The Shanghai–Beijing 'Air Express' Service Model and its Impact on the Pricing Behaviour of Airlines[1]

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Abstract

Using departure day airfare data, this paper examines the pricing pattern on the Shanghai–Beijing route and reveals anti-competitive pricing behaviour following the introduction of the 'Air Express' service. This new service adds limited value to passengers because of the airport facility constraints. Jointly providing the 'express' service has provided a channel through which the three dominant players can communicate effectively to achieve more stable prices at a higher level. Interestingly, lower prices charged by the fringe airlines on this route were accommodated by the big ones. Meanwhile, the three dominant airlines did not exhibit any obvious deviation in pricing from each other.

Key words: airline pricing; collusion; China

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Introduction

Numerous theoretical and empirical studies on the pattern of airline pricing attempt to explain price dispersion and variation. Price discrimination is traditionally seen as one of the sources of price variation, especially in the airline industry (Borenstein, 1985; Gale, 1993; Stavins, 1996; Gerardi & Shapiro, 2007). A common phenomenon is that business passengers pay much higher prices than leisure travellers who have budget constraints and are more sensitive to changes in airfares (Wang & Song, 2010). Oligopolistic strategies used by the players on a typical oligopoly route might be another source of price variation. Game theorists have modelled the conditions that might have resulted in price wars and price collusion between competitors (Green & Porter, 1984; Rotemberg & Saloner, 1986; Slade, 1989). In many of these theoretical works, change in demand has been seen as a trigger for change in price. Dana (1999) demonstrated that price rigidities and demand uncertainty lead not only to inter-firm price dispersion, but also to intra-firm price dispersion. Dana also predicted that price increases with the number of firms. Some airline economics literature has shown that price dispersion is significantly influenced by competition and airport dominance (Borenstein, 1989; Borenstein & Rose, 1994; Evans & Kessides, 1993). A recent study by Mantin and Koo (2009) claimed that price dispersion is affected by demand variables such as population, income and the share of business passengers, as well as the presence of low-cost carriers. They, however, dismissed the importance of market concentration.

Studying a single route's pricing pattern across airlines could provide more in-depth analysis of airline pricing. By examining the airfares on the London–New York route, Bilotkach (2006) found that prices aimed at business travellers are different between airlines while leisure airfares are not. Bilotkach et al. (2010) reported noticeably different pricing strategies used by competitors in the same market. This paper will look at the airfare variations on the most important route in China: the Shanghai–Beijing route. Some special features of this route differentiate this study from existing works. First, although such regulation has been removed from most other domestic routes, entry into and exit from the Shanghai–Beijing route are still regulated considering that Beijing and Shanghai airports operate at close-to-full capacity, which means that potential competition does not exist. Since 2006, five airlines have provided services on this route, including Air China, China Eastern Airlines, Shanghai Airlines, Hainan Airlines and China Southern Airlines. Second, following the proposal by the General Administration of Civil Aviation of China (CAAC), the 'Air Express' service was introduced on this route from August 2007, with special check-in counters, baggage carousels, security check points, and dedicated boarding channels. All five airlines joined this program and collectively forged the brand 'Air Express'. However, all these airlines were publicly listed companies and so had to compete against each other for their own interests. In fact, they had done so in the past on many domestic routes, and cutthroat competition, or price wars, were not uncommon (Zhang & Round, 2009). It is interesting to find out how these airlines priced on the Shanghai–Beijing route, especially how the prices varied across airlines before and after the introduction of the 'Air Express' service. This paper will address these issues by examining the average airfare of each airline on the departure day.

Shanghai–Beijing 'Air Express' and the Data

China launched high-speed train services in April 2007 with the introduction of bullet trains (called Dong Che Zu or D train in China), reducing travel time from Shanghai to Beijing from 13 hours to 10 hours. This improvement in train services has continued. A high-speed railway linking Shanghai and Beijing will be completed by the end of 2011, reducing travel time between the two cities to less than four hours. Therefore, train services are set to challenge the air services and attract business passengers who are crucial to airlines' revenue.

