern has employed business-to–consumer (B2C) websites in 27 countries and set up call centres in Beijing, Chengdu, Europe and North America. In terms of customer service, Air China and China Eastern have been awarded a three-star ranking by Skytrax. Both are members of Star Alliance and Skyteam, respectively. Each of these airlines' FFPs have attracted a large number of members in the last 10 years. However, service quality, customer satisfaction and loyalty associated with major Chinese airlines have not been fully explored. This study aims to bridge this gap by assessing the service quality of China's four major airlines and examining the determinants of customer satisfaction and customer loyalty in China's airline market.

3. Methodology

3.1. The survey

To carry out this research, a list of services making up the typical service offered in the airline industry including pre-flight, in-flight and post-flight service items were first drawn up. The questionnaire was divided into three sections. The first part collects respondents' socio-demographic characteristics including age, gender, education, nationality and income. The second section inquired after passengers' flight information including purpose of travel, travel frequency, air ticket booking channel, and the factors that influenced the choice of airline. A question whether or not the passenger was a member of the FFP of the airline chosen was also included in Section 2. Following Ostrowski et al. (1993), respondents were also asked to indicate whether they would fly with the same airline next time, which allowed us to measure customer loyalty in this research. The third section is composed of pre-flight, in-flight and post-flight service items. Respondents were asked to evaluate each service attribute using the five-point Likert scale,

ranging from "1 = strongly dissatisfied" to "5 = strongly satisfied". Section 3 also requests the respondents to rate their satisfaction with airfare, FFP, punctuality, the airline's response to flight delay and complaints, and overall satisfaction.

The target population for this study consisted of domestic passengers who had arrived in Tianjin Binhai International Airport in China via the four largest domestic airlines–Air China, China Southern Airlines, China Eastern Airlines, and Hannan Airlines. Pilot testing was conducted using a small sample of 20 passengers to check the accuracy of the questions and statements. Minor amendments were made to five questions to avoid ambiguities and confusions. A formal survey was conducted from 5 July to 20 July 2014 with the help of two research assistants. The questionnaires were distributed to domestic passengers in the arrival hall at Tianjin Binhai International airport and taxi waiting areas outside the terminal. In an attempt to reduce the bias and increase the representation of the sample, the survey was conducted during both peak hours (8–9am) and off-peak hours (3–4pm) from Monday to Sunday. During the two-week period, 800 questionnaires were distributed but only 650 were collected and 590 of them were deemed valid. Namukasa (2013) noted that much literature involving air passenger survey dealt with a sample size of around 300 to 600. Therefore, the sample size of 590 in this study is suitable and valid.

The principal component analysis method was used in this study to locate the underlying dimensions of the service items (28 in total except ticket price and overall satisfaction). A goal of principal component analysis is to derive a relatively small and manageable number of factors that capture as much information as possible in the measured/observed variables (Leech et al., 2011). The factor score for each dimension can be produced for further analysis such as multiple regression to mitigate the multicollinearity problem. The regression method is used in generating the factor scores which will used as independent variable in the probit models to be discussed next.

3.2. The probit model

A probit model is employed to examine the factors determining customer satisfaction and loyalty. For the customer satisfaction model, the dependent variable takes the value of 1 if the rating for customer satisfaction is 4 or 5, and 0 otherwise. For the customer loyalty model, the dependent variable takes the value of 1 if the respondent indicated that he or she would fly with the same airline next time. Wooldridge (2002) gives the general response probability in binary response models

$$P(y = 1|x_1, x_2, ..., x_K) = G(x\beta) \equiv p(x),$$

where $\mathbf{x}$ is $1 \times \mathbf{K}$, $\boldsymbol{\beta}$ is $K \times 1$. G is a cumulative distribution function (cdf), whose specification can be derived from an underlying economic model. This specification can cover probit, logit, and a number of other binary choice models, depending on the distribution function that G takes. The probit model is the special case of this form when G is the standard normal cdf and is between zero and unity.

The interpretation of probit coefficients is not analogous to the corresponding coefficients obtained by linear regression models. The magnitudes of each coefficient is not especially useful in a practical sense. Therefore, the marginal effect (or partial effect), which shows the effect of an infinitesimal change in a continuous independent variable on the probability of the dependent variable, is usually reported. In the case of a non-continuous variable, such as a dummy variable, the marginal effect reports the discrete change in the probability of this dummy variable changing from 0 to 1.

