

# What do Chinese passengers expect from domestic airlines?

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## ABSTRACT

It is well understood that apart from low fares, passengers today also value convenience and other service aspects such as departure and arrival times and check-in queue time. This paper seeks to investigate the passenger expectations of services in China's domestic air market and how they evaluate some important airline service attributes in the stated choice experiments. Using the Likert scale data and the stated preference data, this paper first identifies the order of importance of the service items from the point of ticket purchase to the point of arrival baggage claim and then elicits the values that Chinese passengers place on schedule delay, punctuality and the size of network. Not surprisingly, safety was rated as the most important out of the 16 items. Chinese passengers have very low tolerance on flight delays and mishandling of their baggage. Interestingly, the size of fleet and the Frequent Flyer Programs are not considered as very important issues. This research also shows that Chinese airlines have failed to establish a strong brand reputation among passengers, and that consumers are willing to pay a high amount of money to avoid schedule delay and to fly with airlines with improved punctuality, especially when the travel is for business purpose. This research has significant implications for both large and small carriers in the design of non-price competition strategies.

KEYWORDS: Airline, stated choice, service quality, China

## 1. Introduction

China's air transport industry has experienced a quick expansion in the past two decades. In 1990, only 13.5 million passengers were carried in the domestic markets whereas this number increased to 60.3 million in 2000 and 215.8 million in 2009. During the same period, cargo and mail volume increased from 239 thousand tonnes in 1990 to 3.2 million in 2009 (CAAC 2010).

However, until the late 1990s most Chinese airlines, which emerged from the monolithic Chinese government-owned carrier CAAC<sup>1</sup>, had failed to establish a brand image and develop a favourable reputation among consumers. Air China was the first Chinese carrier that introduced the frequent flyer program in 1994 in order to retain customers and differentiate their services, followed by China Eastern and China Southern in 1998. Other airlines quickly followed suit and almost all the airlines had their frequent flyer programs in place in the early 2000s.

The influx of foreign airlines since the 1990s has had an impact on both the state-owned airlines and Chinese consumers. In the domestic market, consumers would ask the Chinese carriers why similar services could not be provided as their foreign counterparts, especially in the event of flight delay; in the international markets, passengers would vote with their foot and fly a foreign airline going abroad. Consequently, since the late 1990s, apart from fierce competition in pricing, Chinese airlines also made strides in many aspects of services from the start point of ticket purchase to the final point of arrival baggage claim. For example, telephone and internet booking services were introduced, guidelines on handling flight delays and cancellation were issued, and queue times at check-in counter and boarding gate were monitored and reviewed by many airlines.

However, investment in new facilities and training to improve service quality will undoubtedly incur high costs and the airlines will have to make sure that the investment should go to the essential items that are valued highest by passengers. Flight delay might be one of the key issues worth addressing with time and efforts. According to Shanghai Consumer Protection Commission, almost half of the complaints from passengers on civil aviation stem from flight delays in 2009 and 2010 (Yu 2010). In the United States, Ball et al. (2010) claimed that flight delay was a serious and widespread problem and it cost about 31.2 billion US dollars to airlines, passengers and other parts of the economy in 2007. Using two data sets, Likert scale data and stated preference data, collected from the same survey, this research will first identify the order of importance of the service items from ticket purchase to arrival baggage claim and then use the stated choice methods to elicit the values that Chinese passengers place on some important air service attributes. This paper also has a purpose to see if the major domestic airlines have established a strong brand reputation that influences the passengers' air travel choices. This research will have significant implications for both large and small carriers in the design of non-price competition strategies.

Next section will briefly review the literature, mainly on the studies that apply stated choice methods in an airline choice context. Section 3 introduces the survey design and data collection, followed by the model specification in section 4. Section 5 presents the data analysis and we offer some conclusions in section 6.

## **2. Literature review**

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<sup>1</sup> 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.

It is necessary to understand what consumers really want in defining and delivering high-quality service (Zeithaml et al.1990). 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. Quite a few Studies investigated airline service dimensions that matter most to passengers include Gilbert and Wong (2003), Chen and Zhang (2005), Liou and Tzeng (2007) and Liou et al. (2011), just to name a few.