The CAAC admitted that looming competition from the rail industry nationwide triggered the proposal to establish a joint 'Air Express' service between Beijing and Shanghai. The aviation authorities hoped that, if successful, this operation model could be applied to other domestic routes. The essence of this program appears to be to provide faster and more flexible services to retain business passengers. Special check-in areas and fast-track security check channels were set up at both Beijing Capital Airport and Shanghai Hongqiao Airport for passengers travelling between the two cities. Special arrangements were made for boarding and baggage services as well as the use of VIP lounges. The most important arrangement between the five airlines servicing this route was that a ticket from one airline could be endorsed to another airline unconditionally (Zhou, 2007).

It was hoped that, with all these arrangements, travel time between Shanghai and Beijing could be contained to three hours from the point of check-in to the point of leaving the destination airport (including two hours' flying time). The 'Air Express' service also aimed to allow a passenger to depart any time they arrived at the airport from 7 am to 10 pm by providing at least one departure every 15 minutes during peak time. To build the reputation of the brand, the eventual goal for punctuality was declared to be 90%, with the initial goal being 85% (Xu & Chen, 2007). On the introduction of the 'Air Express' service in August 2007, China Eastern and Air China commanded the largest market share, with 14 and 11 flights from Shanghai to Beijing a day respectively, followed by Shanghai Airlines' six flights (Timetable, 2007). Daily frequency for Hainan Airlines was three while China Southern only operated one service every day. Such a market share distribution is not surprising as the two national carriers,[2] China Eastern and Air China, are headquartered in Shanghai and Beijing respectively. Shanghai is also home to Shanghai Airlines, a local carrier mainly owned by the Shanghai government. These were the only three carriers servicing the Shanghai–Beijing market until the early 2000s, when Hainan Airlines gained access rights. China Southern was granted the right to fly the route in 2006. A total of 5.79 million passengers were transported by air between Shanghai and Beijing in 2007 with an average load factor of 80.94%, making this route the busiest market in China (Statistical Data on Civil Aviation of China, 2008). Guo et al. (2006) noted that Beijing and Shanghai are two of the most important source markets for outbound tourists. Undoubtedly, they also generate

[2] All the national airlines including Air China, China Eastern and China Southern, have been partly privatised since the late 1990s (Zhang & Round, 2008).

and attract a large number of domestic tourists to the air services between Beijing and Shanghai, as these two cities are classical tourism destinations. Therefore, studying the pricing behaviour on this route not only has significant implications for business travellers, but also for leisure travellers and the tourism industry in general.

Immediately after the launch of the 'Air Express' route on 6 August 2007, the airfares between Shanghai and Beijing went up substantially. , This increase was reported widely (Xu & Chen, 2007), and people became concerned that the 'Air Express' service would be used as a platform to facilitate price collusion. The airlines quickly denied this accusation and reduced their airfares (Liu, 2007). However, when critics were appeased, another round of price increases followed (Li, 2007).

The airfare data used for this study come from the sales information of an agent at the Shanghai airports.[3] This agent has been in the top five agents selling Shanghai–Beijing tickets for China Eastern in the past few years and is the largest in the airport area.[4] As this agent is based at the airport, 80% of the passengers who purchase tickets immediately fly out. Therefore, the airfare can be regarded as the departure day price. The agent's monthly statistics report the daily sales revenue and the number of tickets sold for each airline. Thus, the average price for a particular day can be calculated. If the sales revenue of a particular day includes business or first-class tickets, they are removed from the data. Therefore, the final airfare data represent one-way daily economy class (with or without discount) price from Shanghai to Beijing for the period from January 2007 to December 2007 for all five airlines mentioned above.[5] Table 1 reports the descriptive statistics for the airfare data. China Eastern has the highest average airfare for 2007 while Shanghai Airlines has the lowest. The coefficients of variation for each month are also presented in the table. This indicator measures price dispersion. It appears that China Eastern had a more stable and smaller dispersion in the second half of 2007. All airlines had relatively high price dispersion in the first two months, normally indicating relatively strong competition (see Borenstein and Rose, 1994). It can be seen that most of the airlines experienced lower price dispersion in August, but in the following months, relatively large price variations still existed for China Southern, Hainan Airlines and Shanghai Airlines. Surprisingly, all carriers showed considerably low variations in price in December. Although December is a busy season in western countries, it has never been a peak season for air travel in China. It is, therefore, highly likely that a collusive agreement was reached that restricted competition.

