

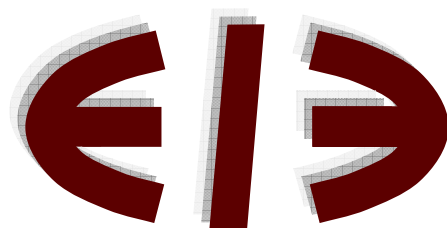
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Relationships, Layoffs, and Organizational Resilience: Airline Industry Responses to September 11

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**RELATIONSHIPS, LAYOFFS, AND ORGANIZATIONAL RESILIENCE:
AIRLINE INDUSTRY RESPONSES TO SEPTEMBER 11TH**

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**RELATIONSHIPS, LAYOFFS AND ORGANIZATIONAL RESILIENCE:
AIRLINE INDUSTRY RESPONSES TO SEPTEMBER 11TH**

The terrorist attacks of September 11th, 2001 affected the U.S. airline industry more than almost any other industry. Certain of these companies emerged successful, however, and demonstrated remarkable resilience while others languished. This investigation identifies the reasons why some airline companies recovered successfully after the attacks while others struggled. Evidence is provided that layoffs after the crisis, while intended to foster recovery, instead inhibited recovery throughout the four years after the crisis. But layoffs after the crisis were strongly correlated with the lack of financial reserves and the lack of a viable business model prior to the crisis. Digging deeper, we find that having a viable business model itself depended on the extent to which positive employee relationships had been achieved and maintained over the long term. One implication of our findings is that layoffs, while reducing costs in the short term, may also undermine the positive relationships that are critical for achieving lasting recovery.

(155 words)

The U.S. airline industry faced devastating losses in the wake of the September 11th, 2001 terrorist attacks. According to Kevin Murphy, airline industry analyst for Morgan Stanley, “If there was ever a stress test for a good business, this is it.” The day after the attacks, the major airlines appeared in front of Congress seeking relief in the form of federal assistance. Fifteen billion dollars were allocated to the industry, some in the form of outright grants to cover the loss of operating revenue in the days after the attacks when the industry was shut down by federal order. The rest of the \$15 billion allocation was made available in the form of loan guarantees to be allocated according to rules established by the Air Transport Stabilization Board. Even with this federal assistance, however, the industry continued to lose millions of dollars on a daily basis due to the slow rate of passenger return. In response to these losses, the major airlines cut their flights by an average of 20 percent and laid off an average of 16 percent of their workforces in the weeks following the attacks. Even though all of the major airlines were devastated about equally in terms of the initial decline in passenger traffic, however, they did not respond in the same way. Some airlines emerged from this crisis resilient and strong, whereas others languished and even confronted bankruptcy.

This is a story of organizational resilience. It is an investigation of the factors explaining the success of some airline companies after the 9/11 attacks and the struggles of others. It focuses on the roles played by relational reserves, financial reserves and the viability of the underlying business models in ten major airline companies. Specifically, the study explains why managers must maintain and enhance strong employee relationships (relational reserves) during crisis in order to ensure commitment and productivity. But it also highlights the crucial role played by financial reserves (cash flow and low debt levels) and an organization’s business

model in the ability to respond effectively to crisis. Organizations are better able to cope with a crisis when they maintain strong relational and financial reserves and when they have business models that fit the needs of the existing competitive environment. Drawing upon fifteen years of data from the airline industry prior to the crisis, we see that achieving a viable business model is itself a function of positive employee relationships. While layoffs enable organizations to respond to crisis in the short term, they also risk damaging the relationships that are needed for long term recovery.

THE ROLE OF POSITIVE RELATIONSHIPS FOR INDIVIDUALS, COMMUNITIES, AND ORGANIZATIONS

Abundant research has shown that positive human relationships improve outcomes for individuals, communities, and organizations (Cameron, Dutton, & Quinn, 2003; Dutton & Ragins, 2006). For individuals, positive social relationships are associated with higher levels of physical and psychological well being (Ryff & Singer, 2001) and lower risk of death (Seeman, 1996), at least partly due to the revitalizing, stress-reducing effects of positive relationships. Positive relationships affect the hormonal, cardiovascular, and immune systems of the body, thus enhancing health and wellbeing, and enhancing the relationships themselves (Heaphy & Dutton, 2006). In communities, the density and patterns of social connections are predictors of economic vitality (Gittell & Vidal, 1999; Putnam, 2001). Social capital and the existence of positive social networks account for community-level outcomes such as educational attainment, financial well-being, and the reduction of crime (Baker, 2000).

In organizations, social capital facilitates the transfer of knowledge (Nahapiet & Ghoshal, 1998; Levin & Cross, 2006) and the achievement of coordinated action (Leana & Van Buren, 1999; Crowston, & Cammerer, 1998; Faraj & Sproull, 2000) among organizational members.

