

**THE IMPACT OF FIRM FINANCIAL CONDITION ON AIR FARES –
A CONTINGENCY APPROACH**

By

Christian Hofer

Robert H. Smith School of Business
University of Maryland
2318 Van Munching Hall
College Park, MD
20742

chofer@rhmsith.umd.edu
301-345 5038

Abstract

This research reviews and reconciles previous research on the relationship between airline financial condition and air fares. A contingency framework is developed and empirically tested using data from the U.S. airline industry. The results suggest that the magnitude of the effect of financial condition on prices depends on airline characteristics such as operating costs and market power as well as on competitive characteristics like market concentration and a firm's financial condition relative to its route market competitors. It is further shown that this effect is substantially larger for firms operating under Chapter 11 protection than for firms approaching bankruptcy.

1. Introduction

The question of how a firm's financial condition and its prices may be related has been investigated from multiple perspectives. Researchers from the economics, corporate finance, and strategy fields have published a substantial amount of literature on this and related issues. Yet, in summary, the findings have been largely inconclusive, not only across but also within the respective research streams. Different theories suggest different effects of firm financial condition on prices, and empirical research has found only limited, at times ambiguous support for any single theoretical contention. In this article, I not only draw on various theories from the economics, corporate finance and strategic management fields to investigate the present research question, but also attempt to reconcile the apparent conflict by adopting a strategic contingency perspective that identifies in which way and under what conditions airline financial distress may impact air fares. This article reports a comprehensive effort to investigate the impact of airline financial condition on air fares in great theoretical and empirical detail. There are, in fact, multiple theoretical perspectives and contingencies that may partly explain the variability of a troubled firm's pricing behavior. Focusing on competitive actions in general, Ferrier et al (2002) have presented a first attempt to reconcile these conflicting views. They stress the importance of context-specific contingencies such as industry growth and concentration, as well as top management team heterogeneity in defining the relationship between performance distress and competitive behavior. The strategy literature offers rich insights into the contingencies that may moderate this relationship. This research builds on the work of Ferrier et al in drawing on a broad theoretical basis, but extends the extant body of knowledge in three respects: First, price is used as a criterion variable. None of the studies published in strategic management journals examine the impact of financial condition on prices. Yet, price is probably the single most important and relevant measure of competitive behavior. Using price as a dependent variable rather than categorical variables such as number and type of competitive actions also allows for a more detailed evaluation of the *magnitude* of a firm's reaction to changes in its financial condition. A second contribution lies in examining financial condition in more detail than has been done before.

While some studies focus on bankruptcy filings (e.g. Borenstein and Rose, 1995), others use measures such as Altman's Z score (Altman, 1968) to evaluate a firm's financial situation (e.g. Ferrier et al, 2002). There is, however, substantial evidence that financial distress may differentially impact firm behavior before, during, and after a Chapter 11 filing occurs (Borenstein and Rose, 1995; Kennedy, 2000; Busse, 2002). I therefore include both measures in the empirical analyses to more precisely sort out the effects of financial distress and bankruptcy per se. Furthermore, I consider a firm's financial standing *relative* to its competitors in the market. In fact, financial conditions in absolute terms may not necessarily imply any pricing actions if competing firms find themselves in similar financial situations. More specifically, I expect such pricing actions to be more pronounced when a distressed firm's financial situation is significantly different from that of its rivals. Finally, this study is unique with respect to its empirical detail. I use a panel data set from the U.S. airline industry to investigate the relationship between financial condition and price. Unlike in many previous studies, the unit of observation in the analysis is a specific route (i.e. "product") market rather than a firm year or firm quarter (e.g. Ferrier et al, 2002; Chattopadhyay et al, 2001; Busse, 2002). This allows for a much more fine-grained and statistically robust examination of the hypotheses.

The remainder of the article is structured as follows: Below, a comprehensive review of the literature and appropriate theories is provided, and hypotheses are derived. Next, the research model is introduced, the data and variables are discussed, and econometric issues are addressed. In section four, the regression results are presented. The article concludes with a brief summary of the main points. The study's limitations are noted and directions for future research are provided.

2. Theoretical background and hypothesis development

As briefly outlined above, there are numerous competing perspectives on the relationship between (airline) financial condition and prices. In this section, an overview of these theories from the strategy, economics and corporate finance fields is provided and hypotheses are derived. I develop the research

hypotheses in two steps: Based on their broader empirical support, I discuss those theories contending that deteriorations in financial condition lead to competitive pricing behaviors first. I then consider theories that negate this relationship and integrate them into a contingency framework that suggests moderating effects between firm financial condition and a firm's pricing behavior.

2.1. Financial condition as a driver of competitive pricing behavior

The strategy literature offers two theories, prospect theory¹ and organizational learning theory that may support a positive relationship between financial condition and a firm's competitive pricing behavior. Both theories are discussed in turn before empirical evidence and arguments from standard microeconomic and corporate finance theory are set forth.

Prospect theory (Kahneman and Tversky, 1979) posits that decision makers are more risk seeking when facing situations of likely loss while the inverse is true for decision makers operating in the domain of profitability. Prospect theory can, thus, be readily applied to evaluate the risk-taking behavior of financially troubled firms: Managers of low-performing, troubled firms may be risk-assertive in their strategic choices in the expectation of positive long-term returns to risk (in terms of increased market shares, revenues, or profits, for example). In fact, there is substantial support for the contention that troubled firms choose riskier strategies in the strategic management literature (e.g. Bowman, 1982; Singh, 1986; Moses, 1992; Wiseman and Bromiley, 1996). Chattopadhyay et al (2001) further investigate firms' responses to threats by considering elements such as organizational characteristics and strategic type, and Wiseman and Gomez-Mejia (1998) examine managerial risk taking across different governance modes. While extending the basic framework of prospect theory, both papers still support the hypothesized relationship between a firm's level of distress and risk seeking behavior. Authors have, thus, based their arguments on prospect theory when investigating the relationship between organizational decline and risk taking behavior in general (Bowman, 1982;

¹ While prospect theory has its origins in the economics field, its concepts have been widely adopted by strategic management researchers.

Singh, 1986; Wiseman and Gomez-Mejia, 1998; Chattopadhyay et al, 2001; Shoham and Fiegenbaum, 2002), organizational adaptation (McKinley, 1993) or innovation (Mone et al, 1998). So how does risk taking behavior relate to a firm's pricing strategy? As noted by Ferrier (2001), pricing actions represent a particular type of competitive actions which have been associated with organizational risk taking (e.g. Ferrier et al, 2002). Moses (1992) further notes that certain low price strategies "sacrifice short-run profits in an attempt to establish a market and generate profits over the long run" (p.40). He concludes that penetration strategies are high risk strategies because the firm might incur further losses if costs fail to decrease below price levels in the longer term. Finally, pricing actions entail the risk of imitation or retaliation by competing firms. LeBlanc (1992), for example suggests that low-cost incumbents may choose predatory pricing in response to firms entering their (low-price) markets. In more general terms, authors have investigated the dynamics of competitive actions and responses and have found that a firm's actions drive competitors' responses (Chen et al, 1992), which in turn, determine the effectiveness and performance effects of the focal firm's actions (Smith et al, 1991; Peteraf, 1993; Chen, 1996). The risk of choosing low price strategies in a homogenous competitive environment, thus, lies in the possibility of unbalancing the competitive equilibrium (Xu and Tiong, 2001) and the potential loss resulting from aggressive competitive responses (Young et al, 1996). In summary, prospect theory supports the argument that financial distress induces firms to engage in a riskier, more aggressive pricing behavior (see also e.g. Lant and Montgomery, 1987).

