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A comparative analysis of cost change for low-cost, full-service, and other carriers in the US airline industry

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ABSTRACT

This study compares cost and productivity changes of full-service carriers (FSCs), low-cost carriers (LCCs) and 'other' carriers classified as regional or charter firms. Findings show cost reductions of 10 percent for FSCs and 22 percent for regionals/charters, and cost increases of 8.5 percent for LCCs from 1993 to 2014. Nontrivial productivity gains due to increases in load factor and stage length explain the findings for FSCs. Unexplained technical change accounts for the cost increases for LCCs, while productivity gains due to increases in load factor and stage length and unexplained technical change contribute to cost declines for 'other' carriers. These findings are interpreted as indicating (1) the LCC cost advantage over FSCs has eroded somewhat over this period, and (2) sources of cost changes over this period differ by air carrier classification.

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1. Introduction

A substantial amount of research examines productivity growth following regulatory reform of the U.S. airline industry (See for instance, Oum & Yu, 1995 and Good, Nadiri, Roller, & Sickles, 1993). Most of the findings from past research suggest that following regulatory reform airline companies in the U.S. experienced improvements in productivity. A contributing factor toward such growth has been the influence of low-cost carriers (LCCs) on industry productivity.

Competitive pressure from LCCs has contributed to increased efficiency and the threat of bankruptcy for full-service (sometimes referred to as legacy) carriers. For instance, in the last 13 years, each of the three largest U.S. full-service carriers has declared bankruptcy. Tsoukalas, Belobaba, and Swelbar (2008) point out that bankruptcy and the threat of bankruptcy has allowed full-service carriers (FSC) to negotiate more favorable labor contracts, resulting in cost reductions. Moreover, they also suggest that

increased labor seniority and slower growth have contributed to higher costs for LCCs. In fact, Tsoukalas et al. (2008) estimate that the average difference in labor cost per available seat mile between full-service carriers and low-cost carriers decreased from 1.2 cents in 2000 to 0.3 cents in 2006. Further evidence of cost convergence between LCC and full-service carriers costs is presented by KPMG (2013), who in a global survey of airlines, find that average costs per available seat kilometer were 3.6 cents higher for full-service carriers than LCCs in 2006 and only 2.5 cents higher in 2011.

On the other hand, Borenstein (2011) argues that the cost difference between LCCs and full-service carriers has not converged in recent years, with costs adjusted for average flight distance remaining 40 percent higher for FSCs in comparison to LCCs over the last decade. Given the recent disagreement as to whether LCC and FSC costs are converging, and a lack of understanding on the reasons for LCC and FSC cost movement in recent years, this study explores recent cost changes for LCC and non-LCC carriers. Cost change is decomposed to identify productivity change from changes in density, firm size, movement characteristics, and technical change, and changes in input prices.

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The remainder of this study consists of four additional sections. The next section examines various airline business models, and identifies factors that may contribute to varying productivity trends for LCCs, FSCs, and other carriers. Distinguishing the various airline business models is important, as major differences in business strategies among the various airline types have significant implications for costs and revenues. Section 3 describes the data construction and the empirical approach used to estimate cost functions for LCCs, FSCs, and the group of 'other' carriers consisting of regional and charter companies. Section 4 presents cost findings for each carrier group, and concluding remarks are provided in Section 5.

2. Classifying the Airlines

While airlines employ a variety of strategies to control costs and to generate revenues, there are four basic types of carriers today, with carriers in each category employing similarities in the general business model employed (Leick & Wensveen, 2014). These include: (1) Full-Service Carriers (FSCs) – often referred to as network carriers or legacy carriers – providing frequent service using a hub and spoke network; (2) low-cost carriers (LCCs) providing point-to-point service, often using less congested secondary airports; (3) regional carriers (RCs) serving as feeders to the FSCs, and often not ticketing passengers; and (4) charter carriers (CCs) providing unscheduled service for vacation packages (Leick & Wensveen, 2014).

2.1. Full-service carriers (FSCs)

Although business models have been changing somewhat, the traditional full-service carrier is one that provides frequent service to a wide-variety of destinations, and provides a number of ancillary services, including complementary beverages, in-flight entertainment, airport lounges, and assigned seating (Gillen, 2006; Huschelrath & Muller, 2012; Leick & Wensveen, 2014). In essence, the FSC aims to be the one-stop air transportation provider to the communities it serves – providing air travel to business and vacation travelers to domestic and international destinations (often through alliances with international airlines).

