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Bankruptcy and Pricing Behavior in U.S. Airline Markets

By SEVERIN BORENSTEIN AND NANCY L. ROSE*

Modern economics has generated many theories of the ways in which a firm's financial condition may affect its conduct in the product market. Although some of these imply that a company constrained by capital structure or financial distress will compete less aggressively, managers often argue that firms in financial trouble have "nothing to lose" and will slash prices to "generate cash." Perhaps nowhere has this view been repeated more often than in the airline industry. Executives at major carriers as well as a special government commission on the industry's financial woes have argued that financially weak airlines, and especially those under Chapter 11 bankruptcy protection, have cut prices and harmed the financial health of the industry.

There are a variety of channels through which financial distress, and bankruptcy in particular, might influence pricing decisions by the affected firms or their rivals. First, filing for bankruptcy protection may directly alter costs or demand. If bankrupt carriers are able to lower their marginal costs through abrogation of existing labor and equipment lease contracts or if passengers perceive a bankrupt carrier to offer lower-quality service and consequently reduce their demand for its flights, filing for bankruptcy may lower a carrier's preferred price on a route. Competing airlines may choose to respond by lowering or raising prices, depending on how the bankruptcy

affects their residual demand. Second, bankruptcy may lead an airline to discount future revenues more heavily. This could raise prices, as in models with consumer switching costs, where low current prices can be viewed as an investment in future market share; or it could reduce prices, as in collusion models, where increases in discount rates may lead to deviations from cooperative pricing behavior. Third, bankruptcy may alter the strategic position of the firm, committing it to more aggressive competition (e.g., by inducing a preference for greater risk) or less aggressive competition (e.g., by increasing liquidity constraints or otherwise constraining managerial actions). Finally, bankruptcy may invite predatory behavior from financially healthy rivals by limiting the ability of the bankrupt firm to finance a costly price war.

Despite considerable theoretical work, there have been few empirical tests of financial or capital-structure effects on product-market behavior (see Judith Chevalier [1995] and the papers in this session for examples). This study contributes to the empirical evidence by reporting the effect of bankruptcy announcements on pricing behavior in the U.S. airline industry. We use data from the seven Chapter 11 bankruptcy filings by large U.S. air carriers between 1989 and 1992: Eastern (March 1989), Braniff (September 1989), Continental (December 1990), Pan Am (January 1991), Midway (March 1991), America West (June 1991), and TWA (January 1992). We focus primarily on the four largest of these, defined by the number of affected domestic routes: Eastern, Continental, America West, and TWA. We find little evidence that bankruptcy per se affects an airline's pricing behavior, although financial distress that culminates in a bankruptcy filing appears to be associated with somewhat lower prices. Among these four major bankruptcies, only

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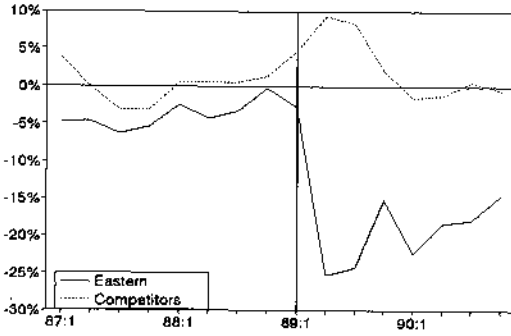