Organizational learning theory also provides support for a positive relationship between performance distress and strategic change or competitive aggressiveness (Ferrier et al, 2002). Lant et al (1992) argue that previously unsuccessful firms undergo a learning process which may lead to strategic reorientation, and Ferrier (2001) suggests that the discrepancy between an organization's goals and its actual performance provides motivation for future actions and increases the likelihood of strategic change. To the extent that pricing actions reflect changes in the underlying firm strategy, one may thus argue that financially distressed firms are more likely to lower their prices than are healthy firms.

From a **microeconomics** and **corporate finance** perspective, Brander and Lewis (1986) argue that a firm's "output market behavior will, in general, be affected by [its] financial structure" (p.957, brackets added). Investigating the linkages between financial and product markets, they demonstrate that highly leveraged firms will likely compete more aggressively by increasing their output since riskier strategies with (potentially) higher returns are more attractive to equity holders as a result of the limited liability effect of equity financing, than are conservative strategies which primarily appeal to debt holders. In a similar vein, Maksimovic and Zechner (1991) suggest that highly leveraged firms choose riskier technologies in terms of their expected cash flows. Hendel (1996) supports this assertion, arguing that "firms under financial distress use aggressive pricing to generate cash" (p.309) and that prices are a function of a firm's liquidity. A number of authors have empirically examined the relation between firm financial conditions and pricing behavior. Borenstein and Rose (1995) find support for the theoretical contentions summarized above, indicating that air fares drop by five to six percent in the months preceding the carrier's Chapter 11 filing. Kennedy (2000) demonstrates that a distressed firm's sales revenues and profits (and that of its rivals) decrease prior to bankruptcy as a result of its altered product market conduct. Finally, Busse's (2002) findings suggest that highly leveraged firms are more likely to start price wars. Busse also argues that "firms in poor financial condition discount future revenues more heavily than do financially sound firms" (p.298), thus focusing on boosting short term sales (by cutting prices, for example).

Taken together, there is substantial theoretical and empirical support for the contention that financially distressed firms choose riskier strategies and price more aggressively, i.e. follow a low-price strategy in an effort to gain market shares and boost sales². In the context of the airline industry, I therefore state Hypothesis 1 as follows:

Hypothesis 1: All else equal, airline financial condition and air fares are positively related.

² See also Ferrier et al (2002) for a definition of competitive aggressiveness

Hypothesis 1 implies that financially distressed carriers may be expected to sell at lower prices, all else equal. Prior research, however, suggests that the above hypothesized price effect of firm financial condition (distress) differs over time. As Borenstein and Rose (1995) and Kennedy (2000) have shown, firms try to prevent insolvency by generating cash through aggressive competition prior to bankruptcy filings. Once these firms operate under Chapter 11 protection, however, they benefit from lower operating costs as debt payments are paused (Rose-Green and Dawkins, 2002) to support the restructuring of the firm. This lower cost base may allow bankrupt firms to charge even lower prices. Moreover, soft demand may force carriers to cut fares once they operate under bankruptcy protection since the latter signals uncertainty to consumers³. I therefore suggest the following hypothesis:

Hypothesis 2: The impact of airline financial distress on air fares is greater during bankruptcy than prior to the Chapter 11 filing.

As indicated previously, a different set of theories suggests opposite effects of a firm's financial condition on its prices. These perspectives are reviewed below, and hypotheses that suggest that the relationship between financial condition and prices is moderated by other factors are formulated.

2.2. Conflicting theoretical arguments: The contingency approach

In this section, I briefly discuss theoretical perspectives that negate any effect of firm financial condition on firms' pricing behavior and then present two groups of contingencies that are hypothesized to impact the relationship between financial condition and prices: organizational characteristics and competitive situational characteristics.

The **threat-rigidity model** has emerged as a counterhypothesis to prospect theory. Staw et al (1981) argue that individuals, groups, and organizations exhibit restrictive information processing patterns,

³ A more detailed discussion of the differential effects of firm financial condition on air fares over time can be found in Hofer et al (2005).

centralize control and conserve resources when faced with threatening situations. These mechanisms result in increased rigidity which reduces an organization's ability to change and adapt to its environment (McKinley, 1993). As noted by McKinley (1993) and Mone et al (1998), there is broad empirical support for the threat-rigidity model: Smart and Vertinsky (1984), for example, find that executives consult fewer information sources during crises, and Chattopadhyay et al (2001) present some evidence that organizations respond to control-reducing threats with low risk, internally directed actions. From this perspective, firms in poor financial conditions may, thus, be expected to not reduce prices in the short-term, but to behave passively and conservatively (Ferrier et al, 2002).

Similar rigidity arguments can be found in the **industrial organization economics**, **game theoretic** and **finance** literature. First, the kinked demand curve theory suggests that firms in oligopolistic markets with few sellers and rather homogenous products face highly inelastic demand for price decreases (e.g. Waldman and Jensen, 2001). Put differently, firms will refrain from price competition given that their rival firms may be expected to match these moves, thus offsetting any profit gains (Scherer, 1980). This argument is further supported by game theory: Derfus et al (working paper) argue that pricing actions are negative-sum actions in that competitors will be worse off after implementing successive price reductions. Consider, for example, a sequential game between duopolists: Firm two observes firm one's move and subsequently acts in response to firm one's action. Firm one, in turn, observes firm two's action and may choose to react, etc. (see e.g. Gibbons, 1992). When such moves consist of price reductions, the price may fall below average cost levels in the course of this competitive interaction of moves and countermoves (see also Dasgupta and Titman, 1998). These theories are, thus, in line with the imitation/retaliation argument discussed earlier (see e.g. Smith et al, 1991; Chen et al, 1992; Peteraf, 1993; Chen, 1996; Busse, 2002).

In summary, the threat-rigidity model and arguments from the industrial organization, game theoretic and finance literature suggest that financially distressed firms may refrain from lowering prices as information processing and decision making processes are altered in the face of threats or for fear of

retaliation. In this article I attempt to reconcile the apparent theoretical and empirical conflict that has shaped previous research on the relationship between financial condition and prices. Indeed, there are indications that – under certain conditions – each of the groups of theoretical arguments supporting or denying a negative impact of financial distress on prices may be true. As will be discussed below, there appear to be further contingencies that may impact this relationship. Similar to Ferrier et al (2002), I develop a contingency framework which suggests moderating effects of *organizational* and *competitive situational characteristics*. This framework aims at defining in what instances and in what direction financial condition may impact prices.

Organizational characteristics

It is suggested that the relationship between financial condition and prices may be moderated by certain organizational characteristics. More specifically, a firm's strategic type and its positioning within an industry are hypothesized to influence its market conduct. Moreover, a firm's market power may impact an organizations ability and motivation to implement price changes.