There has been a growing body of literature on airline services using stated preference data which are obtained from surveys that ask consumers to make hypothetical choices by making tradeoffs among the attributes of the choice set. They are in contrast with revealed preference data that reflect the actual choices made by consumers. Louviere et al (2000, p.21) articulate some good reasons why researchers should be interested in using stated preference data. For example, when we need to estimate demand for new products with new attributes or feature and when explanatory variables have little variability in the market, stated preference data are particularly useful.

Passengers make their air travel choices between airlines and itineraries based on a variety of characteristics including different attributes of the services that an airline can provide. Frequency is one of the characteristics. Higher frequency will reduce the cost of schedule delay, a measure depicting the deviations from a passenger's preferred time of travel, and increase the visibility of a flight option (Lijesen 2006). Hess and Polak (2006) also show that flight frequency has a significant overall impact on the appeal of a given airport while fare and aircraft size have a visible impact only among some social groups. The author pointed out that although frequency is not generally taken into account directly by the respondents, it captures the effects of visibility, capacity and schedule delay.

Most passengers, even some of the business travellers, are sensitive to airfares. More and more companies have issued the travel policies to control business travel expenses (Bender and Stephenson, 1998; Mason 2000). Using stated reference data, Mason (2000) found that prices are the most important purchase factor followed by in-flight comfort and flight frequency. Mason (2001) reported that punctuality and frequency are viewed with the highest importance for short haul business travellers. Travel cost, penalty for ticket changes, flight frequency and in-flight seat comfortability are all significant variables in the stated choice experiments in Espino et al (2008) and Martin et al. (2011). It is, therefore, in our stated choice model, schedule delay that is closely associated with flight frequency, punctuality, and price are included. The airline brand dummies are also considered to see if the reputation itself has become an intangible asset that affects the travellers' choice. The size of the network of an airline is included as it potentially captures the effect of the frequent flyer programs (FFPs) and more importantly, the importance of this attribute has significant implication to the emerging low cost airlines in China that usually operate on a small number of point-to-point, short and medium haul routes. Although passengers' air travel choice may be affected by many other attributes, it is inappropriate to include too many in the choice tasks that may be beyond the respondents' cognitive ability. Details of these attributes will be presented in the next section.

### 3. Survey design and data collection

The questionnaire used for this study has four parts. The first part collects demographic information. The second part asks the respondent to rate 16 items using a numerical score ranging from 1 to 4 with 1 being not important in their air travel, 2 slightly important, 3 important and 4 extremely important. The 16 items range from ground services to in-flight services as well as safety and price discount.

In part three, the respondents are first given ten choice sets assuming a scenario where the respondents travel from Shanghai to Guangzhou for business purpose. Then another ten choice sets are presented assuming that the travel from Shanghai to Guangzhou is for a private vacation in part four. All the 20 choice sets consist of the same attributes listed in Table 1, each with four travel options. The respondents are required to indicate their preferred option in each choice task (see Table 2 for an example). The questionnaire gives detailed definitions for these attributes. Even though China Northern was merged by China Southern at the time of survey, it is still included in the stated choice game as when designing the survey, we wanted to see if the elimination of this brand represents a loss to consumers.

Table 1: Choice attributes and levels

Attribute	Definition	Level
Airline brand	Airlines that operated on Shanghai-Guangzhou routes	China Eastern(mu), China Southern(cz), Shanghai Airlines(fm), China Northern(cj)
Price	The airfare between Shanghai and Guangzhou	Full fare 1280 yuan, 25% off 960 yuan, 50% off 640 yuan
Schedule delay	The inconvenience of travelling at a time other than the passenger's preferred departure time measured by the difference between your preferred departure time and the scheduled departure time for each flight.	120 minutes, 80 minutes, 40 minutes
Punctuality	Average punctuality rate between Shanghai and Guangzhou	90%, 80%, 70%
Network	Number of routes an airline operates domestically and internationally	700, 350, 70

Table 2: An example of the choice set presented to the respondent.