FIGURE 1. EASTERN AND COMPETITOR PRICES

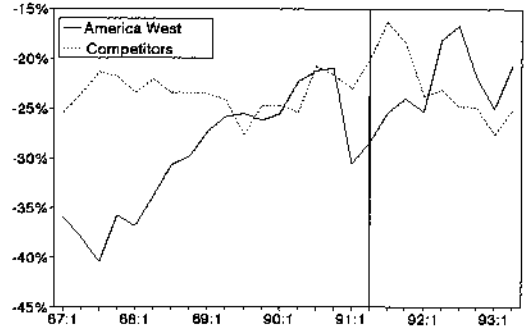


FIGURE 3. AMERICA WEST AND COMPETITOR PRICES

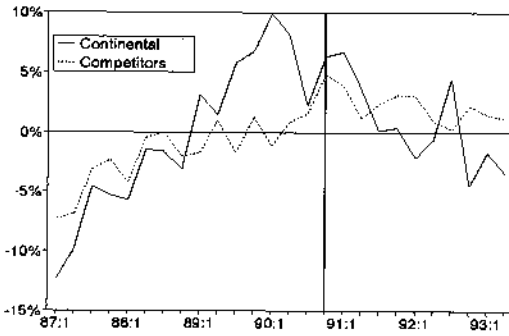


FIGURE 2. CONTINENTAL AND COMPETITOR PRICES

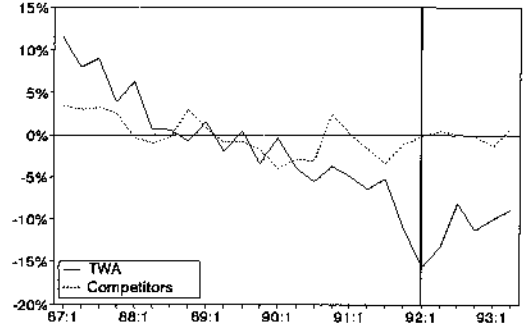


FIGURE 4. TWA AND COMPETITOR PRICES

Eastern appears to have lowered prices significantly subsequent to filing for Chapter 11 status. This change also may incorporate lingering effects of the Eastern strike that virtually shut down the airline for the second quarter of 1989 and lasted for more than a year. We find no evidence that carriers competing with bankrupt airlines cut their prices on overlapping routes following a bankruptcy filing, even for the Eastern bankruptcy.

Our analysis is based on fares on domestic routes recorded in the Department of Transportation's 10-percent ticket sample (Databank 1A) for the 26 quarters from 1987:1 through 1993:2.¹ We first detail the

pricing behavior of bankrupt airlines and their rivals for each of the four major bankruptcy events. Regression analysis of price changes for the full set of bankruptcy announcements follows.

I. Pricing Behavior for Major Bankruptcy Events

Figures 1-4 present price trends around the four major airline bankruptcies. For each quarter, we compare the airline's sampled ticket prices to the average price for all domestic tickets on routes in the same 100-mile distance block. A value of zero for this "normalized price" reflects fares equal to the distance-adjusted overall domestic average price. The solid line in each figure traces the normalized price for the bankrupt carrier; the dashed line traces the normalized

¹Data-set construction is similar to that described in Borenstein and Rose (1994).

price averaged across all nonbankrupt competitors on the same routes. The bold vertical line indicates the quarter in which the bankruptcy filing occurred.

Looking first at the effect of a bankruptcy filing on an airline's own pricing behavior, we note that only Eastern exhibits a marked change in pricing patterns subsequent to its bankruptcy filing. Prior to its March 1989 bankruptcy announcement, Eastern's normalized prices were stable at about 5-percent less than industry averages. The decline in its prices subsequent to bankruptcy, and contemporaneous with the labor strike, was large (dropping 10-20 percent compared to industry average fares) and apparently permanent. This stands in sharp contrast to the three other major bankruptcies we analyze. Continental, America West, and TWA all appear to have reduced fares relative to previous trends about six months before their bankruptcy filings; these returned to trend within six months for TWA, and within a year for America West. Continental fares continued to decline relative to industry average fares through the end of our sample period. Apart from Eastern, these figures provide little evidence of permanent price changes induced by the bankruptcy filing and suggest that financial distress rather than bankruptcy per se may be responsible for observed changes in an airline's price preferences.²

The dashed lines representing competitor responses to bankrupt airlines do not support the contention that bankrupt airlines have forced down the prices of other carriers. For all four bankruptcy events, competitors raised normalized prices in the quarter when their rival declared bankruptcy; in three of the four cases competitors' prices increased further in the quarter after the bankruptcy filing.

²Bankruptcy filing is itself endogenous, an issue we do not address in this analysis. Lower fares preceding bankruptcy filings may reflect some exogenous shock that contributes to financial decline or may themselves precipitate the bankruptcy filing. Neither of these effects, however, is likely to lead to positive estimated price changes by rivals.

TABLE 1—AVERAGE PRICE CHANGES OF AIRLINES ENTERING CHAPTER 11 BANKRUPTCY

Variable	Airline			
	Eastern	Continental	America West	TWA
Relative price at $t-2$	-0.009 [744]	+0.089 [679]	-0.306 [284]	-0.054 [419]
Change, $t-2$ to $t-1$	+0.031 (0.004) [665]	-0.050 (0.004) [674]	-0.118 (0.009) [278]	-0.043 (0.005) [416]
Change, $t-2$ to t	+0.017 (0.005) [593]	-0.065 (0.005) [657]	-0.037 (0.009) [259]	-0.053 (0.008) [412]
Change, $t-2$ to $t+1$	-0.223 (0.041) [22]	+0.002 (0.007) [659]	+0.034 (0.010) [257]	-0.043 (0.010) [407]
Change, $t-2$ to $t+2$	-0.169 (0.007) [564]	-0.012 (0.006) [657]	+0.048 (0.015) [241]	-0.000 (0.011) [380]

Notes: Standard errors of the averages are given in parentheses. The number of markets are reported in brackets.