[3] There are two airports in Shanghai: Hongqiao and Pudong. In particular, the 'Air Express' refers to the services between Beijing airport and Hongqiao airport. Both China Eastern and Air China have some flights to Beijing departing from Pudong airport (mainly in connection with an international sector), but the sales report did not separate them from those departing from Hongqiao airport. As a result, this study treats the two airports as one.

[4] This agent sells tickets for all the airlines.

[5] Fewer observations were obtained for Hainan and China Southern Airlines because of their low frequency in 2007.

Table 1 Descriptive Statistics for Airfares

	Obs.	Average	Std. dev.	Min	Max	Coefficient of variation (%)											
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
China Eastern	249	888.59	213.93	410	1130	32.1	34.3	24.9	19.7	27.2	21.0	18.5	18.4	18.2	23.0	15.9	1.3
Air China	225	882.65	201.43	340	1130	31.5	34.5	23.4	20.1	20.2	17.8	19.3	24.0	18.6	24.3	13.8	1.6
Shanghai Airlines	257	809.57	241.81	230	1130	30.2	34.2	25.7	20.9	27.0	32.5	24.5	21.1	30.3	27.8	29.0	6.0
Hainan Airlines	286	833.08	243.51	230	1130	47.9	29.6	38.0	21.2	31.4	27.1	19.7	22.4	31.3	26.9	23.3	5.8
China Southern	171	860.67	238.48	450	1130	52.9	31.7	27.4	28.0	28.1	23.9	26.9	16.1	26.2	28.8	37.6	13.2

Model Estimation and Discussion of Results

A Dickey–Fuller (DF) test was conducted to see whether the time series price data of the five airlines follow a unit root process. There has been strong evidence against a unit root and in favour of a stationary process. It is therefore legitimate to estimate a time series OLS model to see the pricing patterns across airlines before and after the introduction of the 'Air Express' service. The dependent variable is the departure day average airfare in logarithm form. How the prices vary during a week is of interest. Dummies were thus created for Tuesday to Sunday and Monday was chosen as the benchmark. Monthly dummies were also included to capture the effect of changes in demand from month to month. January was set as the base category. A POSTAUG dummy was included to see if the prices after July were higher than in the previous months. It takes the value of 1 for the period from August to December. Interactions between POSTAUG and the daily dummies of a week allow the price fluctuations after the introduction of 'Air Express' service to be checked. The estimation results of using all five airlines' aggregate data can be found in Table 2. The POSTAUG was dropped in model specification 1 due to the multicollinearity problem. To clearly reveal the change in prices after August, specification 2 including POSTAUG was estimated. Robust standard errors were reported to accommodate the potential autocorrelation and heteroskedasticity problems.

Table 2 OLS Estimation Results Using Aggregate Data

Specification 1 (dependent variable logairfare)			Specification 2 (dependent variable logairfare)		
Independent variable	Coefficients	Robust Std. Err.	Independent variables	Coefficients	Robust Std. Err.
China Eastern	0.051**	0.023	China Eastern	0.050**	0.024
Air China	0.048**	0.024	Air China	0.045*	0.025
China Southern	–0.084***	0.030	China Southern	–0.075**	0.031
Hainan Airlines	–0.071***	0.026	Hainan Airlines	–0.056**	0.028
Tuesday	0.083**	0.040	Tuesday	0.078*	0.042
Wednesday	0.189***	0.041	Wednesday	0.178***	0.043
Thursday	0.218***	0.042	Thursday	0.194***	0.044
Friday	0.232***	0.029	Friday	0.234***	0.049
Saturday	–0.024	0.042	Saturday	–0.026	0.045

Sunday	0.170***	0.040	Sunday	0.173***	0.040
Postaug*tue	–0.102*	0.058	Postaug*tue	–0.090	0.062
Postaug*wed	–0.140**	0.060	Postaug*wed	–0.130**	0.064
Postaug*thu	–0.206***	0.066	Postaug*thu	–0.153**	0.071
Postaug*fri	–0.094	0.057	Postaug*fri	–0.091	0.059
Postaug*sat	–0.026	0.065	Postaug*sat	–0.010	0.070
Postaug*sun	–0.104*	0.056	Postaug*sun	–0.082	0.058
Feb	0.105**	0.053	Postaug	0.197***	0.040
Mar	0.123***	0.046			
Apr	0.267***	0.045			
May	0.091**	0.043			
Jun	0.121***	0.043			
Jul	0.251***	0.043			
Aug	0.400***	0.048			
Sep	0.226***	0.061			
Oct	0.288***	0.059			
Nov	0.326***	0.061			
Dec	0.550***	0.055			
Constant	6.458***	0.043			
Number of observations	1188		Number of observations	1188	
R-squared	0.2128		R-squared	0.1235	