Airline brand	Shanghai Airlines	China Southern	China Eastern	Shanghai Airlines
Ticket price	50% off, 640 yuan	25% off, 960 yuan	50% off, 640 yuan	Full fare, 1280 yuan
Schedule delay	40 minutes	80 minutes	120 minutes	80 minutes
Punctuality rate	80%	70%	90%	80%
Network	70	350	700	70
I choose (tick your most preferred option)				

The survey was conducted in late 2006 at Shanghai Hongqiao Airport. With the help of an airport ticket counter, every passenger who came to buy the ticket to Guangzhou was asked if he or she was willing to complete the survey. The passengers were allowed to take the questionnaire home and send it back with postage-paid envelope provided by the author. From September to December 2006, 180 questionnaires were collected, but only 151 were deemed valid. Some respondents ticked more than one option in a choice task and their data were discarded. Although some respondents did not complete all the 20 choice sets in the questionnaire, their information was still regarded as valid and those left blank were recorded as ‘missing data’.

The Sawtooth Software was used to generate the choice sets with a balanced overlap approach that will lead to more precise estimates of interaction effect (Sawtooth Software 1998).<sup>2</sup> Balanced overlap permits a modest degree of level overlap, i.e., levels occasionally repeat within the same choice set (see Street et al. (2005) for a quick reference of the construction of optimal and nearly optimal stated choice experiments).

#### 4. Logit model specifications

The stated choice model is based on the random utility theory (see Train (2003) for details). It is assumed that the decision maker  $q$ 's utility is maximised by choosing alternative  $j$ , which can be expressed as:

$$U_{jq} = V_{jq} + \varepsilon_{jq}$$

where  $V_{jq}$  is the observed representative utility depending on the attributes of alternative  $j$  and the socio-economic characteristics of decision maker  $q$ .  $\varepsilon_{jq}$  is a random error term that is unknown to researchers.

<sup>2</sup> Stata 11 was used for the econometric estimation in this paper.

The first model to be estimated is a basic conditional logit model assuming that an option is chosen due to the reputation of the airline, price, schedule delay, punctuality rate and the size of the network. The representative utility is as follows:

$$V_j = \beta_1 \mu + \beta_2 cz + \beta_3 fm + \beta_4 cj + \beta_5 price + \beta_6 delay + \beta_7 punctuality + \beta_8 network, j=1, 2, 3, 4.$$

The second model considers the interactions between gender and the variables of price, schedule delay, punctuality rate and network.<sup>3</sup> The indirect utility is expressed as

$$V_j = \beta_1 \mu + \beta_2 cz + \beta_3 fm + \beta_4 cj + \beta_5 price + \beta_6 delay + \beta_7 punctuality + \beta_8 network + \beta_9 price * gender + \beta_{10} delay * gender + \beta_{11} punctuality * gender + \beta_{12} network * gender, j=1, 2, 3, 4.$$

where gender takes the value of 1 if the respondents are male and otherwise 0.

The third model is a mixed logit model with the specification being the same as the first model, but the coefficients of all the variables are assumed to vary over decisions makers except for the price variable. That is, the coefficient of the price is fixed in Model 3 and other coefficients are assumed to be normally distributed. The mixed logit model is estimated using the command MIXLOGIT written by Hole (2007) in Stata. Both the business and leisure travel data from the stated choice survey were used to estimate the three models respectively.

The stated choice model can be used to derive estimates of the amount of money a decision maker is willing to pay to obtain some benefit or avoid some cost from a specific action (Louviere et al. 2000). The willingness to pay (WTP) is the payment that would make the decision maker to be indifferent after a single unit change in an attribute, which can be calculated by the ratio of this attribute's coefficient to that of the price variable.

## 5. Results and discussion

Table 3 reports the demographic and travel information collected from the first part of the questionnaire. Although with deregulation and increasing competition in China's airline markets as well as the rising disposable income, air travel has become more affordable, it can be seen that about 90% of the respondents have a university degree and about two-thirds earn an income of more than 40,000 yuan, which suggest that it is too early to claim that the relatively expensive air travel has become the first travel choice for ordinary people. This is also evidenced by the relatively low air travel frequency in previous year reported by the respondents. In fact, surface transportation modes, especially the train service (not the high speed railway service), are more important to China's about 200 million migrant workers than air transport.