Table 1
Demographics and travel experiences.

	Frequency	Percent		Frequency	Percent
Gender			*Education*		
Male	334	56.6	High school or lower	80	13.6
Female	256	43.4	Diploma	132	22.4
Age Group			Bachelor Degree or higher	378	64.0
Under 30	94	15.9	*Airline that respondent flew with*		
31—40	208	35.2	Air China	140	23.7
41—50	212	35.9	China Eastern Airlines	124	21.0
51—60	66	11.2	China Southern Airlines	148	25.1
60 +	10	1.7	Hainan Airlines	178	30.2
Ethnic			*Income per month (yuan)*		
Chinese	444	75.3	less than 2000	64	10.8
Non-Chinese	146	24.7	2001—4000	170	28.8
FFP member			4001—6000	254	43.1
Yes	146	24.7	6001—8000	76	12.9
No	444	75.3	Over 8000	26	4.4
Travel Frequency in the past 12 months			*Purpose of Travel*		
Less than three times	268	45.4	Business	318	53.9
Three or more	322	54.6	Leisure	272	46.1

Oyewole (2001) reported that occupation, marital status, gender, and education have a significant impact on customer satisfaction in the air travel industry while some other demographic variables such as age and household income do not have apparent influence on the satisfaction ratings. Clemes et al. (2008) also reported that social demographic characteristics including age, gender, and income of air passengers tended to influence the level of satisfaction with international air services. Therefore, demographic variables will be considered in the probit models. We also include the passenger's travel purpose, travel frequency and FFP membership in the probit models as they may influence the perception of airline service (Gilbert and Wong, 2003).

As mentioned earlier, the quality of pre-flight, in-flight, and post-flight services has a significant positive effect on customer satisfaction and loyalty. The factors generated by the principal component analysis method will be included in the customer satisfaction probit models as explanatory variables. Following Namukasa (2013) who claimed that passenger satisfaction as a mediating variable had a strong influence on passenger loyalty, we used the customer satisfaction variable as an independent variable in the customer loyalty model. The definitions of the variables for the probit models can be found in Table 3.

4. Results and analysis

4.1. Sample characteristics and service quality rating

Table 1 shows the demographic and basic travel information of the subjects. The collected sample has a relatively equal distribution in terms of gender (56.6% male and 43.4% female). Most travellers possessed a tertiary diploma or a higher educational qualification (86.4%). More than 75% of the passengers surveyed were mainland Chinese (75.3%). Only a quarter of the participants were a member of the FFPs. About 85% of the respondents used air services at least twice in the last 12 months and the distribution of the airlines that they flew with was quite even—24% of the respondents used Air China, 21% China Eastern, 25% China Southern and 30% Hainan Airlines. Close to half of the participants reported that their monthly income was within the range of 4000–6000 yuan. Business travellers accounted for 54% of the total respondents. The demographic information contained in Table 1 is largely consistent with a comprehensive survey conducted by Civil Aviation Management Institute of China (2010), which reported percentages of 50.3% passengers travelling for business, 57.5%

males, and 41% with an annual income less than 50 000 yuan.

The top five service items that participants assigned the highest scores to are "check-in information" (mean = 3.8), "boarding announcement" (mean = 3.8), "cabin safety demonstration and captain's announcement" (mean = 3.79), "arrival services" (mean = 3.79) and "self check-in facilities" (mean = 3.76). It appeared that passengers were relatively satisfied with the airport ground handling services. On the other hand, passengers assigned relatively low scores to "ticket price" (mean = 3.31), "in-flight shopping" (mean = 3.43), "number of flights on the route" (mean = 3.43), "in-flight entertainment" (mean = 3.5) and "flight schedule (mean = 3.53)". Apparently passengers were not quite happy with the items involving payment to the airlines, as well as flight frequency and times.

4.2. Results of factor analysis

To assess the dimensionality of the service quality construct, a factor analysis was performed on the 28 items using the principal component analysis with promax rotation. The principal component analysis generated four dimensions (Table 2) when eigenvalues were set at greater than 0.9. The oblique rotation method was selected because these dimensions were not expected to be independent of each other. Three factors, which can be summarised as "in-flight entertainment, FFP and airline response to flight delay and passenger complaints" (factor 1), "departure and arrival experiences, in-flight comfort and cabin crew professionalism" (factor 2), "flight selection and ticket purchase experience" (factor 3) cumulatively accounted for 65.5% of the variance. Table 2 shows the factor loadings after rotation and only those greater than 0.4 are displayed.

