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A re-examination of incumbents' response to the threat of entry: Evidence from the airline industry

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ABSTRACT

Much of the literature on the airline industry identifies a potential entrant to a market based on whether the relevant carrier has presence in at least one of the endpoint airports of the market without actually operating between the endpoints. Furthermore, a potential entrant is often defined as a credible “entry threat” to market incumbents once the potential entrant establishes presence at the second endpoint airport of the market. This paper provides evidence that even when a potential entrant has presence at both endpoint airports of a market, incumbents may not respond to this as an effective “entry threat”. Specifically, we find that (1) incumbents lower price by more when the potential entrant has a hub at one or both market endpoints; and (2) incumbents increase rather than lower their price if they have an alliance partnership with the “potential entrant”.

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1. Introduction

Goolsbee and Syverson (2008) and Morrison (2001) find evidence that incumbent airlines tend to cut fares in response to actual entry as well as the “threat” of entry by Southwest Airlines, while Brueckner et al. (2013) investigate the impact of potential competition from low cost carriers (LCC) and find similar results. Much of this literature identifies a potential entrant based on whether the relevant carrier has presence in at least one of the endpoint airports of the market without actually operating between the endpoints. Furthermore, Goolsbee and Syverson (2008) among others elevate the status of a potential entrant to a credible “entry threat” to market incumbents once the potential entrant establishes presence at the second endpoint airport of the market. However, a key point we make in this paper is that even when potential entrants have presence at both endpoint airports of a market, these “potential entrants” may not all be effective “competitive threats” to incumbents in the market.

First, some potential entrants will be better able to exploit economies of passenger-traffic density than others. A carrier enjoys economies of passenger-traffic density when its marginal cost of transporting a passenger falls as the volume of passengers it transports increases (Brueckner and Spiller, 1994). The carriers that can better exploit economies of passenger-traffic density will have lower marginal cost upon actual entry, and therefore provide

more of a competitive threat to incumbents. We capture potential entrants' ability to exploit economies of passenger-traffic density based on whether the potential entrant uses at least one of the market endpoint airports as a hub. The argument is that if a market endpoint is a hub for a potential entrant, then upon actual entry in this market, this hub airport will enable the carrier to transport a larger volume of passengers on flights between the endpoints since many of these passengers may just be connecting through the endpoint hub. Therefore, an endpoint hub airport can enable the carrier to have lower marginal cost in the market due to the relatively high volume of passengers it will transport between the endpoints of the market.

Second, we argue that some carriers that have presence at the market endpoint airports without operating between these endpoints may incentivize market incumbents to increase rather than decrease price. Specifically, we posit that if the carrier present at the endpoint airports has an alliance partnership with an incumbent, this alliance partnership can enable the incumbent to charge a higher price due to consumers' increased preference for alliance partners' products. An alliance may increase consumers' preference for partner carriers' products since passengers have greater opportunities to accumulate and redeem frequent-flyer miles across partner carriers (Lederman, 2007), especially when partner carriers' networks are complementary rather than overlapping.

We draw inference on our hypotheses from a reduced-form price regression in which market-level price charged by incumbents is regressed on various market characteristic controls as well as measures of the characteristics of the set of potential entrants to a market. Following the literature we identify potential entrants to

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a market based on the set of airlines that have presence in at least one endpoint airport of the market. However, we go a step further to distinguish between potential entrants that have presence at both market endpoints based on (1) whether a market endpoint airport is a hub for a potential entrant; and (2) whether a potential entrant has an alliance partnership with any of the market incumbents.

Consistent with our arguments above, the econometric estimates suggest that incumbents lower price by more when potential entrants have a hub at one or both market endpoints. That is, potential entrants that have a hub at the market endpoint seem to pose a greater competitive threat to incumbents in the market. Perhaps due to this type of potential entrant's unique ability to better exploit economies of passenger-traffic density upon actual entry. Also consistent with our arguments above, the econometric estimates suggest that incumbents increase rather than lower their price if they have an alliance partnership with the "potential entrant". In sum, incumbents seem to be most threatened by potential entrants that they are not allied with and when these potential entrants use the market endpoint airports as their hub.

The analysis in our paper also constitutes a methodological extension to the analysis in [Goolsbee and Syverson \(2008\)](#). In particular, when analyzing incumbents' response to the threat of entry, our empirical framework accounts for the fact that market structure is endogenous, and therefore is able to mitigate potential biases in estimating incumbents' responses. For example, shocks to demand or costs that are unobserved by researchers, but observed by firms can jointly influence existing firm's pricing decisions and potential entrants' decisions to enter the market ([Evans et al., 1993](#)). As such, the estimate of incumbents' pricing response to entry may either be biased upwards or downwards if we do not account for endogenous entry decisions associated with these demand and cost shocks. The empirical methodology we use to account for endogenous market structure is closest to [Singh and Zhu \(2008\)](#) and [Berry \(1992\)](#).