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

Both specifications produce similar results. Specification 1 shows that China Eastern and Air China charged significantly higher prices (about 5%) than Shanghai Airlines while China Southern and Hainan Airlines charged much lower airfares (by 7.1% and 8.4% respectively). Zhang and Round (2009) reported the aggressive pricing strategy used by Hainan Airlines to expand its domestic networks. Similar strategy might have been used here to establish

reputation in this relatively new market. Given the smaller market share commanded by China Southern and Hainan Airlines on this route, we cannot exclude the possibility that the low prices were compensation for their service quality defects of few flights. In addition, even though the Shanghai–Beijing market is dominated by business passengers, the absolute number of leisure travellers should not be underestimated. Therefore, it is also likely that the two airlines deliberately targeted this group of price-sensitive passengers.

It is noticeable that all other months had significantly higher prices than January. This might be explained by the fact that January is the start of a new financial year and business activities are generally low in the advent of the Chinese New Year. April is usually a peak season for both business and leisure travel in China. Therefore, the price was about 26.7% higher than in January on average. However, it is difficult to explain why the prices were so significantly higher in all months in the second half of 2007. The only reason points to price collusion. The POSTAUG variable in specification 2 clearly indicates that airfares after July were about 20% higher than in the first few months on average.

There were reports alluding to price collusion, which was caused by the requirement of unconditional endorsement of the tickets for the convenience of passengers, even for a ticket with 70% discount off the full airfare (1130 Chinese Yuan). Meanwhile, the CAAC required that the airline that actually transported the passenger must settle the ticket at 85% of the published airfare (1130 Chinese Yuan) with the issuing carrier (Xu & Chen, 2007). Although this has never been formally confirmed, this senseless requirement is consistent with the CAAC's attitude towards competition, i.e., it does not want to see strong competition between airlines or the offering of deep discounts (see Zhang & Round, 2008 for details). Some passengers might abuse this privilege by buying a cheap night ticket and flying on peak hour flights with another airline. The issuing carrier would thus suffer a loss by paying the difference. Xu and Chen quoted an anonymous person from Air China: 'airlines will achieve balance in the long run as all the participants face the same problem and we have to endorse tickets to each other reciprocally'. However, given the imbalanced frequencies between airlines, it would not be possible for such a long-run balance to be achieved. In addition, as with many other businesses, airlines tend to focus on the short-run profits and losses. Therefore, what was observed after 6 August was that all the airlines sold full price or a price with only 10% off to avoid 'endorsable' losses. Such a simultaneous increase in prices angered the public and the motivation of introducing the 'Air Express' service was questioned. Although the airlines argued that August was a traditional peak season for air travel due to summer holidays, merely a few days later there was a plunge in airfares followed by a sudden increase (Li, 2007). The endorsement rule was subsequently changed – only tickets with less than 20% discount were endorsable. Li described the airfares on the route from Shanghai to Beijing as 'roller coaster' following the introduction of the 'Air Express' service and that it is difficult to know what happened behind the dramatic changes in prices.

Price wars and collusion are two common phenomena in China's domestic airline markets. This is because most explicit and implicit price collusive agreements do not last long, as observed by Zhang and Round (2009). They found that many price-fixing agreements were

actually very vulnerable and could be easily upset by a change in outside conditions such as demand. Cutthroat competition would occur before a new agreement could be negotiated. It seems that their observations were still valid for the Shanghai–Beijing market in 2007. However, without the joint 'express' service, most of the collusive behaviours might have been deterred by the new Anti-Monopoly Law, while with this new program, airlines could freely engage in any talks in the name of seeking cooperation and providing better air express services. This joint service might serve as tool to disguise illegal activities.