To test the internal consistency of each construct, Cronbach's reliability coefficients were applied. The coefficients reported in Table 2 range from 0.85 to 0.95, which are considered to be quite acceptable according to Kline (1999). The Kaiser-Meyer-Olkin (KMO) measure verifies the sampling adequacy. The sample size is considered to be adequate for factor analysis, given that the KMO values are well above 0.7 (Hutcheson and Sofroniou, 1999). For each factor, item scores were summed and divided by the number of items that loaded most highly onto that component to yield a factor score ranging from 1 to 5.[2] Table 2 contains the mean and standard

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[2] This set of non-refined factor scores is different from the refined factor scores used in the probit model (DiStefano et al., 2009), but they are highly correlated.

Table 2
Principal component analysis results.

Service items	In-flight entertainment, FFP and airline response to flight delay and passenger complaints (factor 1)	Departure and arrival experiences, in-flight comfort and cabin crew professionalism (factor 2)	Flight selection and ticket purchase experience (factor 3)
Flight booking and payment types			0.704
Number of flights on this route			0.690
Flight schedule			0.722
Convenience/efficiency of check-in			0.681
Baggage allowances/handling			0.622
Seat choice			0.524
Courtesy of Check-in employee	0.546		
Self check-in facilities	0.560		0.588
Check-in information	0.530		0.531
Boarding announcement	0.646		
Facilities at airport lounge	0.642		
Boarding process	0.675		
Courtesy of boarding employee	0.635		
Special services for children/disabled travellers	0.648		
Comfort of aircraft seat	0.657		
Courtesy of flights attendants	0.627		
Capability and helpfulness of flight attendants	0.636		
Cabin safety demonstration/captain's announcement	0.634		
Newspapers and magazines on board	0.582	0.540	
In-flight entertainment		0.740	
In-flight shopping		0.751	
In-flight food and drinks		0.654	
Convenience of baggage claim		0.668	
Ground services on arrival		0.523	
FFP		0.669	
Flight punctuality		0.712	
Responsiveness from airlines if there is delay		0.787	
Response to complaints from airlines		0.781	
Mean factor score(standard deviation)	3.572(0.939)	3.716(0.915)	3.6847(0.789)
Eigenvalues	15.63	1.69	1.02
% of variance explained	55.82	3.02	3.66
Reliability (Cronbach's alpha)	0.94	0.95	0.85
Measure of sampling adequacy (KMO)	0.966		

deviation of the factor score for each of the three factors. A one way ANOVA test suggests that factor 2 received significantly higher average scores than factors 1 and 3.

4.3. Results of probit models

Table 3 presents the definitions of the variables for the probit models as well as the descriptive statistics. The results of the probit models based on the whole sample data are reported in Table 4. The marginal effects of the significant variables provided in the table are computed at the means of the independent variables. As expected, the three factors capturing ground and in-flight service quality are significant determinants of customer satisfaction. Interestingly, if the ticket was paid by the passenger, the probability of being satisfied with the service was about 21% lower. Higher income passengers were less likely to be satisfied with the service quality. Passengers in the 50−60 age group were more likely to give

a "satisfied" rating than those under 30. Other demographic variables such as gender, education level, and nationality did not have a significant impact on the satisfaction rating. Ticket price and frequency of travel did not have an impact on the probability of customer satisfaction. Surprisingly, being a member of an airline's FFP did not necessarily mean that the passenger had a higher satisfaction with its service. Taking the HU variable (flying with Hainan Airlines) as the base group, the recent flying experience with Air China, China Southern or China Eastern did not lead to a significant change in the probability of customer satisfaction. The coefficients remained insignificant when each of these three airlines were used as the base group, which may suggest that there was little or no difference between the services offered by the four airlines.

Surprisingly, the customer loyalty model in Table 4 shows that customer satisfaction did not have a significant impact on customer loyalty. This finding contradicts with previous studies such as

Table 3
Descriptive statistics.