Since airlines may change the mix of routes they serve, we next calculate a same-route comparison of the distance-adjusted normalized prices. Table 1 reports these results for the bankrupt airlines.³ The first row indicates the level of normalized prices two quarters before the bankruptcy filing; as in the figures, a value of zero reflects average distance-adjusted prices equal to the overall industry average. Rows 2-5 record changes relative to this benchmark over the next year. The number of routes used in each price calculation are bracketed; these tend to decline as bankrupt carriers exit routes completely or drop below the 5-percent route-share threshold used in our analysis. Although the data suggest that Eastern substantially lowered its prices following its bankruptcy filing, this is not true of the three other major bankruptcies. Continental, America West, and TWA prices appear to have declined prior to bankruptcy, but the declines were largely offset by relative

³To focus on significant routes for the bankrupt carrier, Tables 1-3 analyze routes on which the bankrupt carrier has a minimum 10-percent share two quarters before the bankruptcy. Carriers are considered to be active on these routes whenever they have a minimum 5-percent share.

TABLE 2—AVERAGE PRICE CHANGES OF COMPETITORS OF CHAPTER 11 AIRLINES

Variable	Competitors of:			
	Eastern	Continental	America West	TWA
Relative price at $t-2$	+0.021 [739]	+0.009 [645]	-0.363 [261]	-0.067 [403]
Change, $t-2$ to $t-1$	+0.001 (0.003) [658]	+0.010 (0.003) [633]	-0.129 (0.015) [251]	+0.015 (0.004) [399]
Change, $t-2$ to t	+0.027 (0.004) [586]	-0.009 (0.005) [608]	-0.018 (0.009) [228]	+0.043 (0.008) [392]
Change, $t-2$ to $t+1$	-0.020 (0.023) [21]	+0.024 (0.007) [608]	+0.057 (0.010) [222]	+0.007 (0.007) [387]
Change, $t-2$ to $t+2$	+0.071 (0.005) [561]	+0.006 (0.007) [602]	+0.020 (0.010) [207]	+0.005 (0.009) [359]

Notes: Standard errors of the averages are given in parentheses. The numbers of markets are reported in brackets.

price increases in later quarters (more than offset for America West).

Table 2 presents the same analysis for rivals of each bankrupt airline. Routes in this table are a subset of those in Table 1, since the bankrupt carrier has no significant (5-percent minimum share) competitor on some of its routes. Overall, competitors' prices show little tendency to decline subsequent to bankruptcy, although America West's rivals (of which Southwest Airlines probably is most significant) appear to have matched its pre-bankruptcy price cuts. Within two quarters following each bankruptcy, competitors' prices are at least as high or higher than they were in the two quarters preceding the bankruptcy filing. As in the earlier figures, the evidence does not support the claim that bankrupt airlines have forced competitors to lower their prices.

Finally, we explore whether price responses differ across competitors. Models of predatory behavior, for example, suggest that financially healthy ("deep-pocket") carriers are more likely to undertake aggressive pricing against weaker rivals. Furthermore, executives at some airlines have been more outspoken than others in blaming the industry's financial difficulties on the behavior of airlines under Chapter 11 protection. Table

TABLE 3—AVERAGE PRICE CHANGES OF INDIVIDUAL COMPETITORS OVER A $[-2, +2]$ WINDOW

Competitor	Bankrupt airline			
	Eastern	Continental	America West	TWA
American	+0.090 (0.015) [205]	+0.037 (0.009) [421]	-0.051 (0.012) [119]	+0.027 (0.014) [294]
Delta	+0.068 (0.005) [452]	+0.046 (0.009) [327]	+0.063 (0.021) [98]	+0.011 (0.012) [181]
Northwest	+0.105 (0.023) [71]	-0.018 (0.021) [114]	+0.368 (0.035) [30]	+0.007 (0.025) [123]
Southwest	-0.438 — [1]	-0.028 (0.019) [68]	+0.012 (0.011) [44]	+0.045 (0.026) [32]
United	-0.014 (0.019) [48]	-0.082 (0.009) [252]	-0.039 (0.013) [120]	+0.019 (0.014) [184]
USAir	+0.112 (0.012) [89]	+0.072 (0.014) [134]	+0.020 (0.041) [19]	+0.035 (0.022) [88]

Notes: Standard errors of the averages are given in parentheses. The numbers of markets are reported in brackets.

