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## Are the bankrupt skies the friendliest? ☆

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## ABSTRACT

We use data from the US airline industry to investigate whether firms that are under bankruptcy protection, as well as these firm's product market rivals, change the quality of the products they offer. We measure the quality of the services offered by a carrier using flight cancellations and delays, and the age of the aircraft used by the carrier. We find that delays and cancellations are less frequent during bankruptcy filings but return to their pre-bankruptcy levels once the bankrupt firm emerges from bankruptcy. We also find that firms use Chapter 11 filings to permanently reduce the age of their fleet. We do not find evidence of statistically and economically significant changes by the airline's competitors along any of the dimensions above.

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## 1. Introduction

Partly fueled by the deteriorating credit conditions resulting from the financial turmoil that began in 2007, corporate bankruptcies in the last few years have soared. The Administrative Office of the U.S. Courts reports 12,863 Chapter 11 filings for the year ending June 30, 2009, up about 94% from the previous year when 6513 business filed for bankruptcy protection.<sup>2</sup> Attention has traditionally centered on the direct costs of bankruptcy proceedings, such as legal and administrative expenses, as well as their indirect costs, such as lost sales.<sup>3</sup> Much of the current discussion involves the effect of bankruptcy on the firm's employees who might be laid off, on the firm's suppliers who might face reduced demand, and on consumers of the bankrupt firm

☆ This paper belongs to a line of research on product market competition and bankruptcy. We benefitted from comments received in the 2010 Western Finance Association Meetings in Victoria. We also benefitted from discussions with Hector Almeida, Ken Ayotte, Murillo Campello, Mike Gallmeyer, Rick Green, Barton Hamilton, Oliver Richard, David Robinson, Patrik Sandas, David C. Smith, Andrew Sweeting, and William Wilhelm. Lynn LoPucki generously shared his Bankruptcy Research Database. Schenone gratefully acknowledges financial support from the Pettit-DeMong and the Walker Fund Fellowship from the McIntire School. Evan Kwiatkowski and Huiping Cheng provided outstanding research assistance. All remaining errors are our own.

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<sup>2</sup> Firms filing for bankruptcy protection belong to a wide range of industries, from Lehman Brothers to the Tribune Group in July and December, 2008 respectively, and Chrysler and GM in April and June 2009, respectively.

<sup>3</sup> Franks and Torous (1989), Thorburn (2000), Bris et al. (2006), Hennesy and Whited (2007), Bebchuk (2002).

who face a lower quality product or a reduction in the variety of the products offered by the bankrupt firm. Still, there is no systematic evidence showing whether or not product market *quality* changes during and after bankruptcy.<sup>4</sup>

We use data from the US airline industry to investigate the effect of Chapter 11 filings on the quality of the products that firms offer during a bankruptcy filing and after the firm emerges from bankruptcy protection. Using a single industry allows us to examine how bankruptcy filings affect the quality of the products while abstracting from potentially confounding unobserved differences across different industries. Thus, our analysis is in the same spirit as Chevalier (1995a,b), who studies the relationship between leverage buyouts and the pricing behavior of firms and their rivals using cross-section data from the US supermarket industry.

Several features of the airline industry make it particularly appealing to address the question of this paper. First, and foremost, there are clear and objective ways to define measures of product quality: flight cancelations, flight delays, and aircraft age, as well as oversold seats, and lost and mishandled baggage.<sup>5</sup> Second, there have been several bankruptcy filings in the industry over the last ten years by firms that interact with different carriers in distinct markets, and over different years. This allows us to identify the effects of bankruptcy on product quality, independent of potentially confounding market, firm, and time effects. Finally, the airline industry is an oligopoly, and hence we should expect competitors to react strategically to the choices made by bankrupt firms in the markets where these firms interact. Competitors might attempt to displace the bankrupt firm and capture the distressed firm's market share by improving product quality. However, non-bankrupt firms do not enjoy the concessions that bankruptcy grants the insolvent firm, for example, in terms of lease and labor contract renegotiations and rejections. Thus, these firms are limited in the way in which they can reorganize their business plan to respond to changes adopted by the bankrupt firm.