Variable	Description	Obs	Mean	Std. Dev.	Min	Max
Satisfaction	satisfaction = 1 if overall satisfaction rating is 4 or 5	590	0.610	0.488	0	1
Loyalty	loyalty = 1 if passenger chose the same airline for their next travel	590	0.481	0.500	0	1
Gender	Gender dummy = 1 if respondent is male	590	0.566	0.496	0	1
Travel Frequency	Travel frequency dummy = 1 if respondent flew more than twice in the last 12 months	590	0.545	0.498	0	1
Nationality	Nationality dummy = 1 if respondent is a Chinese citizen	590	0.753	0.432	0	1
Travel purpose	Travel purpose = 1 if traveller is a business traveller	590	0.539	0.499	0	1
Age group 1	Age dummy = 1 for respondent aged between 18 and 30	590	0.159	0.366	0	1
Age group 2	Age dummy = 1 for respondent aged between 30 and 40	590	0.352	0.478	0	1
Age group 3	Age dummy = 1 for respondent aged between 40 and 50	590	0.359	0.480	0	1
Age group 4	Age dummy = 1 for respondent aged between 50 and 60	590	0.112	0.315	0	1
Age group 5	Age dummy = 1 for respondent aged over 60	590	0.017	0.129	0	1
Education	Education dummy = 1 if respondent received a tertiary education or higher	590	0.864	0.342	0	1
Income	Income dummy = 1 if income is greater than 6000 yuan	590	0.173	0.378	0	1
Payment	Payment = 1 if the ticket was paid by the respondent	590	0.342	0.475	0	1
CA	ca = 1 if respondent flew with Air China	590	0.237	0.426	0	1
CZ	cz = 1 if respondent flew with China Southern	590	0.210	0.407	0	1
MU	mu = 1 if respondent flew with China Eastern	590	0.250	0.433	0	1
HU	hu = 1 if respondent flew with Hainan Airlines	590	0.302	0.409	0	1
FFP	FFP dummy = 1 if respondent is a member of the frequently flyer program of the airline he/she flew with	590	0.247	0.432	0	1
Factor1	A dimension capturing in-flight entertainment, FFP and airline response to flight delay and passenger complaints	590	0	0.971	−2.687	1.515
Factor2	A dimension capturing departure and arrival experiences, in-flight comfort and cabin crew professionalism	590	0	0.956	−2.775	1.651
Factor3	A dimension capturing departure airport experience	590	0	0.958	−3.275	1.611
Ticket price	Satisfaction with the ticket price	590	3.311	1.170	1	5

Table 4
Determinants of customer satisfaction and loyalty.

	Coef.	Std. Error	Marginal effect (dy/dx)	Coef.	Std. Error	Marginal effect (dy/dx)
Dependent variable: satisfaction				Dependent variable: loyalty		
Satisfaction				0.189	0.117	
Ticket price	0.104	0.069		0.089*	0.051	0.035
Gender	0.036	0.133		−0.178	0.111	
Travel frequency	0.162	0.141		0.126	0.118	
Nationality	−0.178	0.155		0.121	0.126	
Travel purpose	0.127	0.151		0.135	0.126	
Age group 2	0.304	0.220		0.313*	0.178	−0.123
Age group 3	0.332	0.218		0.098	0.179	
Age group 4	0.731***	0.275	0.235	0.009	0.233	
Age group 5	−0.996	0.794		0.417	0.452	
Education	−0.052	0.211		0.438**	0.181	0.170
Income	−0.325*	0.186	−0.125	−0.064	0.156	
Payment	−0.546***	0.155	−0.208	−0.388***	0.132	−0.153
CA	0.154	0.179		−0.738***	0.152	−0.280
CZ	0.155	0.187		−0.553***	0.154	−0.213
MU	−0.155	0.175		−0.691***	0.153	−0.264
FFP	0.268	0.160		0.177	0.129	
Factor1	0.470***	0.072	0.176			
Factor2	0.877***	0.079	0.329			
Factor3	0.369***	0.086	0.138			
Summary statistics:				Summary statistics:		
1.Number of observations = 590				1.Number of observations = 590		
2. Log likelihood = −262.61				2. Log likelihood = −375.08		
3. LR chi-sqaure(17) = 263.80***				3. LR chi-sqaure(17) = 66.94***		

*Significant at 10%; **significant at 5%; ***significant at 1%.