The demographic information also shows that 39% of the respondents have joined a frequent flyer program. Because it is free to join, some of them hold several airlines' frequent flyer

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<sup>3</sup> A model that includes interaction effects between attributes was estimated, but the interaction effects are not statistically significant. Interactions of other socio-economic variables such as education and income with the main attributes were also found not significant.

cards. When asked whether they are loyal to a certain airline, 55.8% of the members claimed yes while 25% said no.

Table 3: Demographic and travel information of the sample (N=151)

Demographics		Number of respondents	percentage
Gender	Male	90	59.6%
	Female	61	40.4%
Education	High school or less	14	9.3%
	University degree	96	63.6%
	Postgraduate degree	40	26.5%
Age	Under 25 years old	24	15.9%
	25-45	121	80.1%
	Over 45 years old	6	4%
Living place	Shanghai	97	64.2%
	Non-Shanghai residents	50	33.1%
Annual income	Less than 20,000 yuan	14	9.3%
	20,000-40,000 yuan	35	23.2%
	40,000-70,000 yuan	40	26.5%
	70,000-100,000 yuan	33	21.9%
	Over 100,000 yuan	26	17.2%
Frequent flyer program membership	Not a member	92	60.9%
	Air China	18	11.9%
	China Southern	17	11.3%
	China Eastern	10	6.6%
	Shanghai Airlines	9	6%
	Other	5	3.3%
Loyalty to airlines	Very loyal	5	9.6%
	Loyal	24	46.2%

	Neutral	10	19.2%
	Not loyal	9	17.3%
	Not loyal at all	4	7.7%
Air travel frequency in previous year	Once or none	34	22.5%
	2 to 4 times	58	38.4%
	5 to 10 times	35	23.2%
	More than 10 times	24	15.9%

Table 4: The degree of importance of the service items

	N	Mean	Std. Deviation	Male mean and ranking	Female mean and ranking
Safety	150	3.45	.782	3.46(1)	3.45(3)
Length of delay time	150	3.43	.754	3.32(3)	3.58 (1)
Delay frequency	150	3.41	.770	3.31**(4)	3.57**(2)
Departure and arrival times	148	3.31	.746	3.35(2)	3.25(4)
Baggage delivery	149	3.09	.825	3.02(5)	3.21(6)
Price discount	150	3.07	.752	2.97**(7)	3.23**(5)
Direct flight	150	2.97	.763	2.98(6)	2.95(9)
Courtesy	150	2.96	.793	2.87*(9)	3.10*(7)
In- flight service	150	2.95	.754	2.89(8)	3.05(8)
Check-in queue time	150	2.73	.911	2.70(10)	2.77(10)
Frequency	148	2.64	.927	2.60(11)	2.69(13)
Phone/internet	149	2.62	.984	2.53(12)	2.75(11)



booking					
On-board meal	150	2.58	.922	2.48*(13)	2.73*(12)
Scale of fleet	148	2.52	.853	2.42*(14)	2.67*(14)
Return of FFPs	144	2.47	1.070	2.37(15)	2.60(15)
Ticketing location	149	2.23	1.068	2.20(16)	2.29(16)

\* male and female means differ at 10%; \*\* at 5%.

The second part of the survey shows that on average all the service quality attributes were rated greater than 2 (slightly important). It is apparent that Chinese passengers always put safety first and would be more likely to choose an airline with a sound safety record. Safety and reliability were also identified as the most important factors of service quality in Liou and Tzeng (2007) among Taiwanese passengers. Our survey also reveals a very strong sentiment against flight delay measured by both the length of delay time and delay frequency. It is not uncommon that ground handling staff are verbally abused and violently attacked when long delay occurs at many Chinese airports. Some passengers may even refuse to board a plane or leave a plane if their delay compensation request cannot be satisfied, which will cause further flight delays or cancellation of the next legs. As most of the passengers share the same sentiment at the time of delay, airport police rarely use forces to remove the violent passengers to avoid backlash from other passengers unless serious conflict arises. Most Chinese airlines do not have consistent delay policies and procedures. Many delays have to be handled on a case-by-case basis and offering cash is usually the last resort to appease passengers.

