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# Airport dominance and airline pricing power: An investigation of hub premiums in the Chinese domestic market

Ruowei Chen<sup>a</sup>, Zheng Lei<sup>b,\*</sup><sup>a</sup>Shanghai Aircraft Design and Research Institute, COMAC, 5188 Jinke Road, Pudong, Shanghai, China<sup>b</sup>Centre for Aviation Research, University of Surrey, Guildford GU2 7XH, UK

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## ABSTRACT

This research analyses the effects of airport dominance on airline pricing power with the empirical study based on the Chinese domestic market using fixed-effect panel data models. Results from the regression analysis indicate that airport dominance is the most important source of pricing power in the gradually deregulated Chinese domestic market. Hub carriers are able to charge higher prices to premium class passengers and non-hub carriers benefit from the “umbrella effects” of hub premiums. However, hub carriers are not able to translate their airport dominance to pricing power in the economy class market, whereas non-hub carriers even have to reduce the prices as their market shares at major airports increase. This study contributes to the literature by explicitly segmenting the market into economy and premium classes. The results have important policy implications in terms of further deregulation of Chinese domestic market.

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## 1. Introduction

How does airport dominance affect an airline's pricing power? The answer to this question is critical to regulators as well as practitioners in the air transport industry. Despite the continuous debates about sources of market power, an important gap in the literature is that few studies have explicitly quantified the relationship between airport dominance and airline pricing from the product differentiation perspective. It is likely that the high mark-ups of a dominant airline are mainly contributed by price inelastic business travellers rather than price sensitive leisure travellers. Furthermore, previous studies mainly focus on the fully deregulated markets such as the United States (US), where airlines dominating a market and operating in concentrated, oligopolistic markets may earn substantial premiums. What remains unknown is how such effects change when a country evolves from a tightly controlled regime to a deregulated market.

The purpose of this paper is to analyse the effects of airport dominance on pricing power in the Chinese domestic market. It contributes to the literature in the following areas. First, it uses China as a case study providing much needed insights into this fast growing market when it is transforming from a tightly controlled regime to a deregulated market. Second, we segment the market by premium and economy classes so that the effect of airport dominance on airline pricing power can be quantified separately for these two distinctly different products. Finally, fixed-effects panel data models are employed to control for the carrier-route specific characteristics, avoiding the potential estimation bias caused by cross-sectional analysis. The remainder of this paper is organized as follows. Section 2 reviews the previous studies on airport dominance and hub

\* Corresponding author.

E-mail addresses: [chenruowei@comac.cc](mailto:chenruowei@comac.cc) (R. Chen), [zheng.lei@surrey.ac.uk](mailto:zheng.lei@surrey.ac.uk) (Z. Lei).

premiums. Section 3 provides background information regarding the deregulation, airline consolidation and hub airports in China. Section 4 explains the methods used in this study and discusses the econometric issues. Section 5 describes the data and reports descriptive statistics for the whole sample and sub-samples. Section 6 presents the estimation results while Section 7 interprets fixed-effect time dummies and time interaction. Finally, Section 8 concludes the paper.

## 2. Airport dominance and hub premiums

Since the deregulation of the US domestic aviation market in 1978, concerns on market power in the airline industry have attracted longstanding attention from governments and academics alike. It is generally believed that market dominance and market concentration<sup>1</sup> are the main sources of airlines' market power. Numerous studies found that airlines dominating a hub airport are capable of exercising market power, charging higher prices to passengers, which is so called "hub premiums" phenomenon (e.g. Levine, 1987; Borenstein, 1989; Evans and Kessides, 1993; Morrison and Winston, 1995; Berry et al., 1996; Lee and Luengo-Prado, 2005; Chi and Koo, 2009). It is worth highlighting that the definitions, or measures, of "hub premiums" are not consistent in the literature. In some studies, hub premiums refer to the mark-ups of average fares at a concentrated hub airport comparing to average fares at un-concentrated airports (e.g. US GAO, 1990). Whereas in other studies (e.g. Borenstein, 1989; Evans and Kessides, 1993), the hub premiums often refer to price mark-ups charged by the dominant airline as opposed to other airlines without airport dominance. In this study, we focus on the latter definition which pays more attention to the effects of market power.