Parasuraman et al. (1998), and Lin and Wang (2006) who argued that customer satisfaction was one of the major determinants of customer loyalty, but is consistent with Dolnicar et al. (2011) who found that factors of satisfaction were not a driver of behavioural loyalty. Airfare had a significant and positive impact on customer loyalty at the 10% significance level. Passengers were less loyal to the airline they travelled with if the payment was made by themselves. Compared with those who travelled with Hainan Airlines, passengers who flew with Air China, China Southern and China Eastern were less likely to fly these airlines again.

However, it might be problematic to examine the determinants of customer satisfaction and loyalty at the aggregate level using the entire sample data without making a distinction between time-sensitive (mainly business travellers) and non-time-sensitive passengers (mainly leisure travellers) as they may place difference values on ticket price and service quality. Time-sensitive travellers tend to place a high value on flight punctuality and frequency of service. They usually do not book their flights in advance. Their tickets need to be transferable from one flight to another in the event of changes in travel plans at short notice. As their tickets are usually paid for by their company, this group of passengers often buys less restricted tickets at a higher price. In contrast, non-time-sensitive travellers are interested in obtaining the lowest fares, and are willing to accept longer travel times and more restrictions on the use of their tickets. The distinction between time-sensitive and non-time-sensitive passengers has implication for studying the

customer satisfaction and loyalty issue and a mere inclusion of a dummy variable to account for this may not be sufficient as the coefficients of other explanatory variables could be substantially different. It is, therefore, necessary to estimate the respective determinants for each group of passengers who unlikely belong to the same market segment. In fact, Dolnicar et al. (2011) reported that the drivers of airline loyalty were different in different market segments.

Tables 4 and 5 report the determinants for customer satisfaction and customer loyalty, respectively. It is evident that service quality variables including factors 2 and 3 are significant drivers of passenger satisfaction for leisure travellers. This is even so for business passengers as all three factors are statistically significant and the marginal effects are even larger, other things being equal. For business passengers, being a member of an airline's FFP is positively associated with customer satisfaction at the 10% level while there is no such relationship for leisure travellers. This is consistent with Hess et al. (2007) who found that FFP mattered less for holiday makers. Leisure passengers who travelled more intensively in the last 12 months tended to have higher levels of satisfaction. This is not the case for business passengers whose satisfaction levels were 19% lower if they flew three or more times a year. It is not surprising to see that ticket price is a significant determinant of customer satisfaction for leisure passengers whereas this effect is not seen in the business passenger model. Leisure passengers who travelled with Air China, China Southern and China Eastern tended to have higher level of satisfaction compared those who travelled with Hainan Airlines. In contrast, business passengers travelling with China Eastern and China Southern would be less satisfied with their services compared those travelling with Hainan Airlines. This has raised doubt about the accuracy and objectivity of the rating by Skytrax that consistently awarded Hainan Airline a 5-star airline rating. It is interesting to note that higher income leisure passengers were less likely to be satisfied with the service quality. This is also the case for business passengers with higher education levels who might hold higher expectations of airline service quality.

We turn now to the customer loyalty model reported in Table 5. Customer satisfaction is a significant determinant of customer

loyalty among leisure passengers, but satisfactory service does not lead to higher loyalty for business passengers. Coyne (1989) argued that the relationship between satisfaction and loyalty is nonlinear. When satisfaction rose above a certain threshold, repurchase loyalty increased rapidly. However, when satisfaction fell below another threshold, customer loyalty declined equally rapidly. It is likely that satisfaction levels measured in this study have not reached Coyne's (1989) upper threshold but are still higher than the lower critical point, and thus we may not see a strong impact of satisfaction on customer loyalty. Unfortunately we are unable to test this possibility with the survey data collected, which should be addressed in future research. Other researchers including Ngobo (1999) argued that there exists a linear relationship between the two variables but the relationship is only important within a specific segment of satisfaction or when there are limited choice sets for consumers. Deregulation in China's airline industry has clearly provided passengers with many choices including state-owned, private and even low cost carriers, which may have diluted the correlation between customer satisfaction and customer loyalty. Leisure passengers were sensitive to prices and so ticket price had a significant effect on passenger loyalty. Male customers with leisure purpose were less likely to use the same airline upon their next travel. Table 6 also suggests that business passengers' loyalty would be strengthened as their flying frequency increases. The participation of an airline's FFP did not lead to higher retention of clients for either business or leisure travel. Although Vlachos and Lin (2014) reported that FFP was one of the key factors that determine Chinese business traveller loyalty, they also mentioned that the "Big Three" airlines' FFP were rated lower than those of Xiamen and Hainan Airlines. As our sample does not include Xiamen Airlines, our finding regarding the role of FFPs should not be regarded as a complete contradiction to that reported by Vlachos and Lin (2014). In fact, Civil Aviation Management Institute of China (2010) reported that only 5% of the passengers chose an airline on the basis of its FFP, which is consistent with our finding. Given that FFP has been an influential and effective marketing technique used by many airlines around the world to develop a loyal customer base (Liu and Yang, 2009), more efforts are needed for Chinese

Table 5
Determinants of customer satisfaction for leisure and business travellers.