A question might naturally arise. Given the conditions conducive to price collusion and the high possibility that the airlines did collude, why did the five carriers not charge similar prices on average? After all, these airlines can easily monitor each other's sales and price information to enforce a collusive agreement as they use the same reservation system. However, quite often, a stable collusion does not mean that all players price the same. Some members with low frequency would be disadvantaged by charging the same price as the dominant players. Therefore, to reduce the chance of the fringe players deviating, the major players had to accommodate them by allowing them to price lower. This strategy is widely known in China's airline industry and developed from numerous failures in achieving durable collusion.

Specifications 1 and 2 also show that, apart from Saturday, the airfares on other days were significantly higher than on Monday. For example, the price on Friday was 23.2% higher. One interesting finding from the models is that since the introduction of the 'Air Express' service, the airfares on other days were lower than before. For example, the price on Friday was only 13.8% (0.232–0.094) higher than that on Monday. Apart from Saturday, all other daily variables and the corresponding interaction terms are jointly significant, which shows that airlines gained more power in setting their prices and were able to price within a smaller range. This is consistent with the price dispersion patterns presented in Table 1.

Table 3 OLS Estimation Results for Individual Airlines (dependent variable logairfare)

Variables	China Eastern	Air China	Shanghai Airlines	China Southern	Hainan Airlines
	Coefficient (Robust Std. Err.)	Coefficient (Robust Std. Err.)	Coefficient (Robust Std. Err.)	Coefficient (Robust Std. Err.)	Coefficient (Robust Std. Err.)
Tuesday	0.122 (0.076)	0.091 (0.080)	0.064 (0.083)	0.039 (0.117)	0.120 (0.103)
Wednesday	0.220*** (0.076)	0.186** (0.081)	0.212** (0.083)	0.152 (0.118)	0.174 (0.107)
Thursday	0.168*	0.325***	0.247***	0.231**	0.150

	(0.087)	(0.081)	(0.092)	(0.104)	(0.106)
Friday	0.323***	0.320***	0.218***	0.037	0.221**
	(0.066)	(0.074)	(0.079)	(0.118)	(0.106)
Saturday	0.007	0.092	–0.053	–0.101	–0.091
	(0.079)	(0.077)	(0.088)	(0.141)	(0.104)
Sunday	0.184**	0.202**	0.175**	0.115	0.189
	(0.074)	(0.082)	(0.086)	(0.132)	(0.097)
Postaug*tue	–0.124	–0.129	–0.159	–0.158	–0.053
	(0.109)	(0.106)	(0.128)	(0.168)	(0.141)
Postaug*wed	–0.217**	–0.228	–0.312**	–0.011	–0.011
	(0.100)	(0.142)	(0.133)	(0.195)	(0.142)
Postaug*thu	0.269	–0.324***	–0.308**	–0.213	–0.054
	(0.127)	(0.115)	(0.155)	(0.185)	(0.154)
Postaug*fri	–0.208**	–0.257**	–0.196	0.218	–0.184
	(0.087)	(0.112)	(0.121)	(0.170)	(0.146)
Postaug*sat	–0.064	–0.154	–0.075	–0.026	0.127
	(0.107)	(0.111)	(0.143)	(0.198)	(0.161)
Postaug*sun	–0.154	–0.222**	–0.204*	0.088	–0.062
	(0.103)	(0.112)	(0.122)	(0.174)	(0.131)
Feb	0.059	–0.068	0.045	0.240	0.290
	(0.103)	(0.097)	(0.099)	(0.187)	(0.141)
Mar	0.131*	0.116	0.103	0.239	0.079
	(0.076)	(0.080)	(0.071)	(0.174)	(0.145)
Apr	0.283***	0.251***	0.238***	0.246	0.375***
	(0.075)	(0.086)	(0.074)	(0.176)	(0.131)
May	0.052	0.127*	0.057	0.148	0.102
	(0.081)	(0.076)	(0.078)	(0.177)	(0.135)
Jun	0.207***	0.143*	–0.012	0.104	0.147