Prior research has suggested that a firm's particular **strategic type** may impact its behavior. Chattopadhyay et al (2001), for example, find that a firm's propensity to respond to threats with externally as opposed to internally oriented actions is impacted by its strategic focus. They present empirical support for the contention that firms focusing on product-market development (prospectors) are more likely to act externally (by changing prices, for example) since the "effectiveness of a product-market development strategy depends to a large extent on controlling or modifying the external environment" (p.940/941). Firms focusing on domain defense (defenders), in turn, "are more likely to act within themselves to become more efficient through standardizing organizational processes" (p.941). In a similar vein, Smith et al (1997) find that strategic group membership predicts the manner in which a firm may be expected to compete. More specifically, their results suggest that "entrenched dominants", which most closely resemble Miles and Snow's (1978) "prospectors", tend to compete on price to a greater extent than "high-end fliers" and "niche-seekers" which are somewhat

comparable to Miles and Snow's "defenders". I therefore expect a differential impact of financial condition on a firm's prices by strategic type, given the firms' differential inclinations to act externally versus internally in response to changes in the firm's financial situation. Although there are multiple definitions and classifications of strategic types (see e.g. Shoham and Fiegenbaum, 2002), these can be simplified and synthesized as follows (see also Chattopadhyay et al, 2001): Defenders are those firms that operate in a stable, well-defined set of market segments, tend to act conservatively, and are characterized by established organizational structures and operating routines. Prospectors, in turn, are those firms that constantly seek for opportunities to expand their business and whose most distinctive features are their innovativeness and cost-leadership. In the empirical practice, many operationalizations of strategic types have been suggested, ranging from simple dichotomies (e.g. Peteraf, 1993) to multidimensional clusters (e.g. Smith et al, 1997). There is, however, substantial agreement in the literature that a firm's costs are an important differentiator with respect to its strategic type (see the above definitions of prospectors and defenders). This is particularly true in the U.S. airline industry: Both the academic and trade press frequently refer to specific airlines as either *high-cost* carriers or *low-cost* carriers. Peteraf (1993), for example distinguishes between pre- and post-deregulation air carriers, the former being mostly high-cost firms⁴ while the latter are virtually all low-cost airlines. I therefore identify a firm's strategic type by means of its operating costs. In fact, an airline's relative cost (dis)advantage may impact its choice of strategy. While lower operating costs leave some room for price reductions and potentially ensuing price wars, higher operating costs imply that price cuts likely lead to increased operating losses. The latter, however, is to be avoided when operating under severe financial conditions anyway. This reasoning thus suggests that the higher an airline's operating costs, the smaller the effect of firm financial condition on prices will be. I thus state Hypothesis 3 as follows:

Hypothesis 3: The magnitude of operating costs negatively moderates the effect of airline financial condition on air fares, all else equal.

⁴ Southwest Airlines being a notable exception

The magnitude and direction of the effect of firm financial condition on prices may also depend on the firm's power in the particular product (i.e. route) market. In the long run, greater **market power** may result in the achievement of lower marginal costs through economies of density (Ferrier et al, 2002). Furthermore, market power may be indicative of barriers to entry and mobility that isolate market-leading firms from intense competition (Caves and Porter, 1977; Caves and Ghemawat, 1992). From this perspective, market power may be considered a valuable firm resource that allows for above-normal returns. Consequently, some researchers have argued that firms will likely try to defend their market power. Busse (2002), for example, presents empirical evidence that firms are more likely to enter price wars the greater their market shares, and LeBlanc (1992) argues that firms strive to maintain monopoly profits by implementing limit or predatory pricing.

These predictions of industrial organization economics theory and the resource-based view may, however, not hold when explicitly considering a firm's financial condition. First, note that distressed firms typically focus on short term survival rather than on long term strategic positioning. While the latter is the ultimate purpose of distressed firms' turnaround efforts, generating sufficient cash flows is a mandatory obligation these firms face in the immediate future. In this vein, bankrupt U.S. airlines frequently terminate unfavorable aircraft leases and collective labor agreements right upon entry into Chapter 11 protection. If liquidity is the prime objective, however, price cuts in an effort to maintain market power may prove counter-productive: Assuming pricing at marginal cost (which is quite reasonable when considering the U.S. airline industry), any price reductions will necessarily imply further losses. In any event, distressed airlines' revenues are unlikely to increase as a result of price reductions since the latter would have to be outweighed by increases in passenger demand. Bankrupt carriers, however, likely face lower passenger demand (even with competitive prices) due to their relative unattractiveness compared to healthier airlines, given the uncertainty about the carrier's reliability and continued existence. Distressed firms with greater market shares will thus incur greater revenue losses when engaging in price competition, whereas firms with smaller market shares face smaller revenue effects. Assuming (quasi)fixed production costs in the short run, these revenue losses

directly affect the firm's bottom line. This implies that engaging in price competition is more appealing to firms with smaller market shares: The absolute revenue impact is much smaller, the potential market shares to be gained are greater, and any pricing actions hurt the market leading firm(s) significantly more than the moving firm (i.e. the firm with the smaller market shares that initiates price competition). This reasoning incorporates the concepts of Judo economics (Gelman and Salop, 1983) and Judo strategy (e.g. Yoffie and Kwak, 2002), which essentially posit that a firm's size and market power may constitute a competitive disadvantage when adequately leveraged against it by smaller firms. This perspective thus suggests that a distressed firm's market share is inversely related to its inclination to compete on price:

Hypothesis 4: Market power negatively moderates the relationship between airline financial condition and prices, ceteris paribus.

A second set of contingencies – those relating to competitive situational characteristics – are discussed below.

Competitive and market characteristics

Besides organizational characteristics, competitive and market characteristics that specifically relate to a distressed firm's competitive environment are hypothesized to impact the firm's pricing strategy. I specifically consider two aspects: market concentration and the competitors' financial conditions.

First, **market concentration** will likely affect a firm's pricing decision. More specifically, the expectation of competitive responses and retaliatory moves in highly concentrated markets impacts a firm's valuation of the effects of any price changes. The structure-conduct-performance paradigm posits that industry concentration reduces the level of competition (e.g. Scherer, 1980; Waldman and Jensen, 2001). Young et al (1996) find empirical support for this contention, noting that firms in concentrated markets or industries carry out fewer competitive moves. Just like in the case of the

previously discussed market power hypothesis, however, special consideration is required in the context of this discussion of the effects of firm financial condition. I have previously argued that distressed firms will tend to refrain from price cutting as their market shares increase. Holding market shares constant, however, an increase in market concentration is equated to an increase in the competitors' market power, which may imply increased competitive pressures but also an increased attractiveness of judo strategies that hurt larger rivals. Consequently, the effect of firm financial condition on prices may be expected to be stronger as the level of market concentration increases, holding all else constant. Hypothesis 5, thus, is directly connected to the previous hypothesis and also ultimately builds on the concept of judo economics.

Hypothesis 5: After controlling for market power effects, market concentration positively moderates the impact of airline financial condition on air fares, ceteris paribus.

A distressed firm's pricing decisions will, in part, also depend on its **competitors' financial situations**. If a firm's rivals experience similar degrees of distress as the focal firm does (and assuming that the firms' products are undifferentiated), then these rivals may be expected to exhibit comparable or symmetric pricing behaviors. A focal firm's price reductions would then be matched by the other firms, and no single firm could gain a competitive advantage. In fact, game theory suggests that each firm will always have an incentive to slightly undercut its competitor's prices, thus eroding profit margins to zero (e.g. Gibbons, 1992). Financially distressed firms will, therefore, avoid competing on price when their competitors find themselves in similar financial conditions.

Conversely, I can state Hypothesis 6 as follows:

Hypothesis 6: An airline's relative financial condition, i.e. the difference between a focal firm's financial situation and that of its competitors, is positively related to prices.