Borenstein (1989) found that dominance and concentration at the route level as well as at the airport level are principal determinants of price premiums of an airline. He argued that frequent flyer programs, travel agent commission override programs, and corporate discount programs are the main sources of hub premiums. Control of scarce resources like airport gates and slots by incumbent airlines which raises up entry barriers for new entrants also contributes to hub premiums. Evans and Kessides (1993) found that hub premiums are more associated with airport characteristics rather than route features. After controlling for inter-route heterogeneity in price which has been omitted in Borenstein's (1989) study, Evans and Kessides (1993) found that substantial pricing mark-ups are derived from an airline's dominance at an airport rather than at the route level. Airport and route concentration also plays a role in explaining price premiums but the effects are relatively small compared to airport dominance. Their findings are supported by Hofer et al. (2008) who confirmed that airport market share and airport concentration contribute to largest part of price premiums while the impact of route market share and concentration on price is much smaller. However, a recent study by Bilotkach and Lakew (2014) using a seventeen-year panel dataset in the US found that airport concentration is the strongest source of market power but the result is mainly driven by the smaller airports.

A limitation associated with the above studies is that airline passengers are implicitly assumed to be homogeneous.<sup>2</sup> In reality, there exist two very distinct types of airline customers, namely, business and leisure passengers. The former are usually price sensitive and are less willing to pay for frequency and frequent flyer features while the latter normally possess the opposite features. Airlines capture these two types of customers with different products, namely, premium class for business travellers and economy class for leisure passengers. Borenstein (1989) attempted to analyse the pricing effects on different market segments by examining the 20th, 50th and 80th percentile fares. However, the proportion of leisure and business travellers may vary widely across markets, thus the same percentile fare may represent different passenger mix across various markets. For instance, the 80th percentile fare may represent business passengers in some markets whereas leisure traveller in others. Hence, aggregating the same percentile fare data may risk from mixing the effects for different market segments. Despite problems in the data, Borenstein (1989) still found that airport market share has more profound impact on the high priced market than on the low priced market.

Berry et al. (1996) developed a utility function based on discrete choice model of demand, to estimate the differential willingness to pay for different air travel features of leisure and business travellers. They concluded that the dominant hub carrier's ability to charge higher fares is restricted to the tickets that appeal to relatively price-inelastic business travellers, who favour the origin-hub airline, and are willing to pay an average premium of 20%. Meanwhile these high prices do not provide a "monopoly umbrella" to other non-hub airlines. Their study provides evidence for the price differentiation strategy exercised by airlines in different market segments, but the relationship between airport dominance and price mark-ups remains ambiguous.

Similar conclusions are obtained by Lee and Luengo-Prado (2005). They used the fare data of different cabin classes, namely, restricted coach fares and premium fares<sup>3</sup> and found that some carriers extract additional hub premiums from premium fare class passengers. After controlling for passenger mix, the average hub premiums at major US hubs are reduced. How-

<sup>1</sup> It is important to make a distinction between market dominance and market concentration. The former refers to an individual firm's ability to control prices and service offerings in a market, while the latter is an indicator of the competitiveness of a market (Hofer et al., 2008). While all firms may benefit from market concentration, the dominant firm may derive additional benefits from its dominant position in the market (Hofer et al., 2008).

<sup>2</sup> This is probably due to lack of reliable data. Most of the empirical studies on pricing in the US airline industry are based on the same dataset, namely the Databank of the US Department of Transportation's Origin and Destination Survey, which is a 10% random sample of all tickets that originate in the United States on US carriers. Many researchers prefer to only use restricted coach fare because the premium fare classification is defined by carriers and may not follow the same standard. Moreover, some apparent mistakes occur in premium data. For instance, JetBlue as a low-cost carriers report all their tickets as first-class.

<sup>3</sup> The premium fare group in their study includes 82% unrestricted coach fare and 18% business and first-class fare.

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