	(0.069)	(0.073)	(0.086)	(0.169)	(0.128)
Jul	0.259*** (0.070)	0.207** (0.082)	0.173** (0.079)	0.258 (0.175)	0.376*** (0.122)
Aug	0.397*** (0.099)	0.366*** (0.128)	0.414*** (0.110)	0.484** (0.219)	0.409** (0.160)
Sep	0.310*** (0.099)	0.329*** (0.114)	0.130 (0.118)	0.301 (0.210)	0.180 (0.170)
Oct	0.267*** (0.099)	0.284** (0.127)	0.330*** (0.112)	0.328 (0.212)	0.315** (0.160)
Nov	0.433*** (0.095)	0.434*** (0.116)	0.265** (0.118)	0.123 (0.208)	0.370** (0.169)
Dec	0.596*** (0.089)	0.571*** (0.106)	0.554*** (0.109)	0.584*** (0.214)	0.577*** (0.151)
Constant	6.442*** (0.075)	6.447*** (0.098)	6.490*** (0.078)	6.338*** (0.178)	6.291*** (0.132)
Number of observations	249	225	257	171	286
R-squared	0.296	0.274	0.213	0.242	0.262

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

It is better to break down the aggregate data to see the individual carrier's pricing patterns. Chow tests have been conducted to see if the coefficients in the five equations reported in Table 3 are equal. Interestingly, the coefficients for the three big players on this route are not significantly different from each other (A statistic $F(23,427) = 0.57$ for China Eastern and Air China, and $F(23, 458) = 0.82$ for China Eastern and Shanghai Airlines). However, China Eastern has significantly different coefficients from China Southern and Hainan Airlines ($F(21, 375) = 3.08$ and $F(23, 488) = 2.27$ respectively) while the coefficients between China Southern and Hainan are roughly equal ($F(23, 410) = 1.14$). Such evidence suggests that Air China and China Eastern closely matched each other in pricing while the two fringe players appeared to adopt similar pricing strategies. It should be noted that during most of the days in a week, China Southern and Hainan Airlines did not exhibit significant fluctuations in prices, as did China Eastern and Air China. For example, apart from Friday, the other days did not see significantly higher or lower prices than Monday while this was not the case for China Eastern and Air China, most of whose departure day prices were significantly higher. Similar

patterns can be observed from the monthly dummies. It seems that the three big players were able to charge statistically and economically higher prices than they charged in January, especially in the second half of the year. This is consistent with the findings from the model using the aggregate data that the dominant airlines on this route possessed more market power. They would not worry about losing passengers as their services dominated peak hours, which were important to price-insensitive passengers. The introduction of the 'Air Express' service seems to have strengthened their pricing ability on this route.

It is evident that passengers were worse off on this route in terms of the prices paid. The question is whether they have received better services as initially hoped. As mentioned earlier, some passengers abused the unconditional endorsement rule. So did the airlines. Some of them oversold far more seats than the normal number of 'no show' passengers because the cost of handling the overbooked passengers became very low. The airlines could easily put them onto another flight in the next 15 or 30 minutes regardless of the operating carriers and complaints about overbooking have been increasing.

It has also been reported that the check-in counters dedicated to 'Air Express' could not meet the increasing number of passengers, with the queues for check-in and security check sometimes being longer than those of other flights (Zhou, 2007). Another factor beyond the control of the airlines is that flights between Beijing and Shanghai are frequently delayed due to air traffic control, which makes the 'three hour' goal from one airport to the other almost impossible. In fact, what impressed passengers most were the increased prices, not any improvement in services.

Conclusion

Using the departure day airfare data, this paper has conducted an in-depth analysis of the pricing patterns on the Shanghai–Beijing route with a focus on its most likely anti-competitive pricing behaviour following the introduction of the 'Air Express' service model. This new service has been tarnished by airport facility constraints coupled with a substantial increase in prices. Jointly providing the 'express' service has provided a channel through which the three dominant players could communicate effectively to achieve more stable prices at a higher level. Interestingly, lower prices charged by the fringe airlines on this route were accommodated by the big ones. Meanwhile, the three dominant airlines did not exhibit obvious deviation in pricing from each other.

Given that the Shanghai–Beijing route is the most heavily travelled market in China, the detrimental effect of the explicit and implicit collusive behaviour on passengers should not be underestimated, especially when most of the promised conveniences have not yet been realised. It would be more dangerous if this model were implemented on other routes, allowing the airlines to shelter from the threat of competition from high-speed rail services. This would not only hamper business travel, but would also damage leisure travel and the tourism industry in general. It is therefore suggested that the antitrust authorities should keep

a close eye on this service model and take necessary actions to ensure that competition remains in the market.

