



# Bankruptcy and product-market competition: Evidence from the airline industry<sup>☆</sup>

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## ABSTRACT

We investigate the effects of Chapter 11 bankruptcy filings on product market competition using data from the US airline industry. We find: i) bankrupt airlines permanently downsize their national route structure, their airport-specific networks, and their route-specific flight frequency and capacity; ii) bankrupt airlines lower their route-specific prices while under bankruptcy protection, and increase them after emerging. We do not find robust evidence of significant changes by the bankrupt airline's competitors along any of the dimensions above.

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## 1. Introduction

In the past few years thousands of firms have filed for bankruptcy protection under Chapter 11 of the United States Bankruptcy Law.<sup>2</sup> Firms filing for bankruptcy protection belong to a wide range of industries, from Lehman Brothers to Chrysler and GM.<sup>3</sup> The unprecedented

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<sup>2</sup> There have also been an outstanding number of personal bankruptcy filings. See White (2007) for more on this.

<sup>3</sup> Lehman Brothers filed in July 2008. Chrysler and GM filed in April and June 2009, respectively.

number of filings has led to a renewed interest in the economics of bankruptcy. Most of the previous work has examined the direct costs of bankruptcy proceedings, such as legal and administrative expenses, as well as their indirect costs, such as lost sales (Bebchuk, 2002; Bris et al., 2006; Franks and Torous, 1989; Hennesy and Whited, 2007; Thorburn, 2000).<sup>4</sup> There is also work on the effects of bankruptcy on firm survival (Hotchkiss, 1995), on equity returns (Jorion and Zhang, 2009), and on innovation (Acharya and Subramanian, 2009). Nonetheless, there is surprisingly little work on the effects of bankruptcy filings on product market competition.

This paper uses data from the US airline industry to investigate the effect of Chapter 11 filings on prices, capacity choices, and networks. These data are from one single industry for which we have data from a cross-section of local markets. This allows an examination of how bankruptcy filings affect the strategic decisions of firms, holding industry fixed. In this sense, our approach is in the same spirit as Chevalier (1995a, 1995b), who uncovers basic stylized patterns in the relationship between leverage buyouts and the pricing behavior of firms and their rivals using cross-section data from the US supermarket industry.

The airline industry provides an interesting empirical framework for several additional reasons. First, air transport is arguably the most important means of transportation in the US. Second, the airlines seeking

<sup>4</sup> See also the early work by White (1982). Recently, there has been extended research comparing auctions against a reorganization-based bankruptcy system such as Chapter 11. See Hotchkiss and Mooradian (2003) and Eckbo and Thorburn (2009).

bankruptcy protection form a heterogeneous group, including low cost carriers such as ATA, and national carriers such as United and USAir. The range of variation in the identities of the bankrupt airlines ensures that our empirical analysis provides insights on other industries as well. Third, because it is one industry where carriers interact over many distinct markets and over time, we can identify the effects of bankruptcy on product market competition, independent of potentially confounding market, firm, and time effects. Finally, because there are bankrupt and non-bankrupt carriers serving the same market, we can investigate different carriers' price reactions to one carrier's bankruptcy.

We start our analysis by looking at how bankruptcy filings affect the network of the bankrupt carrier and of its rivals. We find that at the US national level, the bankrupt carrier permanently drops approximately 25% of its pre-bankruptcy routes. We also look at airport specific networks. Not surprisingly, we find similar results. The bankrupt carrier reduces its average number of markets out of an airport by 26% while under bankruptcy protection, and by 24 after its emergence from Chapter 11 relative to its pre-bankruptcy numbers. Its rivals increase the average number of markets they serve at the US national level, but this result is not very robust across specifications and we do not confirm it when we look at changes in the number of markets out of airports. Next, we investigate how bankruptcy filings affect the flight frequency and capacity decisions. We find that the bankrupt firm lowers by 21% the average frequency of flights within a route while operating under court protection, and by 32.8% once the carrier emerges from bankruptcy. We also find that bankruptcy filings have an equally significant effect on the bankrupt's average capacity (measured by seats in a route) both during and following a bankruptcy filing. We do not find robust evidence of any significant changes by the bankrupt airline's competitors along any of the dimensions above. We conclude our analysis with a study of the effects of bankruptcy filings on airline market mean prices. We find that the insolvent carrier's price drops by 3.1% while under bankruptcy protection, and increases by almost 5% after emerging, both of these numbers relative to pre-bankruptcy prices. Again, we do not find evidence of any significant changes by the bankrupt airline's competitors along any of the dimensions above.