3 reproduces the analysis of Table 2 for the six largest nonbankrupt airlines. American Airlines, probably the most vocal critic of airlines operating under Chapter 11 protection, has raised its postbankruptcy prices relative to industry norms in three of the four bankruptcies, the three cases in which American overlapped on the most routes. USAir, the financially weakest of the major airlines that have not sought Chapter 11 protection, raised its prices in response to all four bankruptcies, although the average increase is significant in only one of the four cases. Overall, there is no apparent relationship between financial health and price responses.

II. Econometric Analysis of Bankruptcy Effects on Airline Prices

In this section, we report results from an econometric model of airline prices that estimates bankruptcy effects using data on all seven bankruptcy filings. We model the quarter-to-quarter change in log price for an airline on a route as a function of current and one-period-lagged changes in the

passenger-based Herfindahl index (to control for changes in market structure), lagged changes in the log-price variable (to control for the substantial negative serial correlation in price changes), fixed time effects for each quarter, and a set of bankruptcy measures described below. The model implicitly assumes that exogenous changes in the remaining variables typically included in cross-sectional models of airline price levels, such as airport congestion, market density, network interconnectedness, and airport dominance, are sufficiently small that they can be excluded from the specification.

We include two sets of indicator variables designed to capture the effects of impending or recently declared Chapter 11 bankruptcy on route prices. The first set measures the average change in price for a bankrupt airline; the second measures the average change in price for nonbankrupt airlines on routes with a near-bankrupt or bankrupt competitor. We scale these variables so that their coefficients reflect price changes over four three-month periods: 90–180 days and 0–90 days before a bankruptcy filing, and 0–90 days and 90–180 days after a bankruptcy filing. The sum of the price changes over these four periods indicates the net change in price during the window beginning six months before and ending six months after the date of Chapter 11 filing. None of the airlines in our sample exited Chapter 11 during our observation period, although bankrupt airlines do exit routes.

This model is estimated by unweighted ordinary least squares using the 1,777 routes for which we observed at least 300 passengers during each quarter from 1988:1 through 1992:4. Due to space limitations, Table 4 reports results only for the bankruptcy variables. The standard errors are adjusted for heteroscedasticity and contemporaneous correlation of residuals across carriers on the same route.

The data suggest that airlines that file for bankruptcy protection cut their prices 90–180 days before filing for Chapter 11 status by an average of 5.6 percent, and maintain this lower price level over the subsequent nine months. As in the earlier

TABLE 4—REGRESSION ANALYSIS OF PRICE RESPONSES TO BANKRUPTCY

Period	Bankrupt airline	Competitors
90–180 days before Chapter 11	–0.056 (0.005)	–0.020 (0.004)
0–90 days before Chapter 11	–0.004 (0.006)	+0.019 (0.005)
0–90 days after Chapter 11	–0.004 (0.007)	+0.008 (0.006)
90–180 days after Chapter 11	+0.008 (0.006)	+0.004 (0.005)
Change over [–180, +180]-day window	–0.055 (0.010)	+0.011 (0.003)

Notes: Number of observations = 63,671; $R^2 = 0.36$. Huber-adjusted standard errors are given in parentheses. The model includes quarter fixed effects, lagged price change, and current and lagged change in the Herfindahl index. Observations include all carrier routes with at least 10-percent route share.

tables, there is no indication of substantial changes in pricing behavior following the bankruptcy filing. Competitors exhibit little price response to the filing. The results suggest modest declines by competitors when the to-be-bankrupt carrier cuts its prices, but this appears to be more than offset by price increases over the subsequent months. The net change in prices over the year-long window around the bankruptcy announcement is –5.5 percent for the bankrupt carrier and +1.1 percent for its competitors, both statistically different from zero (at the 1-percent level).

III. Conclusion

In the airline industry, many participants and observers have said that firms under Chapter 11 bankruptcy protection tend to price in a manner destructive to their competitors as well as themselves. Our analysis indicates that airlines on average reduce their prices by 5–6 percent prior to a bankruptcy filing, but do not further cut fares subsequent to entering Chapter 11 bankruptcy. This behavior may be neither myopic nor destructive, but rather a rational business response to reduced demand experienced by an airline known to be in finan-

cial distress. Such an interpretation is supported by the evidence that competitors maintain or increase their average fares in response to price-cutting by bankrupt airlines, and by our calculations (not reported here due to space constraints) that bankrupt airlines experience statistically significant declines in market share on routes they continue to serve, despite their lower average fares. The impact of financial distress more generally on airline prices and quantities is the subject of our ongoing research.

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