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References

Bilotkach, V. (2006). Understanding price dispersion in the airline industry: capacity constraints and consumer heterogeneity. In Lee, D. (Ed). *Advances in airline economics*, 1, 329–345. Amsterdam: Elsevier.

Bilotkach, V, Gorodnichenko, Y and Talavera, O. (2010). Are airlines' price-setting strategies different? *Journal of Air Transport Management, 16*, 1–6.

Borenstein, S. (1985). Price discrimination in free-entry markets. *RAND Journal of Economics, 16*, 380–397.

Borenstein, S. (1989). Hubs and high fares: Dominance and market power in the US airline industry. *RAND Journal of Economics, 20*, 344–365.

Borenstein, S, and Rose. N. (1994). Competition and price dispersion in the US airline industry. *Journal of Political Economy, 102*, 653–683.

Dana, J. D. Jr. (1999). Equilibrium price dispersion under demand uncertainty: The roles of costly capacity and market structure. *RAND Journal of Economics*, 30, 632–660.

Evans, W. N. and Kessides, I. N. (1993). Localized market power in the US airline industry. *Review of Economics and Statistics, 75*, 66–75.

Gale, I. (1993). Price dispersion in a market with advance-purchases. *Review of Industrial Organisation, 8*, 451–464.

Gerardi, K. and Shapiro, A. H (2007). The effects of competition on price dispersion in the airline industry: a panel analysis. Working paper, No. 07–7, Federal Reserve Bank of Boston.

Green, E. J. and Porter, R. H. (1984). Noncooperative collusion under imperfect price information. *Econometrica, 52*, 87–100.

Guo, Y., Kim, S .S. and Timothy, D. (2007). Development characteristics and implications of mainland Chinese outbound tourism. *Asia Pacific Journal of Tourism Research*, 12, 313–332.

Li, M. (2007). Air Express price goes up to full fare price during the daytime. *Oriental Morning Post*, 21 August. [Online]. Retrieved 1 March 2010 from http://news.sina.com.cn/c/2007-08-21/031312418848s.shtml.

Liu, C. (2007). Beijing–Shanghai 'Air Express' price eases. *Youth Daily*, 9 August. [Online]. Retrieved 1 May 2010 from http://why.eastday.com/y/200706/u1a339197.html.

Mantin, B. and Koo, B. (2009). Dynamic price dispersion in airline markets. *Transportation Research, Part E*, 45, 1020–1029.

Rotemberg, J. J., and Saloner, G. (1986). A supergame-theoretic model of price wars during booms. *American Economic Review, 76*, 390–407.

Slade, M. E. (1989). Price wars in price setting supergames. *Economica, 56*, 295–310.

Stavins, J. (1996). Price discrimination in the airline market: the effect of market concentration. *Review of Economics and Statistics, 83*, 200–202.

Statistical Data on Civil Aviation of China (2008), Department of Planning and Development, CAAC. Beijing: China Civil Aviation Press.

Timetable (2007). March–October. Beijing: Chinese Air Carriers Timetable Press.

Wang, M. and Song, H. (2010). Air travel demand studies: A review, *Journal of China Tourism Research*, *6*, 29–49.

Xu, M and Chen, J (2007). Long queue for check-in and not so express for Air Express. *Shanghai Morning News*, 7 August. [Online]. Retrieved 10 April 2010 from http://sh.bendibao.com/news/200787/content26814.asp.

Zhang, Y. and Round, D. K. (2008). China's airline deregulation since 1997 and the driving forces behind the 2003 airline consolidations. *Journal of Air Transport Management*, *14*, 130–142.

Zhang, Y. and Round, D. K. (2009). Policy implications of the effects of concentration and multimarket contact in China's airline market. *Review of Industrial Organisation*, 34, 307–326.

Zhou, J. (2007). Long queue for Shanghai–Beijing 'Air Express' service. *Shanghai Business Daily*, 7 August. [Online]. Retrieved 20 May 2010 from http://www.airnews.cn/air/29218.shtml.