This article contributes to the sparse empirical literature on product-market competition and bankruptcy. Borenstein and Rose (1995, 2003) also study the relationship between bankruptcy filings and product-market competition.<sup>5</sup> In looking at the effect on prices and on frequency, they find that in the quarter during which a carrier files for Chapter 11 protection, the number of flights at the airports where the bankrupt carrier operates declines by about 20% relative to the pre-bankruptcy level. Borenstein and Rose (1995) do not find any systematic evidence that either bankrupt firms or their competitors changed prices after a bankrupt firm's Chapter 11 filing. Mainly, our analysis differs from theirs along four dimensions. First, we look at multiple strategic decisions (airport and national network structure, capacity choices, prices). Thus, we can provide a unified framework to understand the effect of bankruptcy filings. Instead, Borenstein and Rose (1995, 2003) limited their analysis just to changes in prices and in number of markets out of airports. We show that the most important changes concern capacity choices in the markets that airlines continue to serve and the size of the network served by the bankrupt airline after exiting from bankruptcy. Second, we investigate the effects during and after a competitor's bankruptcy filing. The post-emergence analysis adds to our understanding of what the 'permanent' changes are in the

set of services offered following a firm's bankruptcy filing. This conforms to the notion that the main purpose of bankruptcy filings should be to allow firms time to reorganize themselves and that the evaluation of the economic success of a bankruptcy filing should be made after the firm's exit from bankruptcy. Third, we show that the effects are fundamentally different for the bankrupt firms and their rivals. In contrast, Borenstein and Rose (1995, 2003) estimate the average effect across both filing and non-filing carriers, and therefore they do not identify the effect on the filing carrier separately from that on its competitors. This is important because bankruptcies do not only affect the bankrupt firm but also its competitors. It is quite emblematic that all the legacy carriers in the United States have now filed at least once for Chapter 11. Fourth, we include specifications that control for such unobserved heterogeneity using route-carrier fixed effects, since it is likely that there are heterogeneous route-carrier unobservables that might confound the results in Borenstein and Rose (1995, 2003). Including route-carrier fixed effects rather than just carrier fixed effects and route fixed effects has been shown to be of fundamental importance in empirical studies of the airline industry.<sup>6</sup>

This work is also related to a growing theoretical literature that examines whether a firm's capital structure impacts competition in the market for the firm's products. This literature focuses on how financial distress impacts the competitive interaction of distressed and non-distressed firms in an industry (Bolton and Scharfstein, 1990; Brander and Lewis, 1986; Dasgupta and Titman, 1998; Hendel, 1996). Several empirical papers followed providing evidence of the interaction between financial distress and product market competition (Bhagat et al., 2005; Bolton and Scharfstein, 1990; Campello, 2006; Chevalier, 1995a, 1995b; Chevalier and Scharfstein, 1995, 1996; Kovenock and Phillips, 1997; Phillips, 1995), and between bankruptcy filings and stock market performance (Ferris et al., 1997). Within this literature, the closest paper to ours is Chevalier (1995a). Our paper differs from hers along one important dimension: we have data on the individual price of the firms, while Chevalier only has data on the average price in a market. This additional information is of crucial importance in our empirical analysis since we do not find evidence of almost any reaction by the rivals of firm that files for Chapter 11 protection.

## 2. Bankruptcies in the airline industry

Several factors that can alter the competitive interaction between firms in an industry come into play when one of the firms reorganizes under Chapter 11.<sup>7</sup> First, the bankrupt firm faces cost shocks inherent to operating under court protection, such as the ability to renege and renegotiate contracts. Furthermore, the bankrupt firm faces demand shocks that can result in reduced demand for its products, as in Opler and Titman (1994). Finally, reorganization might entail changes in the firm's product quality (see Maksimovic and Titman, 1991),

<sup>5</sup> Kristopher and Shapiro (2009) analyzed the effects of competition on price dispersion in the airline industry, using panel data from 1993:Q1 through 2006:Q3 and showed that their results contrasted with those of Borenstein and Rose (1994), who found that price dispersion increased with competition. Kristopher and Shapiro presented evidence that the different results in Borenstein and Rose (1994) and Kristopher and Shapiro (2009) were reconciled by showing that not including route fixed effects would not be enough to control from omitted-variable bias.

<sup>7</sup> The United States Bankruptcy Code contemplates two alternative solutions for firms in financial distress filing for court protection: Chapter 7 and Chapter 11. Chapter 7, entitled Liquidation, allows for an orderly, court-supervised procedure by which a trustee collects the assets of the firm, reduces them to cash, and makes distributions to creditors subject to the debtor's right to retain certain exempt property and to the rights of secured creditors. Chapter 11, entitled Reorganization, allows the bankrupt firm to continue operating while the firm's management restructures the firm's business. Firms that file for Chapter 11 are those deemed a viable ongoing concern which can potentially repay creditors through a court-approved reorganization plan. We focus on Chapter 11 filings and drop firms filing under Chapter 7 because we are interested in the competitive and strategic effect triggered by a firm in the market that operates under bankruptcy protection, and firms filing for Chapter 7 stop operations and liquidate their assets.

<sup>5</sup> In addition to the differences discussed in the body of the article, our analysis differs from theirs along two other dimensions. First, it is likely that there are heterogeneous route-carrier unobservables that might confound the results in Borenstein and Rose (2003). We control for this using route-carrier fixed effects. Second, bankruptcy categorical variables might proxy for the changes in the services that the (bankrupt and non-bankrupt) firms provided even when no carrier was operating under bankruptcy protection. We include carrier specific dummies in order to avoid confounding the bankruptcy effects with the carrier-specific effects.

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