A non trivial part of restructuring is changing the real day-to-day operations. This in turn, has implications for the product market where the firm works. Product market effects include two distinct but related issues. First, does the bankrupt firm alter the quality of the products it offers during and after emerging from bankruptcy? Product quality is an implicit contract between customers and the firm (Maksimovic and Titman 1991), and it is one susceptible to unilateral change by the insolvent firm, as it might lower the quality to reduce costs and hence increase revenue. A second related question is whether the distressed firm will change the quantity and variety of products offered: Which operations and products will the firm continue to offer and which ones will it shed? Consistent with this quantity choice, at what price will the firm sell these products? In bankruptcy the insolvent firm can reject leases and labor contracts, granting the firm a larger leeway to modify its price and quantity business strategy, by shedding products and reducing services. This is the price and quantity question.

In this paper, we concentrate exclusively on the first question: The effects of bankruptcy on product market quality, as captured by flight cancelations, arrival delays, and age of aircrafts. We further discuss and present some evidence using baggage lost and oversold seats in a flight. Ours is the first paper to address the product-market quality implications of bankruptcy. In a companion paper, we focus exclusively on the second question and study the effects of bankruptcy filings on airline network structure, capacity choices, and ticket prices, and report that bankrupt airlines downsize their national route structure as well as their airport-specific networks; and that bankrupt airlines reduce their route-specific flight frequency and capacity. Consistently, prices are not significantly lower after bankruptcy. When dealing with quality changes, in particular arrival delays and flight cancelations, we control for the number of departed flights within markets and time period, since, as our companion paper shows, capacity shrinks during bankruptcy and this could impact delays and cancelations.

We acknowledge that changes in product market competition (both price-quantity and quality) might pre-date the actual filing, creating a potential endogeneity concern. As will be made clear in the econometric section, we deal with this following Ashenfelter (1978).

We find that an insolvent firm decreases the percent of canceled flights by 8% while it operates under protection, and increases it by 3% after emerging from bankruptcy, both numbers relative to pre-bankruptcy levels. The percentage of flights with at least a 15 min delay upon arrival drops by 9% while the carrier operates under bankruptcy protection, but returns to the pre-bankruptcy levels once the carrier emerges from bankruptcy. The age of the fleet (in years since delivery of the make/model), flown by the insolvent firm, drops 9% while the carrier operates under protection, and remains lower after the carrier emerges from protection. Overall, these results show that a firm operating in bankruptcy might be able to improve the quality of its services only temporarily and while the firm operates under bankruptcy. Once the firm emerges, the quality of daily operations returns to their pre-bankruptcy levels. The only change that appears permanent concerns the one stemming from an investment in fixed assets, the renovation of the fleet.

<sup>4</sup> For example, there is anecdotal evidence that during financial distress firms lower product quality to reduce production costs and increase profit margins. A famous case is that of Beech-Nut baby food products. By 1977, the company was struggling financially. At this point the firm started buying inputs from a new apple concentrate supplier, Universal Juice Co. This supplier sold its product at up to 25% below the market price. In 1979 the firm was bought by Nestle. By mid 1980, concerns were raised by research scientists suggesting that the apple juice concentrate supplied by Universal Juice Co. was adulterated. However, the new management dismissed those concerns and continued buying from Universal Juice Co. The FDA begun an investigation which revealed that the product that Beech-Nut was then marketing as 100% apple juice was actually made from beet sugar, cane sugar syrup, corn syrup and other ingredients, with little if any apple juice in the mixture. In November 1986, a federal grand jury indicted Beech-Nut and its top two executives. Prosecutors claimed that the bogus apple juice cost about 20% less to make than real apple juice. See The New York Times, November 14, 1987 and New York Times, October 31, 1993. For a brief history of Beech-Nut, see <http://www.fundinguniverse.com/company-histories/BeechNut-Nutrition-Corporation-Company-History.html>.

<sup>5</sup> We also considered baggage lost, mishandled, and/or pilfered, and oversold seats, as measures of an airline's quality of service. However, for these measures, the data available from the data is not market specific, but only carrier and year-quarter (or year-month) specific. Since the variation across markets is lost, it is not possible to identify the effect of oversales or lost baggages from confounding market effects (e.g., luggages are more likely to be lost in smaller/larger markets, etc.).

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