	Coef.	Std. Error	Marginal effect (dy/dx)	Coef.		Std. Error	Marginal effect (dy/dx)
Dependent variable: satisfaction (leisure travellers)				Dependent variable: satisfaction (business travellers)			
Ticket price	0.294***	0.113	0.114	0.135		0.115	
Gender	0.110	0.220		0.035		0.202	
Travel frequency	1.141***	0.271	0.420	−0.062***		0.225	−0.193
Nationality	−0.056	0.252		−0.067		0.254	
Age group 2	−0.163	0.433		0.313*		0.178	0.131
Age group 3	0.227	0.403		0.098		0.179	
Age group 4	0.808*	0.417	0.282	1.127**		0.504	0.255
Age group 5	−0.563	1.094					
Education	0.383	0.323		−0.908**		0.401	−0.226
Income	−1.071***	0.342	−0.402	−0.065		0.260	
Payment	−1.029***	0.337	−0.388	−0.714***		0.228	−0.237
CA	0.868***	0.306	0.307	−0.270		0.271	
CZ	1.056***	0.314	0.360	−0.643**		0.298	−0.235
MU	0.714**	0.292	0.259	−1.070***		0.281	−0.389
FFP	−0.325	0.295		0.422*		0.227	0.134
Factor1	0.461***	0.120	0.180	0.692***		0.125	0.233
Factor2	0.957***	0.133	0.329	1.100***		0.143	0.371
Factor3	0.071	0.134		0.556***		0.151	0.187
Summary statistics:				Summary statistics:			
1.Number of observations = 590				1.Number of observations = 590			
2. Log likelihood = −109.17				2. Log likelihood = −122.26			
3. LR chi-sqaure(18) = 152.81***				3. LR chi-sqaure(17) = 166.35***			

*Significant at 10%; **significant at 5%; ***significant at 1%.

Table 6
Determinants of customer loyalty for leisure and business travellers.

	Coef.	Std. Error	Marginal effect (dy/dx)	Coef.	Std. Error	Marginal effect (dy/dx)
Dependent variable: loyalty (leisure travellers)				Dependent variable: loyalty (business travellers)		
Satisfaction	0.601***	0.191	0.233	−0.062	0.170	
Ticket price	0.147**	0.072	0.058	0.084	0.083	
Gender	−0.353**	0.175	−0.139	−0.123	0.157	
Frequency	0.162	0.141		0.338**	0.168	0.134
Nationality	0.091	0.201		0.192	0.180	
Age group 2	−0.373	0.315		−0.228	0.234	
Age group 3	−0.736**	0.309	−0.278	0.271	0.235	
Age group 4	0.204	0.343		−0.539	0.414	
Age group 5	0.122	0.542				
Education	0.739	0.270		0.290	0.317	
Income	0.056	0.255		−0.189	0.213	
Payment	−0.290	0.263		−0.317*	0.168	−0.126
CA	−0.488**	0.247	−0.187	−1.188***	0.217	−0.427
CZ	−0.433*	0.232	−0.167	−0.713***	0.226	−0.272
MU	−0.970***	0.253	−0.350	−0.695***	0.216	−0.267
FFP	0.233	0.212		0.199	0.184	
Summary statistics:				Summary statistics:		
1.Number of observations = 590				1.Number of observations = 590		
2. Log likelihood = −163.62				2. Log likelihood = −188.51		
3. LR chi-sqaure(16) = 48.34***				3. LR chi-sqaure(15) = 61***		

*Significant at 10%; **significant at 5%; ***significant at 1%.

carriers to improve the attractiveness of their FFPs. Compared with Hainan Airlines, travelling with the other three major airlines significantly reduced the level of customer loyalty in both market segments. It appears that Hainan Airlines might not have provided all passengers with satisfactory services but it had better customer lock-in strategy.