Generally, travelers have a number of choices for flight times, and can arrive at many destinations without switching airlines. The major innovation that has enabled success of the FSC in providing service to a large number of origin-destination pairs, with frequent service has been the development of the hub-and-spoke system (Borenstein, 1992; Gillen, 2006; Bailey, 2002; Pels, 2008; Peteraf & Reed, 2008).

Gillen (2006) reports that some U.S. airlines had organized into hub-and-spoke networks prior to deregulation in 1978 (e.g. Delta). However, because regulation restricted route entry and exit, most airlines did not develop hub-and-spoke networks until after deregulation (Borenstein, 1992; Bailey, 2002; Gillen, 2006; Leick & Wensveen, 2014; Pels, 2008; Peteraf & Reed, 2008). Under a hub-and-spoke network, the carrier operates flights from smaller markets to a hub airport, timing arrivals close together so that passengers can then connect to flights from the hub to other markets. A major advantage of the hub-and-spoke system for the carrier is that it gives the carrier the ability to generate more traffic over light-density and high-density routes, and therefore to realize economies of density (Caves, Christensen, & Tretheway, 1984 show that airlines are characterized by economies of density). Carriers are able to use larger aircraft, to realize higher load factors (more passengers per available seat), and offer greater service frequency. Passengers benefit from the increased

frequency of service and the wider array of destinations accessible without switching airlines.¹

As Borenstein (1992) points out, the benefits conferred to passengers from increased service frequency and an increase in the number of travel destinations, translate into market power for FSCs. Borenstein (1992) highlights the use of frequent flier programs (FFPs) (first introduced by American Airlines in 1981) to increase market power at hub airports. Since the hub carrier serves more routes from the hub airport than other carriers, it is easier for consumers to accumulate more frequent flier miles with that carrier. Furthermore, the benefit of obtaining frequent flier miles is more valuable on that carrier (as they have access to free trips to more destinations). This induces customer loyalty and results in increased pricing power – particularly for business trips (the highest yielding trips for the carrier). Because of a principal-agent problem, business travelers have an incentive to pursue travel on the carrier that generates the best frequent flier benefits, rather than on the carrier that charges the lowest fare (the company pays the airfare) (Borenstein, 1992).

In addition to being characterized by hub-and-spoke networks, another important characteristic of the FSCs is their use of complex yield management techniques. Yield management is another name for techniques used to maximize revenues. Strategies encompassed in yield management include overbooking, charging higher prices to customers with more inelastic demand (business travelers), and traffic management – or managing traffic to and from hubs to maximize revenues (Voneche, 2005). For the FSC, that offers refundable tickets, serves a large number of airports, and carries passengers together that are traveling to different destinations, this can be extremely complex.

Finally, as mentioned previously, the FSCs are often referred to as legacy carriers, as they were in existence prior to deregulation. While the term "legacy" is not as informative in terms of business strategy, it suggests an important characteristic that distinguishes these carriers from newer carriers – less flexible labor. These carriers existed during the less competitive era of regulation, when carrier resistance to union demands may have been reduced by the lack of competitive pressure (Hirsch & Macpherson, 2000). Although these carriers have been able to renegotiate labor contracts to increase the flexibility of labor, they continue to be plagued by work rules that create less flexible labor (see Bitzan & Peoples, 2014).

In summary, the FSCs can be characterized as offering a full range of services, operating with a hub-and-spoke network, operating a variety of plane sizes to accommodate different markets, and using yield management techniques to increase load factors and revenues. These carriers may also be plagued by less flexible labor and high union wages.

2.2. Low-cost carriers (LCCs)

A recently growing alternative model to the FSC model is the low-cost carrier model that focusses on no-frills, point-to-point service. Prior to deregulation, two U.S. airlines - Western Pacific and

¹ It is important to note, however, that while the hub-and-spoke network gives the advantage of an ability to achieve greater traffic density (and therefore move down the average cost curve), it also entails additional complexity. The increased complexity resulting from the need to coordinate multiple flights, complex yield management, etc., and the decreased factor utilization resulting from the need to accommodate a number of flights at once, suggest that operating a hub-and-spoke network results in operating on a higher average cost curve. Thus, the effect of the hub-and-spoke network on costs is to increase the average cost curve, while moving to a lower point on the respective average cost curve at the same time (due to more traffic).

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