Given the low tolerance on flight delay, it is not surprising that the respondents place a great value on the departure and arrival times. The WTP for schedule delay to be reported later in this paper will tell us the significance of this item from a financial viewpoint. Mishandling of the baggage may cause a long wait and is thus disliked by passengers. As expected, they also prefer price discount and direct flight and appreciate staff friendliness and politeness. Least important items include the ticketing locations, the FFPs and the size of fleet. Liou and Tzeng (2007) also found that FFPs seem to have little attraction for customers in Taiwan. The less attractiveness may be attributable to the poor design or less generous reward of the FFPs. However, given that 60% of the respondents are not frequent travellers (4 times or fewer a year) as reported in Table 3, it is unlikely they would rate the FFPs as high as other service items. Naturally, if they do not attach great importance on FFPs, the passengers do not necessarily choose the big airlines that have a large scale of fleet.

Although the rankings of the 16 items rated by male and female passengers are largely consistent, it is interesting to note that females tend to be more picky on delay frequency, price discount, courtesy, on-board meal and the scale of fleet. Comparisons have been made based on other demographics of the respondents. Except for on-board meal, Shanghai residents and non-Shanghai residents have no significant difference in these ratings. People

from Shanghai tend to place a higher value on the quality of the food on board. Higher income people (over 70,000 yuan) and lower income group again only differed in rating this item while giving roughly the same scores to all other indicators. This is also the case for higher educated people. As these groups of people are the potential source of business passengers, airlines should improve the on-board food quality to attract them.

Table 5 presents the statistics of punctuality and baggage mishandling that resulted in delayed, damaged and lost bags in each of the four quarters of 2007. Passengers' experiences might be worse than what the figures show as in China a flight is considered as on time as long as the plane's door is closed at the scheduled departure time even if the plane is grounded for another one hour due to air traffic control or other reasons. In many other countries, the time of pushback (when the parking brake is released) is considered as the actual departure time. These statistics actually worsened in the following years with the 2010 average punctuality rate in the industry being only 75.8% (CAAC 2011). The large airlines themselves were blamed to be responsible for 41.1% of the cancellation and delays and 27.6% of the delays were due to air traffic control. The medium and small carriers were responsible for 47.9% of their delays and cancellation. Apparently airlines should do more to improve the performance on these two indicators given the low tolerance on them expressed by our respondents.

Table 5: The punctuality and baggage mishandling rates in the four quarters of 2007

Airline	Punctuality rate (per hundred)				Baggage mishandling rate (per million)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Shandong Airlines	85.68	87.37	81.95	85.93	1.77	1.69	1.71	0.03
Air China	84.95	82.88	80.10	83.38	2.94	2.30	1.64	1.23
China Eastern	84.72	85.43	82.54	84.83	2.63	1.35	1.45	1.17
Shanghai Airlines	84.66	84.63	82.07	82.98	0.75	0.57	0.47	0.46
Hainan Airline	84.59	85.42	82.42	84.95	0.03	0.03	0.04	0.04
Sichuan Airlines	84.42	83.48	81.40	83.74	1.06	1.08	1.07	0.52
China Southern	84.06	84.57	82.53	85.26	0.01	0.01	0.02	0.05

Shenzhen Airlines	75.82	72.70	69.67	78.54	0.16	0.13	0.11	0.07
Xiamen Airlines	75.16	83.23	81.54	84.00	1.05	1.00	0.76	0.76

Source: CAAC

Table 6 reports the estimation results of the three models using the choice game data for business and vacation purposes respectively. The airline dummies are not statistically significant for all the models, suggesting that travellers were not influenced significantly by an airline brand when making a travel decision. It appears that Chinese airlines failed to establish a strong reputation through providing quality services and differentiated products. The elimination of the brand of China Northern itself due to the airline merger did not seem to be a huge loss to consumers if other attributes of the services did not change significantly.

Model 1 shows that price, punctuality rate, schedule delay, and the size of network are significant factors for both business and leisure travellers. The signs of these four variables are correct and unambiguous with price and schedule delay being negatively and punctuality and network positively associated with the utility. This is also the case in Model 2 except for the network variable for leisure travellers, which is not statistically significant. The interaction term between price and gender is significant for leisure travel at the 1% level and 10% for business travel with positive sign. This indicates that female passengers place more value on price discount which is consistent with the survey results in Table 4. The interaction between network and gender is also significant at the 5% level with negative sign, suggesting that females again attach more importance on the scale of the airline. The consistent results generated from a four-point rating scale method and stated choice method imply the high quality of our survey.