In summarizing, I have formulated a set of hypotheses on the link between firm financial condition

and its pricing behavior based on a variety of theoretical perspectives. I have presented conflicting viewpoints that suggest a negative or no significant relationship respectively, and have proposed a contingency framework that more precisely defines for what type of firms and under what circumstances changes in a firm's financial situation may cause changes in the firm's pricing behavior.

In the following section, I provide information about the sample data that is used for the empirical analyses, and discuss the operationalization of the variables in the research model as well as methodological issues.

3. Data and methodology

The U.S. airline industry provides the setting for the empirical analyses. This selection is particularly suitable for a number of reasons. First, the markets are clearly defined (Smith et al, 1991), and all firms operating in these markets are dominant-business firms (Peteraf, 1993). Second, the U.S. airline industry is highly competitive (Smith et al, 1991; Peteraf, 1993) and encompasses a large cross-section of routes that differ significantly with respect to their market characteristics (Peteraf, 1993). Third, the industry has experienced periods of severe financial distress (Borenstein and Rose, 1995), but is sufficiently heterogeneous with respect to the airlines' financial conditions. Finally, there is a wealth of publicly available data on the U.S. airline industry due to the U.S. Department of Transportation's reporting requirements⁵.

3.1. Sample data

Data were collected on the top 1000 U.S. domestic origin and destination route markets⁶, for all quarters in 1992 and 2002. These years were chosen because the airline industry experienced serious distress in 1992 and 2002. Quarterly data are used to be able to capture the short-term effects of

⁵ Some sections of this chapter, particularly the sample data and variable descriptions, are similar, if not equal to the corresponding sections of a related paper published by Hofer et al (2005).

⁶ Based on 2002 traffic figures, 48 contiguous states only

Chapter 11 filings on air fares. The top 1000 route markets cover a wide range of route characteristics in terms of traffic volume, distance, and intensity of competition.

The data were purchased from Database Products Inc., a reseller of the Department of Transportation's DB 1A data which contain a 10% sample of all U.S. domestic origin and destination tickets. These data provide airline and route specific information on fares, nonstop and itinerary miles, the number of passengers, and the number of coupons. Additional airport traffic data and airline operating and financial data were gathered from the DOT's Form 41 and T-1 databases. Other data sources include the American Transport Association (ATA), the Bureau of Labor Statistics (BLS), and the Bureau of Economic Analysis (BEA).

Observations from carriers with less than five percent route market share were deleted from the data set. Furthermore, a total of 577 observations were excluded because of unidentified carriers⁷, or unavailable airport and airline data. A total of 23,039 observations were retained for the analyses.

3.2. Variables and measurement

Dependent variable

Previous studies published in the strategic management literature have measured the impact of financial condition on firm behavior in terms of the number and type of competitive actions, response speed and delay, for example (Ferrier, 2001; Ferrier et al, 2002; Smith et al, 1997; Young et al, 1996; Smith et al, 1991; Chen, 1994; Chen et al, 1992). While price data are commonly used as dependent variables in the economics literature, this is, to the best of the author's knowledge, the first study to investigate the impact of financial condition on *prices* from a strategic management perspective. More specifically, $Fare_{kij}$ is the average price carrier k charges on the route between airports i and j .⁸

⁷ "XX – unduplicated commuters" and "UK – unknown carrier"

⁸ All fares are one-way fares based on round-trip purchases and are reported in real 1992 dollars

Independent variables

The measurement of financial condition is of particular interest in the context of this study. Previous studies of financial condition have generally relied on one of two measures. Ferrier et al (2002) and Chakravarthy (1986), for example, relied on a composite measure to evaluate a firm's financial situation. Altman's (1968) Z score is the most prominent member of this group of measures and takes into account the firm's past and present profitability, its liquidity and its degree of activity. Other researchers have focused on Chapter 11 filings⁹, the most visible and definite sign of financial distress, to investigate the effects of firm financial condition (e.g. Borenstein and Rose, 1995; Kennedy, 2000). While both measures have their merit, it is important to note that they capture different aspects of financial condition. Z score-type measures are indicators of a firm's financial health (or distress), while Chapter 11 filings refer to a specific point in time at which the firm is no longer able to meet its debt obligations. The model builds on both of these indicators and includes four measures of financial condition to more precisely sort out its effects on firm behavior in terms of pricing:

- $ZScore_k$ is a measure of airline k 's financial situation. More specifically, I use Z'' scores (Altman 2002), a revised version of Altman's original Z score formulation (1968), which is particularly suitable for firms operating in service industries (such as the airline industry). Based on discriminant analysis, Altman (2002) developed the following model to estimate a firm's financial fitness: $Z'' = 6.56 * X_1 + 3.26 * X_2 + 6.72 * X_3 + 1.05 * X_4$ where X_1 = working capital / total assets; X_2 = retained earnings / total assets; X_3 = EBIT / total assets; X_4 = book value of equity / total liabilities. Higher scores indicate financial health, while low and negative scores indicate (serious) financial distress. I use this variable to test Hypothesis 1. Moreover, I use the airlines' Z'' scores (hereafter denoted ZScore for expositional simplicity) to test the moderating effects from Hypotheses 3, 4, and 5, respectively.
- $Pre4Chpt11_k$, identifies those carriers that will face bankruptcy within the following four quarters.
- $Post4Chpt11_k$ is similar to the $Pre4Chpt11_k$ variable, but identifies those carriers that filed for

⁹ See Daily (1994) for a comprehensive explanation and discussion of the U.S. Code Chapter 11

Chapter 11 within the past four quarters. The inclusion of the $Pre4Chpt11_k$ and $Post4Chpt11_k$ variables allows capturing the differential impact of financial distress over time as stated in Hypotheses 2.

- $ZScoreDiff_{kij}$ is an indicator of an airline's financial standing relative to its route competitors. It is based on Altman's Z'' score and is computed for each carrier in each route market for each time period. It is the difference between the focal carrier's Z'' score and the route market share weighted average of its route competitors' Z'' scores. Higher scores, thus, indicate that the focal carrier is financially better off relative to its route competitors and vice versa. The $ZScoreDiff_{kij}$ variable is designed to test Hypothesis 6 which refers to an airline's financial standing relative to its competitors. This variable, thus, differs from the $ZScore$ and $Chpt11$ variables in that it indicates an airline's *relative* financial standing, i.e. the focal firm's Z'' score relative to the market share weighted average Z'' score of its competitors, rather than its *absolute* financial condition. Positive $ZScoreDiff$ values indicate that the airline is financially better off than its route competitors, while negative values indicate relative financial distress.

I further include a set of moderating variables as mentioned in Hypotheses 3 to 5. More specifically, it is hypothesized that the impact of financial condition on prices varies by strategic type/operating costs (Hypothesis 3), firm market power (Hypotheses 4), and market concentration (Hypothesis 5). These moderating variables are operationalized as follows:

- $AirlineCost_k$ is an indicator of an airline's operating efficiency. It is defined by the ratio of operating expenses and available seat miles (ASM).
- $RouteShare_{kij}$ measures an airline's market power on a route market (based on its share of route passengers).
- $RouteHHI_{ij}$ is a measure of route market concentration. It is based on the Herfindahl-Hirschmann Index (HHI).

These variables are interacted with the *ZScore* variable to estimate their moderating effects in the relationship between firm financial condition and prices.

