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Investigating airline customers' premium coach seat purchases and implications for optimal pricing strategies

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ABSTRACT

We investigate factors that influence airline customers' purchases of premium coach seats using a database of online prices and seat map displays collected from JetBlue's website. Results show that multiple factors influence purchasing behavior; these factors include the amount of the seat fee, how far in advance the ticket is purchased, the number of passengers traveling together, and load factors (as revealed through seat map displays). We find that customers are between 2 and 3.3 times more likely to purchase premium coach seats (with extra legroom and early boarding privileges) when there are no regular coach window or aisle seats that can be reserved for free. In addition, we find that customers who purchase tickets closer to the departure date are less price-sensitive and are willing to pay higher seat fees. We use these model results to show that JetBlue's seat fees are currently underpriced in many markets; an optimal static fee would increase revenues by 8% whereas optimal time-dependent fees would increase revenues by 10.2%. In addition, if JetBlue were to leave their seat fees unchanged and instead reserve certain rows of seats for premier customers, they could potentially increase revenues by 12.8%.

1. Introduction

Over the course of the last decade, airlines have experienced numerous financial challenges, including ballooning costs and intense competition. Many of these challenges came to a head around 2008, when oil prices soared to more than $130/barrel (CNN, 2010) and the global economic crisis hit, dropping the Dow Jones market value by 33.8% (the third worst calendar year performance on record) and triggering a worldwide slowdown in economic activity, including air travel (Seeking Alpha, 2009). Many major airlines had already implemented significant cost-cutting strategies during the early 2000s as part of their bankruptcy restructuring and merger processes, limiting their ability to cut expenses, and the deep market penetration of the Internet, combined with low cost carrier competition, hindered the ability to raise fares. Consequently, "2009 proved to be the worst year on record for U.S. airlines, in terms of year-over-year revenue declines" (Southwest Airlines, 2009).

In response, many airlines sought to increase revenues without increasing fares by creating new ancillary revenue sources, such as fees for checked baggage, on-board food, and seat reservations and upgrades. These services were once bundled into the base price of a ticket, but airlines began to price them separately. In addition, airlines increased the cost of existing ancillary services, including fees for redeeming mileage award tickets, exchanging tickets, and checking pets. Moreover, rather than being a temporary solution to help get airlines through a rough year, these fees have become a permanent fixture

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of the air travel marketplace. According to the Bureau of Transportation Statistics, revenues from ancillary fees have rapidly increased in the past few years: for U.S. carriers with operating revenues over $20M, reported ancillary revenues increased 172% over five years, from $3.6B in 2007 to $9.8B in 2011 (US DOT, 2012). Similar trends are observed worldwide. A recent report sponsored by Amadeus and IdeaWorks, that represents a broader set of airlines and more comprehensive set of ancillary fees, finds that both the number of carriers reporting ancillary revenues as well as the amount of ancillary revenues have increased. In 2007, 23 airlines posted ancillary revenues of $2.45B and in 2011, 50 airlines reported revenues of $22.64B (Sorensen and Lucas, 2012).

Ancillary revenue streams are important to airlines, sometimes turning a loss-making carrier into a profitable one. This was the case for JetBlue in 2011, that reported a net profit of $86M and seat fee revenues of more than $120M (JetBlue Airways, 2011). For some carriers, ancillary revenues can represent a major portion of overall revenues. In the U.S., Spirit Air is notorious for its extremely low base fares and "optional" fees for services such as booking online or by phone, printing a boarding pass at the airport, and carrying on luggage; in 2011, Spirit earned 33.2% of its revenue from these fees. Major carriers such as United/Continental (13.9%), Alaska (14.1%), and American (8.8%) earn a notable percentage of revenue from ancillary fees (Sorensen and Lucas, 2012). Given that the margins on the ancillary services are generally quite large, these fees in many cases represent most or all of the carrier's operating profit.

Despite the prevalence and growing importance of ancillary fees, few studies have examined the direct impact these fees have had on customers' purchasing behavior, let alone the secondary effects of these fees. For example, when airlines began charging for checked baggage, the amount of carry-on luggage increased. As a result, demand for overhead bin space often exceeded what was available. This ultimately led to higher demand for seats with early boarding privileges that give customers earlier access to overhead space. Thus, it appears that by introducing new fees for checked baggage, airlines were also able to begin charging more for seats with early boarding privileges. Similarly, as aircraft load factors increase, passengers realize the probability of having an empty seat next to them drops, and the value of a premium coach seat with extra personal space increases.

Airline operators continue to search for ways to increase ancillary revenues, without negatively impacting sales of basic tickets so much as to cancel out these revenue gains. A principle avenue for achieving such increases is through making fees for ancillary products more complex and differentiating them across customer groups (e.g., by reserving premium coach seats for preferred customers).

On the other hand, customers generally dislike added fees, and in particular dislike fees that appear to be hidden, arbitrary, or unfair. From the regulatory perspective, agencies want to ensure that fees are displayed in a way that is easy for consumers to understand. One issue that is of particular concern is whether the airline practice of reserving seats for preferred customers (i.e., showing certain seats as unavailable for non-preferred customers without elite status in an airline's frequent flier program and/or showing certain seats as unavailable for those customers who do not purchase tickets for higher yield fare classes) effectively "tricks" some customers into thinking a plane is full when in fact it is not, leading customers to buy an upgraded premium coach seat. However, answering this question is difficult, not only for regulatory agencies but also for the airlines themselves, because the majority of airlines only keep records of the customers' final seat assignment. Without more extensive data on the allocation of seat assignments across the entire booking horizon, it is difficult to recreate seat map displays shown to customers at the time of booking (i.e., it is difficult to know what seat choices the customer had at the time of booking). Airlines could certainly collect this information directly, but would need to make major investments in technology infrastructure to do so, and they are unlikely to make such an investment unless they have a high level of confidence that they will receive a decent return on their investment. Regulatory agencies also do not have access to proprietary carrier data, and would need to conduct independent investigations into this issue using publically available data or stated preference surveys.

Our study contributes to the literature on ancillary fees by providing some of the first insights into the role of load factors and seat map displays on customers' premium coach seat purchases. We investigate airline customers' seat purchasing behavior using a database of revealed preference data that includes online prices and seat maps from JetBlue's website. This data is used to investigate the probabilities that customers will pay between $15 and $65 to reserve a premium coach seat that includes extra legroom and early boarding privileges. By tracking seat maps and prices across the booking horizon, the JetBlue data provides the ability to estimate binary logit models of seat choice, which can be used to understand how demand for its premium coach seat product varies across the booking horizon, across markets, and as a function of load factors (as revealed through seat map displays).

The rest of this paper is organized as follows: Section 2 provides additional background context on premium coach seat fees. Sections 3 and 4 provide an overview of the data and modeling methodology. Section 5 presents results and Section 6 uses model results to assess different pricing and seat display policies. The paper concludes with a discussion of major findings.

2. Premium coach seat fees

One of the more common types of ancillary fees is a premium coach seat fee, which is charged to customers wanting to reserve a "good" seat on the aircraft. As of 2013, all mainline carriers in the U.S. with annual operating revenues exceeding