In Model 3, the standard deviations for schedule delay, punctuality and network are statistically significant at the 1% level, indicating that the coefficients of these variables indeed vary in the population. The estimated means and standard deviations provide information on the share of the population that places a positive value on the attribute and the share of the population that places a negative value. Consider first the normally distributed coefficient of the schedule delay for business travel that has an estimated mean of -0.2401 and estimated standard deviation of 0.0206. Almost 100% of the distribution is below zero, meaning that no one preferred schedule delay when travelling for business purpose. For a leisure travel, 86% of the distribution is below zero. About 85% of the business travellers and 78% of the leisure travellers appreciate higher punctuality. The shares favouring a large network for business and leisure travellers are 78% and 77% respectively.

Table 6: Estimation results of the conditional logit and mixed logit models

		Model 1		Model 2		Model 3	
Variable		Business	Leisure	Business	Leisure	Business	Leisure
mu	Mean	-0.0714	0.3003	-0.0952	0.3178	-0.6127	0.3211
	SD	(1.5032)	(0.3681)	(1.5000)	(0.3638)	(1.7785)	(0.3918)
cz	Mean	0.0694	0.4181	0.0457	0.4318	-0.43312	0.5100
	SD	(1.5028)	(0.3665)	(1.5000)	(0.3621)	(1.7761)	(0.3883)
fm	Mean	0.0234	0.5258	0.2135	0.5416	-0.24964	0.6078
	SD	(1.5027)	(0.3677)	(1.4995)	(0.3635)	(1.7788)	(0.3934)
cj	Mean	-0.2956	0.1019	-0.0020	0.1167	-0.8482	0.1672
	SD	(1.5031)	(0.3562)	(1.5000)	(0.3517)	(1.7777)	(0.3724)
price	Mean	-0.0018***	0.0039***	-0.0020***	-0.0044***	-0.0022***	-0.0045***
	SD	(0.0012)	(0.0001)	(0.0002)	(0.0002)	(0.0001)	(0.0002)
delay	Mean	-0.0177***	-0.0116***	-0.0182***	-0.0123***	-0.02401***	-0.0143***
	SD	(0.0010)	(0.0010)	(0.0016)	(0.0017)	(0.0022)	(0.0016)
punctuality	Mean	0.0301***	0.0199***	0.0232***	0.0158**	0.0381***	0.0259***
	SD	(0.0037)	(0.0039)	(0.0059)	(0.0064)	(0.0052)	(0.0053)
network	Mean	0.0004***	0.0003***	0.0008**	0.0001	0.0007***	0.0003**
	SD					0.0366***	0.0339***
						(0.0064)	(0.0076)

	SD	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0001) 0.0009*** (0.0002)	(0.0001) 0.0004 (0.0003)
price*gender	Mean			0.0004* (0.0002)	0.0009*** (0.0003)		
delay*gender	Mean			0.0007 (0.0020)	0.0011 (0.0021)		
Punctuality*gender	Mean			0.0112 (0.0076)	0.0068 (0.0081)		
Network*gender	Mean			-0.0005** (0.0002)	0.0068 (0.0081)		
Number of observation		5943	5831	5943	5831	5943	5831
Log likelihood		-1693.53	-1455.79	-1688.07	-1450.33	-1584.01	-1392.60

\*\*\*significant at 1%, \*\*significant at 5%, \*significant at 10%.

All the models suggest that consumers are willing to pay a high amount to avoid the schedule delay and to fly with airlines with improved punctuality, especially when the travel is for business purpose (see Table 7). Model 1 shows that business passengers' WTP for avoiding a one hour schedule delay is about 600 yuan (the amount in Table 7 times 60), almost half of the full fare. This amount reduces to 180 for leisure travel. Business passengers are willing to pay 170 yuan for an improvement of 10% in on-time rate while leisure passengers are willing to pay 52 yuan. Passengers appreciate a large network that airlines operate. However, the magnitude of WTP is not economically significant. For example, business passengers are only willing to pay 25 yuan for an increase of 100 new routes and the WTP for leisure passengers is 7 for the same increase. Similar results can be found in Modes 2 and 3.