5. Conclusions

Customer loyalty is a source of competitive advantage and an important intangible asset to any organisation (Cossío-Silva et al., 2016). There has been much literature on the relationships between service quality, customer satisfaction and customer loyalty, but empirical evidence from China's airline market regarding the determinants of passenger satisfaction and loyalty is lacking. This paper investigates the service quality of the four major airlines in China's domestic market and explores the links between their service quality and customer satisfaction, as well as the conditions under which airlines can retain existing passengers. In line with traditional wisdom and previous studies, service quality variables are significant factors determining customer satisfaction. Although customer satisfaction is significantly and positively associated with customer loyalty for leisure travellers, satisfactory service did not result in higher customer loyalty among business travellers, which has important implications for the airline operators, given the importance of business passengers to the profit of airlines. In this case, Dolnicar et al. (2011) suggested that airlines may consider shifting resources away from increasing customer satisfaction and to areas such as FFPs to improve customer loyalty.

Previous literature has confirmed that a firm's most profitable customers have a strong tendency to be attracted to superior quality alternatives, especially in a competitive environment in which competitors offer more choices and better services (Ngobo, 1999; Buell et al., 2015). In comparison to Hainan Airlines, business passengers who travelled with Air China, China Southern and China Eastern had higher probabilities of 43%, 27%, and 26%, respectively (at the means of the independent variables) of switching to an alternative carrier, indicating a lower level of brand loyalty. For leisure travellers, the probabilities were 19%, 17% and

35%, respectively, as suggested by the marginal effect figures.

There might be different reasons for passengers to switch airlines. One way to increase consumers' willingness to repeat the purchase is to apply a successful branding strategy to forge a bond between passengers and the airline companies, which will not only lead to a retention rate, but also help increase passengers' willingness to pay a higher price. This can be achieved through advertising via traditional and modern social media, refreshing the current brand image, developing a user-friendly booking website. In fact, none of the major airlines have changed their brand images in the last three decades and a survey could be conducted to understand how Chinese consumers perceive these images. Employees need to be educated to understand brand values and brand promises to make sure that they are strictly enforced in the day-to-day service delivery (Lin and Ryan, 2016).

It appears that the FFPs have been largely a failure for the four major airlines as they failed to increase customer loyalty as revealed in this study. Many Chinse passengers still have the perception that they need to fly frequently to earn FFP points. Unfortunately, there are many alternative transport modes in China including high-speed rail service, which means the vast majority of travellers do not need to fly to their destinations, making the FFPs less appealing. Many international airlines' FFPs have gone beyond the traditional loyalty schemes that only award points for travel, credit cards services and tourism-related consumptions. For example, Qantas' members can earn points with over 450 programs partners including supermarket chains and other retailers, and use the points for over 3000 products in the Qantas Store. With such an extensive reach, about half the Australian population has become members (Wardell, 2014). Chinese carriers should follow suit by increasing the value of their FFPs and thus the switching costs to existing members.

It is necessary to draw distinctions between business and leisure travellers in studying the determinants of customer satisfaction and customer loyalty as they clearly have different preferences regarding airfare and service quality. For example, ticket price had a positive and significant effect on passengers' overall satisfaction and in turn strengthened customer loyalty among leisure travellers while the price factor did not have any impact on satisfaction and

loyalty for business passengers. Some demographic variables such as gender, income and education are statistically significant for one group of passengers but not for another in the probit models estimated. Different marketing strategies should be used to target different market segments to improve customer loyalty.

The findings of this study will undoubtedly enrich the existing literature on airline passenger satisfaction and loyalty and contribute to a better understanding of one of the fastest-growing and major aviation markets. The findings can shed light on the direction of designing non-price competition strategies for China's major airlines. However, this study only investigated the passengers who travelled with four major domestic airlines without considering the fact that deregulation in China's airline industry has resulted in more than 20 airlines operating in the domestic market including state-owned, private and low cost carriers of various sizes. Future research should include competition variables in examining the customer satisfaction and customer loyalty issues. Although this study has revealed some factors that could lead to higher levels of satisfaction and loyalty, it has failed to explain why some other important factors did not, nor suggest strategies or incentives that airlines could adopt to increase their contribution to a higher probability of customer satisfaction and loyalty.

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