Control variables

I also add a set of firm and market specific control variables which have been shown to impact prices in previous research (see e.g. Borenstein, 1989) in the empirical model. The former group includes, most notably, the number of airline passengers in the route market, the airline's load factor, its airport market share (the airline's maximum market share at either airport *i* or *j*), and the carrier's route circuitry, the ratio of itinerary and nonstop mileage. The latter group consists of the distance between airports *i* and *j*, an airport market concentration measure (the maximum airport HHI at the origin or destination airport), and a set of dummy variables capturing slot-controlled airports, routes with high shares of tourist travelers, and the presence of low-cost carrier competition for major or other low-cost carriers, respectively. Time variables are also included in the analysis to capture macroeconomic changes and trends.

Table 1 provides the mean and standard deviation, minimum and maximum values for some selected variables included in the model¹⁰. The mean *ZScore* of -0.59 indicates the gravity of financial distress the airline industry experienced in both 1992 and 2002. While there is no direct interpretation for this value, it implies that a significant proportion of passengers used severely troubled carriers. I further note that approximately seven percent of all passengers traveled with near-bankrupt carriers (*Pre4Chpt11*, 1571 observations), while approximately five percent of all passengers used airlines that filed for Chapter 11 protection within the past year (*Post4Chpt11*, 1196 observations). Moreover, the data set contains 2,414 carrier-route market observations with *ZScoreDiff* values smaller than -2.86 (one standard deviation below the mean), indicating an airline's severe financial distress relative to its route competitors.

¹⁰ A correlation table is available from the author upon request.

	Variable	Mean	Std. dev.	Min	Max
	Fare (1992 U.S. dollars)	114.26	60.61	25.17	1140.19
Financial condition	ZScore	-0.59	2.28	-69.53	3.02
	ZScoreDiff	-0.05	2.81	-68.59	31.97
	Pre4Chpt11	0.07	0.25	0	1
	Post4Chpt11	0.05	0.21	0	1
Moderators	AirlineCost (\$)	0.08	0.02	0.04	0.24
	RouteShare	35.80%	28.11%	5.0%	100.0%
	RouteHHI	5298.78	2172.02	1259.66	10000
Control variables (selected)	AirlinePass	1570.76	2408.01	1	29368
	Distance (miles)	950.86	643.09	30	2717
	SlotRoute	0.15	0.36	0	1
	TouristRoute	0.31	0.46	0	1
	MaxAirportShare	34.06%	24.86%	0.015%	100%
	MaxAirportHHI	3966.56	1885.11	1131.37	10000
	Circuitry	1.02	0.05	1	2.2
	Loadfactor	67.25%	6.37%	35.1%	84.6%
	Quarter1	0.24	0.42	0	1
	Quarter2	0.25	0.44	0	1
	Quarter3	0.26	0.44	0	1
	Quarter4	0.24	0.43	0	1
	1992	0.49	0.50	0	1
2002	0.51	0.50	0	1	

Mean values weighted based on number of airline passengers, except for "AirlinePass"

Table 1: Descriptive statistics for selected variables ($n = 23,039$)

3.3. Empirical methodology

A log-linear price estimation equation forms the basis of the model used in this research. More specifically, an airline's fare on a route is modeled as a function of a set of route, airport and carrier specific variables, as well as a number of control variables. The estimation of the model requires the implementation of a two-stage least squares procedure since $AirlinePass_{kij}$ is an endogenous variable, i.e. the number of airline passengers may impact airfares, while at the same time, the latter may have an effect on the number of passengers. In a first stage regression, the number of airline passengers ($AirlinePass$) is modeled as a function of all exogenous variables including two instrumental variables, $Income$ and $Population$ ¹¹. Fitted values for $AirlinePass$ are then used to estimate fares ($Fare$) in the second stage model.

¹¹ $Income$ is the averaged per capita income at the endpoints of an O&D market, $Population$ is the product of the respective metropolitan populations.

The OLS assumptions of homoskedasticity and independence are frequently not met when dealing with cross-sectional time series data. I therefore implement tests to detect the potential problems of heteroskedasticity and autocorrelation. First, the Breusch-Pagan/Cook-Weisberg Lagrange multiplier test uses fitted values of the dependent variable to determine whether the residuals are constant, i.e. homoskedastic. This test is implemented after an OLS regression similar to the second stage model described above (the sole difference being that the actual values of *Airline Passengers* are used rather than fitted values). The implementation of this test yields a test statistic of 554.2 which follows a χ^2 distribution. The null hypothesis of constant variance is clearly rejected with a significance level of less than one percent. Second, the Wooldridge test for autocorrelation in panel data (Wooldridge, 2002) suggests the presence of first-order auto-correlation ($F = 841.8$, significant at the less than one percent level). Given the presence of heteroskedasticity, autocorrelation and endogeneity (as discussed previously), I implement a generalized two-stage least squares random-effects procedure. The estimation results are discussed next.

4. Empirical Results and Discussion

In the first-stage regression, all independent variables (which are assumed exogenous) and the *Population* and *Income* instruments are used to estimate exogenously determined fitted values for *AirlinePass*. These first stage results are not displayed here due to space constraints but are available from the author upon request. It is noted, however, that most of the results are in accordance with prior theoretical reasoning and empirical research and that the first-stage model is highly significant (Wald $\chi^2 = 33,701$, significant at the less than one percent level).

In this section, I report the results from four different second-stage regression analyses to test the hypotheses. The first second-stage analyses tests Hypothesis 1 by including the *ZScore* variable. The second regression tests the differential effect of financial condition over time (Hypotheses 2) by estimating the model with the *Pre4Chpt11* and *Post4Chpt11* variables. I test Hypotheses 1 and 2

separately to avoid confounding the results by including both the *ZScore* and *Chpt11* variables in a single regression (since all bankrupt airlines have low Z scores). The third second-stage regression model tests the moderating effects of firm costs, firm market power, and market concentration (Hypotheses 3 to 5). The fourth and final model tests the importance of a firm's *relative* financial distress as discussed in Hypothesis 6. Similar to the argumentation above, the *ZScoreDiff* variable is tested separately to avoid confounding the effects of absolute (*ZScore*) and relative (*ZScoreDiff*) financial condition. The second-stage regression results are presented in Table 2.

Before focusing on the variables of interest in the respective regressions, I note that all second-stage models are highly significant (Wald $\chi^2 \geq 52,910$) and explain a significant proportion of the variability in air fares¹².

Turning to the control variables first, it is noted that all coefficient estimates are consistent across all four second-stage models and are statistically significant at the less than one percent level with the exception of the *DistanceSquared* variable. Since most control variables have the expected signs (see Appendix 1), they are not further discussed here. The coefficients of the *AirlinePass* and *RouteShare* variables, however, have unexpected signs. The coefficient for the (fitted) *AirlinePass* variable is positive, indicating that higher numbers of passengers are associated with higher fares. This finding may suggest that firms tend to capitalize on high demand rather than passing on the economies of density to the consumer in the form of lower prices. At the same time, the *RouteShare* variable carries a negative and statistically significant coefficient, while industrial organization theory suggests that market power may result in higher prices. The two variables (*AirlinePass* and *RouteShare*) are naturally highly correlated ($\rho = 0.70$) with *RouteShare* being the ratio of *AirlinePass* and the total number of passengers in the route market. It may, therefore, be useful to interpret both coefficients simultaneously: Consider an airline that competes with other carriers in a given route market. A ten

¹² Note that the reported R-squared statistic is not particularly useful in the context of GLS since the total sums of squares are not broken down as in OLS. The GLS R-squared is not bounded between zero and one and cannot be interpreted as the percentage of variability explained.

percent increase in its route market share implies that the number of passengers it carries in that market increases by more than ten percent, all else equal. The net effect on fares will then be positive since the positive effect of the *AirlinePass* coefficient will outweigh the negative effect of the *RouteShare* coefficient. The findings are, thus, consistent with standard industrial organization economics theory and conform to Borenstein's (1989) finding that greater route market power results in higher fares¹³, but do not suggest the presence of economies of density¹⁴.