Given that our empirical analysis focuses on incumbents' response to the "threat" of entry, we believe that this focus places the paper as a part of the entry deterrence literature. The question of entry deterrence has been examined extensively from a theoretical perspective,¹ but with the exception of our paper, [Goolsbee and Syverson \(2008\)](#), [Huse and Oliveira \(2012\)](#), [Brueckner et al. \(2013\)](#), [Gayle and Xie \(2013\)](#) and [Morrison \(2001\)](#), formal empirical analysis of this issue is scarce. In addition to the entry deterrence literature, a distinct but related strand of literature studies the issue of how actual entry or competition, instead of the threat of entry, affects prices. Notable contributions to this literature include [Berry \(1990, 1992\)](#), [Borenstein \(1989, 1990, 1991, 1992\)](#), [Brueckner et al. \(1992\)](#), [Brueckner and Spiller \(1994\)](#), [Chen and Savage \(2011\)](#), [Evans and Kessides \(1993, 1994\)](#), [Evans et al. \(1993\)](#), and [Ito and Lee \(2004\)](#) among others. Our empirical model also measures incumbents' price response to actual entry, and therefore is able to contribute to this literature as well.

Along with our two key findings previously described, our econometric estimates yield other interesting results. First, as expected, an increase in the number of actual entrants reduces profitability, which coincides with results in [Berry \(1992\)](#). Second, incumbents' price response is different when faced with increased actual competitors compared to increased entry threat. In particular, incumbents seem to cut price more in response to an increase in actual number of competitors, as compared to an

increase in the number of firms that threaten to enter. Third, when the endogeneity of market structure is taken into account, we find that the average price effect of actual entry is marginally larger compared to when endogeneity is not taken into consideration. Conversely, when the endogeneity of market structure is taken into account, the average price effect of an entry threat is marginally smaller compared to when endogeneity is not taken into account.

The rest of the paper is organized as follows: important definitions used throughout the paper are collected in [Section 2](#). [Section 3](#) outlines the econometric model. Estimation techniques are discussed in [Section 4](#). [Section 5](#) describes the data used in estimation. We discuss results in [Section 6](#), and offer concluding remarks in [Section 7](#).

2. Definitions

A market is defined as directional round-trip air travel between an origin city and a destination city. For example, round-trip air travel from Atlanta to Denver is a distinct market from round-trip air travel from Denver to Atlanta.

A product is defined as a unique combination of airline and flight itinerary. Consider the market from Atlanta to Denver for example. Possible products are (1) a nonstop trip from Atlanta to Denver operated by Delta Air Lines; and (2) a nonstop trip from Atlanta to Denver operated by United Airlines. Note that both products are in the same market.

An airline is defined as being an incumbent in a market during the time period that the airline offers air travel product(s) in the market. In our study, incumbents are the existing carriers that offer nonstop online itineraries in each origin–destination market. On the other hand, a carrier is considered as a potential entrant to a nonstop market when this carrier operates in at least one endpoint city of the market in the period preceding the entry period under consideration. For example, suppose that an incumbent, Delta Air Lines, currently operates a flight from Atlanta (ATL) to Denver (DEN). Any airline that flies between Atlanta and cities other than Denver in the preceding period is considered a potential entrant to the ATL-DEN market. Similarly, any airline that flies between Denver and cities other than Atlanta in the preceding period is also considered a potential entrant to the ATL-DEN market.

[Fig. 1](#) shows three cities and two airlines' operations between these cities. Solid arrows mean that the airline is actually offering flights between the cities, while dashed arrows means that the airline is a potential entrant to the market and therefore has the presence in at least one of the relevant market's endpoint cities in the period preceding the entry period under consideration. As illustrated in [Fig. 1](#), American Airlines (AA) operates a route from Atlanta to Chicago (ORD) but not to Denver. Since this airline

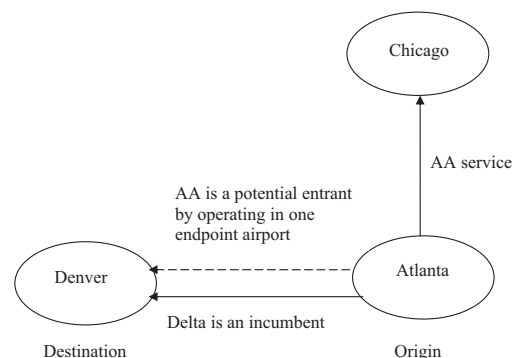


Fig. 1. Identification of a potential entrant.

¹ See for example, [Dixit \(1979\)](#), [Spence \(1981\)](#), [Milgrom and Roberts \(1982\)](#), [Aghion and Bolton \(1987\)](#), [Klemperer \(1987\)](#), [Farrell and Klemperer \(2004\)](#), and [Kwoka \(2008\)](#).

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