Table 7: Willingness to pay

	Model 1		Model 2		Model 3	
	Business	Leisure	Business	Leisure	Business	Leisure
Delay	-9.99	-3.00	-8.66	-2.65	-11.03	-3.16
Male			-8.52	-2.55		
Female			-8.87	-2.80		
Punctuality	17.02	5.17	14.59	4.50	17.51	5.74

Male			16.80	5.13		
Female			11.33	3.58		
Network	0.25	0.07	0.24	0.06	0.30	0.07
Male			0.14	0.09		
Female			0.39	0.02		

The schedule delay problem would be mitigated and the welfare of consumers would be greatly improved if the airline could increase the flight frequency to reduce the difference between preferred and offered departure times. The large amount of WTP sends a strong signal to Chinese airlines that it is worth investing time and efforts optimising their flight schedules and that it is most likely profitable to increase frequency on business routes such as Shanghai- Beijing and Shanghai Guangzhou as the business passengers are willing to pay for this. Lijesen (2006) also suggests that if schedule delay is valued high relative to travel time, developing a hub-and-spoke system could be potentially attractive as it gives room for higher frequencies.

Although the term schedule delay is different from the meaning of delay of departing or arriving later than the schedule time, the WTP of avoiding schedule delay could be indicative of the cost of the actual delay of a flight to consumers, which may provide guidance to the airline as to how much cash it should offer as compensation for a long time delay. The considerable amount of this measure together with high value that passengers place on punctuality can explain the irrational behaviours of some passengers when long flight delay occurs. Their anger and frustrations should be acknowledged and properly handled.

In 2010, Chinese airlines carried 248 million passengers in the domestic market. Based on our WTP measure, even a short delay (less than 15 minutes) would cause substantial costs to the passengers every year. CAAC (2011) reported that the punctuality rate decreased from 83.1% in 2007 to 75.8% in 2010, suggesting a loss of 124 yuan for each passenger according to our first model if other factors are held constant.

Flight delays also bring significant costs to airlines such as extra payment to the crew and grand handling agent, extra parking and handling charges and the possible costs of meal, drink and accommodation provided to the passengers. More seriously, pilot fatigue due to flight delay could cause disastrous consequences. It is, therefore, in both airlines and consumers' interest to improve punctuality and quality services in the event of a long flight delay. Air traffic control due to insufficient airspace is another major reason that led to 27.6% of the delays in 2010. At present, less than 25% of China's airspace is open to civil aviation and the military controls the rest. About 30 foreign airlines' requests to increase frequency or operate new routes to Beijing could not be granted with their requested time slots in 2011 (Xiao 2011). There have been constant calls for relaxing airspace control to ease air traffic congestion from the industry and foreign governments. There is no doubt that the poor on-

time performance in 2010 will put increasing pressure on the military for opening up more airspace in china.

Although Mason (2001) noted that many large companies have agreements with large network carriers which can supply the majority of their travel needs on a global scale. The relatively small amount of WTP for a larger network together with the degree of importance of other service attributes reported in this study send a positive signal to small airlines and low cost carriers that they could develop their competitive advantages attracting not only price-sensitive leisure travellers, but also potentially business travellers through providing reliable and punctual services.

## **6. Conclusions**

This study first uses the Likert scale data to identify the order of importance of the service items from ticket purchase to arrival baggage claim and then uses the stated choice methods to elicit the values that Chinese passengers place on some important air service attributes. Not surprisingly, safety was rated as the most important thing. Chinese passengers have very low tolerance on flight delays and mishandling of their baggage. Interestingly, the size of fleet and the FFPs are not considered as very important issues. The results from the stated choice models suggest that Chinese airlines have failed to establish a strong brand reputation among passengers, and that consumers are willing to pay a high amount to avoid schedule delay and to fly with airlines with improved punctuality, especially when the travel is for business purpose. Investing in areas that can improve the on-time performance will thus benefit both airlines and consumers as well as the economy as a whole.

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