Second-stage G2SLS regression (random effects)		Number of obs.		23039		Obs. per group:		min.		1	
		Number of groups		4508				avg.		5.1	
								max.		8	
<i>Dependent variable:</i>		1		2		3		4			
Fare		Coefficient	P> z 	Coefficient	P> z 	Coefficient	P> z 	Coefficient	P> z 		
Constant		1.669	0.000	1.510	0.000	1.519	0.000	1.620	0.000		
AirlinePass (fitted)		0.075	0.000	0.086	0.000	0.069	0.000	0.082	0.000		
Distance		0.604	0.000	0.541	0.000	0.617	0.000	0.507	0.000		
DistanceSquared		-0.013	0.104	-0.008	0.330	-0.014	0.077	-0.005	0.465		
SlotRoute		0.062	0.000	0.061	0.000	0.061	0.000	0.063	0.000		
TouristRoute		-0.120	0.000	-0.118	0.000	-0.121	0.000	-0.118	0.000		
RouteHHI		0.049	0.000	0.045	0.000	0.059	0.000	0.051	0.000		
MaxAirportHHI		0.092	0.000	0.107	0.000	0.090	0.000	0.106	0.000		
RouteShare		-0.002	0.000	-0.002	0.000	-0.002	0.000	-0.002	0.000		
MaxAirportShare		0.002	0.000	0.002	0.000	0.002	0.000	0.003	0.000		
LCCCompForMajor		-0.154	0.000	-0.170	0.000	-0.148	0.000	-0.164	0.000		
LCCCompForLCC		-0.073	0.000	-0.054	0.000	-0.072	0.000	-0.049	0.000		
AltRouteLCC1M		-0.031	0.000	-0.037	0.000	-0.027	0.000	-0.039	0.000		
Circuitry		0.159	0.004	0.223	0.000	0.147	0.007	0.221	0.000		
ZScore		0.040	0.000			0.094	0.000				
ZScoreDiff								0.015	0.000		
Pre4Chpt11				-0.019	0.001						
Post4Chpt11				-0.047	0.000						
Loadfactor		-0.018	0.000	-0.017	0.000	-0.018	0.000	-0.018	0.000		
AirlineCost		0.232	0.000	0.187	0.000	0.213	0.000	0.184	0.000		
Quarter 2		-0.037	0.000	-0.046	0.000	-0.041	0.000	-0.046	0.000		
Quarter 3		-0.035	0.000	-0.052	0.000	-0.038	0.000	-0.044	0.000		
Quarter 4		-0.041	0.000	-0.064	0.000	-0.043	0.000	-0.059	0.000		
2002		-0.231	0.000	-0.228	0.000	-0.247	0.000	-0.222	0.000		
AirlineCost*ZScore						-0.796	0.000				
RouteShare*ZScore						-0.000177	0.000				
RouteHHI*ZScore						0.000004	0.000				
Wald χ^2		56455.77		52910.59		57765.73		54471.49			
Prob > χ^2		0.000		0.000		0.000		0.000			
R-squared		0.724		0.712		0.728		0.720			

Table 2: Second-stage G2SLS regression estimates¹⁵

I now turn to the variables of interest which test the hypotheses set forth in this paper.

¹³ Note that Borenstein (1989) did not separately control for the number of airline passengers.

¹⁴ Or else, if such economies of density exist, they do not appear to be passed on to passengers in terms of lower fares.

¹⁵ The carrier fixed effects are not shown in this table.

The positive and significant coefficient of the *ZScore* variable in the first second-stage regression ($\beta = 0.4, p = 0.000$) provides clear support for the contention that airline financial condition and air fares are positively related (**Hypothesis 1**). This result thus confirms the basic findings in the extant literature that financially distressed firms behave more aggressively in the output market, *ceteris paribus*. More specifically, this result suggests that the reduction of a firm's Z score by one unit leads to a price reduction of four percent.

The second regression presented in Table 3 tests the differential impact of financial condition over time. The coefficient of the *Pre4Chpt11* and *Post4Chpt11* variables are negative and statistically significant at the less than one percent level. The latter coefficient ($\beta = 0.047, p = 0.000$), however, is more than twice as large as the former ($\beta = 0.019, p = 0.001$). This indicates that the effect of firm financial condition is substantially larger once the airline is actually bankrupt. This finding may support the contention that passengers are reluctant to choose bankrupt carriers given the uncertainty about its reliability and future operations. This may entice such firms to cut prices in an effort to stimulate or maintain passenger demand¹⁶. **Hypothesis 2** is thus supported.

The third column in Table 3 presents a test of the hypothesized interaction effects (Hypotheses 3 to 5). **Hypothesis 3** argues that a firm's operating costs negatively moderate the relationship between financial condition and prices. Remembering that a distressed firm's Z score will be negative, the interaction term *AirlineCost*ZScore*, which is negative and statistically significant at the less than one percent level ($\beta = 0.796, p = 0.000$), will be positive. The analyses, thus, present some evidence for the contention that distressed firms will tend to refrain from competing on price when their operating costs are higher, as suggested in Hypothesis 3.

¹⁶ A more detailed discussion of this "demand effect" can be found in Hofer et al (2005).

In **Hypotheses 4**, it was argued that the impact of firm financial condition on prices is moderated by firm market power¹⁷. The corresponding interaction effect (*RouteShare*ZScore*) is negative and significant ($\beta = -0.0000177$, $p = 0.000$). For severely distressed firms with negative *Z* scores, the interaction effect becomes positive and its magnitude is increasing in the airline's market shares. Route market power, thus, reduces a distressed firm's competitive aggressiveness as stated in Hypothesis 4.

As to the moderating effect of (route) market concentration, it was hypothesized that financially distressed firms will tend to implement greater price cuts when they operate in highly concentrated markets (**Hypothesis 5**), *ceteris paribus*. I first note that the moderating effect of route market concentration (*RouteHHI*) is positive and statistically significant ($\beta = 0.000004$, $p = 0.000$). For severely distressed firms with negative *ZScore* values, the interaction effect then is negative and increasing in route market concentration. As stated in Hypothesis 5, this implies that greater levels of market concentration increase a heavily troubled firm's tendency to compete on price. It should be noted, however, that the coefficient is particularly small, and the observed effect may be economically trivial.

To test **Hypothesis 6**, finally, the coefficient of the *ZScoreDiff* variable from the fourth second-stage regression can be interpreted straightforwardly. The positive and significant coefficient ($\beta = 0.015$, $p = 0.000$) indicates that a firm's financial condition *relative* to its competitors positively impacts the focal firm's prices as stated in Hypothesis 6. Or conversely, the worse a firm's financial standing relative to its competitors, the lower its prices will be¹⁸.

Overall, I find ample support for the theoretical arguments set forth in this paper.

¹⁷ Hypothesis 4 suggests that greater market power is associated with a reduced inclination to compete on price.

¹⁸ Recall that positive *ZScoreDiff* values indicate relative financial well-being, while negative values indicate relative financial distress.

5. Conclusion

The primary objective of this research was to reconcile the extant theoretical conflict revolving around the impact of firm financial condition on prices. Based on a review of varied theoretical perspectives and numerous empirical studies, it is suggested that financial condition generally increases price competition. I do note, however, that this may not be true in some cases. More specifically, I hypothesize that operating costs and market power, as well as market concentration and a firm's financial standing relative to its competitors may impact the magnitude of a troubled firm's pricing actions. A strategic contingency framework which incorporates these moderating effects is developed and tested using a comprehensive panel dataset from the U.S. airline industry. The empirical results provide clear statistical support for all of the hypotheses.

The key message of this study, thus, is clear: Microeconomic and corporate finance theory alone cannot fully explain the relationship between a firm's capital structure and its output market behavior. Organizational and competitive characteristics have to be considered when investigating the effect of financial condition on prices. Strategic management research offers an array of theoretical approaches to further explore this issue, and a contingency framework appears to be an appropriate means to do so. In that vein, the hypotheses reflect and the results present evidence for elements of prospect theory, organizational learning theory, the threat-rigidity model and strategic groups research. I am unaware of any other research that has examined the research question at hand from this perspective. By combining multiple theoretical perspectives and incorporating them in a single, comprehensive contingency framework, I am able to advance the understanding of the link between firm financial condition and prices. This research presents substantial evidence for the contention that financial condition positively affects firm prices. The results suggest that this is particularly true for firms with lower operating costs and smaller market shares, and for firms operating in highly concentrated markets.

Data from the U.S. airline industry are used for the empirical analyses. While this selection has many desirable qualities in terms of the detail and availability of data, I must consider the possibility that these findings may not be generalizable to other industries. The U.S. airline business is particularly competitive and, to some extent, still marked by the era of regulation¹⁹. I leave the exploration of the effects of financial condition on prices in a cross-section of industries for future research.

Research of the impact of financial condition faces a general dilemma: While financial condition is a firm-level phenomenon, prices are clearly market-specific. In this research, I investigate the impact of firm-level condition on individual product market prices. This approach presents some challenges in that it is harder to find statistical significance, and it may be desirable to investigate this research question in the context of single-market firms²⁰. The latter are, however, hard to find nowadays.

On a final note, I should point out that this study's results may also depend upon the measurement of financial distress. I opted for Z score measures and Chapter 11 dummy variables given that they have been widely applied in the extant literature. The finance literature offers numerous variations of these measures as well as entirely different ones (see e.g. Gritta and Pamplin, 2004 for a comparative review of some of these measures). Future research may explore the sensitivity of the results with respect the measurement of financial condition.

This research contributes to the literature on the link between firm financial situation and output market behavior. It is shown that this issue is far from being fully resolved and that strategic management theory offers avenues for further exploration of the impact of financial condition on prices. I have made a first step in this direction by estimating the moderating effect of a number of strategic contingencies on this relationship.

¹⁹ Regulation by the Civil Aeronautics Board ended in 1978, but has shaped the industry in many ways. Although formally deregulated, regulatory controls (e.g. slot controls, antitrust rulings) continue to impact the industry.

²⁰ I do note, however, that I find strong statistical significance for all of the variables of interest included in the models.

Bibliography

- Aiken, Leona S. and West, Stephen G.: "Multiple regression: Testing and interpreting interactions" (1991), Sage Publications, Newbury Park, CA
- Altman, Edward I.: "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy" (1968), *Journal of Finance*, 23 (4), 589-609
- Altman, Edward: "Bankruptcy, Credit Risk, and High Yield Junk Bonds" (2002), Blackwell Publishers, Malden, MA, 7-36
- Baker, Samuel H.: "Risk, Leverage, and Profitability: An Industry Analysis" (1973), *Review of Economics and Statistics*, 55, 503-507
- Borenstein, Severin: "Hubs and High Fares: Dominance and Market Power in the U.S. Airline Industry" (1989), *RAND Journal of Economics* 20 (3), 344-365
- Borenstein, Severin and Rose, Nancy L.: "Bankruptcy and Pricing Behavior in U.S. Airline Markets" (1995), *The American Economic Review*, 85 (2), 397-402
- Bowman, Edward H.: "Risk Seeking by Troubled Firms" (1982), *Sloan Management Review*, 23 (4), 33-42
- Brander, James A. and Lewis, Tracy R.: "Oligopoly and Financial Structure: The Limited Liability Effect" (1986), *The American Economic Review*, 76 (5), 956-970
- Busse, Meghan: "Firm financial condition and airline price wars" (2002), *RAND Journal of Economics*, 33 (2), 298-318:
- Caves, Richard E. and Ghemawat, Pankaj: "Identifying Mobility Barriers" (1992), *Strategic Management Journal*, 13, 1-12
- Caves, Richard E. and Porter, Michael: "From entry barriers to mobility barriers: conjectural decisions and contrived deterrence to new competition" (1977) *Quarterly Journal of Economics*, 91, 241-261
- Chakravarthy, Balaji S.: "Measuring Strategic Performance" (1986), *Strategic Management Journal*, 7 (5), 437-458
- Chattopadhyay, Prithviraj, Glick, William H. and Huber, George P.: "Organizational Actions in Response to Threats and Opportunities" (2001), *Academy of Management Journal*, 44 (5), 937-955
- Chen, Ming-Jer: "Competitor Analysis and Interfirm Rivalry: Toward a Theoretical Integration" (1996), *Academy of Management Review*, 21 (1), 100-134
- Chen, Ming-Jer, Smith, Ken G. and Grimm, Curtis M.: "Action Characteristics as Predictors of Competitive Responses" (1992), *Management Science*, 38 (3), 439-455
- Chevalier, Judith A.: "Do LBO Supermarkets Charge More? An Empirical Analysis of the Effects of LBOs on Supermarket Pricing" (1995), *The Journal of Finance*, 50 (4), 1095-1112
- Daily, Catherine M.: "Bankruptcy in Strategic Studies: Past and Promise" (1994), *Journal of Management*, 20 (2), 263-295
- Dasgupta, Sudipto and Titman, Sheridan: "Pricing Strategy and Financial Policy" (1998), *Review of Financial Studies*, 11 (4), 705-737
- Dresner, M.E., Lin, J.C., Windle, R.J.: "The Impact of Low-Cost Carriers on Airport and Route Competition" (1996), *Journal of Transport Economics and Policy*, September 1996, 309-328
- Evans, William N. and Kessides, Ioannis N.: "Living by the 'Golden Rule' Multimarket Contact in the U.S. Airline Industry" (1994), *Quarterly Journal of Economics*, 109, 341-366
- Feder, Warren H. and Lagrange, Patrick C.: "Considerations for Investors Before Investing in Bankrupt Companies" (2002), *The Journal of Private Equity*, 38-41

- Ferrier, Walter J.: "Navigating the Competitive Landscape: The Drivers and Consequences of Competitive Aggressiveness" (2001), *Academy of Management Journal*, 44 (4), 858-877
- Ferrier, Walter J., Mac Fhionnlaioich, Cormac, Smith, Ken G. and Grimm, Curtis M.: "The Impact of Performance Distress on Aggressive Competitive Behavior: A Reconciliation of Conflicting Views" (2002), *Managerial and Decision Economics*, 23, 301-316
- Fiengenbaum, Avi and Thomas, Howard: "Strategic Groups as Reference Groups: Theory, Modeling and Empirical Examination of Industry and Competitive Strategy" (1995), *Strategic Management Journal*, 16, 461-476
- Gelman, Judith R. and Salop, Steven C.: "Judo economics: capacity limitation and coupon competition" (1983), *The Bell Journal of Economics*, 14, 315-325
- Gibbons, Robert: "Game Theory for Applied Economists" (1992), Princeton University Press, Princeton, New Jersey
- Gritta, Richard D. and Pamplin Jr., R.B.: "Air Carrier Financial Condition: A Review of Models for Measuring the Financial Fitness of the U.S. Airline Industry" (2004), *Proceedings of the 2004 Conference of the Air Transport Research Society*
- Hall, M. and Weiss, L., "Firm Size and Profitability" (1967), *Review of Economics and Statistics*, 49, 319-331
- Hendel, Igor: "Competition under Financial Distress" (1996), *Journal of Industrial Economics*, 44 (3), 309-324
- Hofer, Christian, Dresner, Martin and Windle, Robert: "Financial Distress and US Airline Fares" (2005), *Journal of Transport Economics and Policy*, 39 (3), 323-340
- Kahnemann, Daniel and Tversky, Amos: "Prospect Theory: An Analysis of Decision under Risk" (1979), *Econometrica*, 47 (2), 263-192
- Kennedy, Robert E.: "The Effect of Bankruptcy Filings on Rivals' Operating Performance: Evidence from 51 Large Bankruptcies" (2000), *International Journal of the Economics of Business*, 7 (1), 5-25
- Lant, Theresa K., Milliken, Frances J. and Batra, Bipin: "The Role of Managerial Learning and Interpretation in Strategic Persistence and Reorientation: An Empirical Exploration" (1992), *Strategic Management Journal*, 13, 585-608
- Lant, Theresa K. and Montgomery D.B.: "Learning from strategic success and failure" (1987), *Journal of Business Research*, 15, 503-518
- Leblanc, Greg: "Signaling Strength: Limit Pricing and Predatory Pricing" (1992), *RAND Journal of Economics*, 23 (4) 493-506
- Maksimovich, Vojislav and Zechner, Josef: "Debt, Agency Costs, and Industry Equilibrium" (1991), *Journal of Finance*, 46 (5), 1619-1643
- McKinley, William: "Organizational Decline and Adaptation: Theoretical Controversies" (1993), *Organization Science*, 4 (1), 1-9
- Miles, R.E. and Snow, C.C.: "Organizational strategy, structure, and process" (1978), McGraw-Hill, New York, NY
- Miller, Danny and Chen, Ming-Jer: "Sources and Consequences of Competitive Inertia: A Study of the U.S. Airline Industry" (1994), *Administrative Science Quarterly*, 39 (1), 1-23
- Modigliani, Franco and Miller, Merton H.: "The Cost of Capital, Corporation Finance and the Theory of Investment" (1958), *The American Economic Review*, 158, 261-297
- Mone, Mark A., McKinley, William and Barker III., Vincent L.: "Organizational Decline and Innovation: A Contingency Framework" (1998), *Academy of Management Review*, 23 (1), 115-132
- Morrison, S.A.: "Actual, Adjacent, and Potential Competition: Estimating the Full Effect of Southwest Airlines" (2001), *Journal of Transport Economics and Policy*, 35 (2), 239-25

- Moses, O. Douglas: "Organizational Slack and Risk-taking Behavior: Tests of Product Pricing Strategy" (1992), *Journal of Organizational Change Management*, 5 (3), 38-54
- Moulton, Wilbur N. and Thomas, Howard: "Bankruptcy As A Deliberate Strategy: Theoretical Considerations And Empirical Evidence" (1993), *Strategic Management Journal*, 14 (2), 125-135
- Opler, Tim C. and Titman, Sheridan: "Financial Distress and Corporate Performance" (1994), *The Journal of Finance*, 49 (3), 1015-1040
- Peteraf, Margaret A.: "Intra-industry Structure and the Response toward Rivals" (1993), *Managerial and Decision Economics*, 14 (6), 519-528
- Ravenscraft, David J.: "Structure-Profit Relationships at the Line of Business and Industry level" (1983), *Review of Economics and Statistics*, Feb. 1983, 22-31
- Rose-Green, Ena and Dawkins, Mark: "Strategic Bankruptcies and Price Reactions to Bankruptcy Filings" (2002), *Journal of Business Finance & Accounting*, 29 (9), 1319-1335
- Scherer, Frederic M.: "Industrial Market Structure and Economic Performance" (1980), Rand McNally College Publishing Company, Chicago, IL
- Shoham, Aviv and Fiegenbaum, Avi: "Competitive determinants of organizational risk-taking attitude: the role of strategic reference points" (2002), *Management Decision*, 40 (1/2), 127-141
- Singh, Jitendra V.: "Performance, Slack, and Risk Taking in Organizational Decision Making" (1986), *Academy of Management Journal*, 29 (3), 562-585
- Smart, Carolyne and Vertinsky, Ilan: "Strategy and the Environment: A Study of Corporate Responses to Crises" (1984), *Strategic Management Journal*, 5, 199-213
- Smith, Ken G., Grimm, Curtis M., Gannon, Martin J. and Chen, Ming-Jer: "Organizational Information Processing, Competitive Responses, and Performance in the U.S. Domestic Airline Industry" (1991), *Academy of Management Journal*, 34 (1), 60-85
- Smith, Ken G., Grimm, Curtis M., Wally, Stefan and Young, Greg: "Strategic Groups and Rivalrous Firm Behavior: Towards a Reconciliation" (1997), *Strategic Management Journal*, 18 (2), 149-157
- Staw, Barry M., Sandelands, Lance E. and Dutton, Jane E.: "Threat-Rigidity Effects in Organizational Behavior: A Multilevel Analysis" (1981), *Administrative Science Quarterly*, 26, 501-524
- Waldman, Don E. and Jensen, Elizabeth J.: "Industrial Organization: Theory & Practice" (2001), second edition, Addison Wesley Longman
- Wiseman, Robert M. and Bromiley, Philip: "Toward a Model of Risk in Declining Organizations: An Empirical Examination of Risk, Performance and Decline" (1996), *Organization Science*, 7 (5), 524-543
- Wiseman, Robert M. and Gomez-Mejia, Luis R.: "A Behavioral Agency Model of Managerial Risk Taking" (1998), *Academy of Management Review*, 23 (1), 133-153
- Xu, Tianji and Tiong Robert L.K.: "Risk assessment on contractors' pricing strategies" (2001), *Construction Management and Economics*, 19, 77-84
- Yoffie, David B. and Kwak, Mary: "Judo Strategy: 10 Techniques for Beating a Stronger Opponent" (2002), *Business Strategy Review*, 13 (1), 20-30
- Young, Greg, Smith, Ken G. and Grimm, Curtis M.: "'Austrian' and Industrial Organization Perspectives on Firm-level Competitive Activity and Performance" (1996), *Organization Science*, 7 (3), 243-254