For example, relationships of shared goals, shared knowledge, and mutual respect support high levels of coordination among frontline employees, with positive effects on both quality and efficiency performance (Gittell, 2001; 2002; 2003; Gittell et al., 2000). Moreover, friendships among co-workers and the presence of caring and compassionate relationships are significant predictors of performance outcomes (Cameron & Caza, 2004; Dutton, 2003). A review by Heaphy and Dutton (2006) of the linkage between relational reserves at work and physiological outcomes—which, in turn, facilitate higher levels of worker engagement and productivity—makes a strong case that positive connections at work have an important impact on performance. Dutton and Ragins' (2006) edited volume provides multiple chapters presenting evidence for the positive impact of positive social relationships on resilience and performance. Collectively, this research contributes to a relational theory of how people develop (Miller, 1976; Miller & Stiver, 1997) and how they work effectively together to improve organizational outcomes (Fletcher, 1999; Gersick, Bartunek, & Dutton, 2000).

RELATIONSHIPS AS A SOURCE OF RESILIENCE

The role of relationships is especially important when considering how individuals and organizations respond to crises. Most organizational theory has focused on the negative consequences of crisis such as threat-rigidity, downward spirals, vicious cycles, and tipping points (Staw, Sandelands, & Dutton, 1981; Sitkin, 1992; Gladwell, 2002; Weick, 2003), yet some organizations demonstrate a remarkable tendency to flourish and thrive in the midst of crisis. These organizations demonstrate *resiliency*.

Resiliency in everyday parlance refers to the capability to “absorb strain and maintain coherence” (Oxford English Dictionary). In organizational science it refers to (a) the maintenance of positive adjustment under challenging conditions (Worline, et al, 2004; Weick,

Sutcliffe, & Obstfeld, 1999), (b) the ability to bounce back from untoward events (Sutcliffe & Vogus, 2003), and (c) the capacity to maintain desirable functions and outcomes in the midst of strain (Edmondson, 1999; Bunderson & Sutcliffe, 2002). Resilience is a dynamic capacity of organizational adaptability that grows and develops over time (Wildavsky, 1988). It is not a static attribute that organizations do or do not possess. Rather, it results from processes that help organizations retain resources in a form sufficiently flexible, storable, convertible, and malleable to avert maladaptive tendencies and cope positively with the unexpected (Sutcliffe & Vogus, 2003; Worline et al., 2004).

These processes enable the maintenance of positive social relationships at work, which have been linked to resilience and recovery in individuals (Ryff & Singer; Seligman, 2002) as well as in organizations (Luthans, 2002; Cameron, Bright, & Caza, 2004; Spreitzer, Sutcliffe, Dutton, Sonenshein, & Grant, 2006). That is, a growing body of empirical evidence supports the notion that positive relationships at work—or relational reserves—are a prerequisite to organizational resilience.

These outcomes center on the nature of the relationships that develop among organization members. The levels of social, emotional, and moral support provided to one another, for example, are key components of organizational resilience (Carver, Scheier, & Weintraub, 1989). In a laboratory study where subjects were exposed to equivalent levels of stressors, Aiello and Kolb (1995) found that members of cohesive groups reported the least stress. Similar evidence found that social support among employees reduced the negative effects of work stressors on work outcomes (Moyle & Parkes, 1999; Schaubroeck & Fink, 1998). Positive relationships served as the key coping resources that enabled individuals and organizations to develop resilience in the face of work stress. Individually, children who had close relationships with

caregivers, other competent adults, or peers, and those living in a closely knitted community, were more likely to cope effectively during times of adversity (Masten & Reed, 2002).

FINANCIAL RESERVES AND BUSINESS MODELS AS SOURCES OF RESILIENCE

The predominant theme in the resilience literature is that resiliency results from the presence of both (1) positive relationships and (2) the access to adequate resources. Wildavsky (1988) argued that, in addition to social support, retaining financial reserves in a form that is sufficiently flexible to cope with unanticipated events was a key mechanism for developing resiliency. Similarly, in a study of hospital responses to an unexpected doctors' strike, Meyer (1982) found that slack resources worked as "organizational shock absorbers" that buffered the impact of environmental jolts. The accumulation of substantial financial reserves during tranquil periods enabled one of the most resilient hospitals in the study to adapt to the crisis without the need to lay off employees. In another hospital, a strong organizational ideology emphasizing employee well-being greatly affected the organization's ability to respond to environmental jolts. This hospital had to suffer a short-term decline in profits by not laying off employees, but the strategy allowed it to preserve its commitment to its employees and contributed to its ability to readjust quickly after the crisis.

Building on the theme of adequate resources, we further hypothesize that having a business model that is viable in the existing competitive environment is another important source of resilience for surviving a crisis. Financial reserves help an organization to weather the storm by providing a buffer against losses, but a business model that meets the needs of the existing competitive environment is expected to enable an organization to minimize those losses and thus to recover more quickly. A viable business model, in addition to financial reserves, is expected to be particularly important in the face of a sustained crisis. Given the evidence cited above

regarding the role of relationships in achieving productivity and quality outcomes, we hypothesize that relationships play another critical role in achieving resilience. Not only are relationships critical as a coping mechanism in the face of crisis, according to this story, but they are also critical for creating viable business models that can survive a sustained crisis.

LAYOFFS AS A RESPONSE TO CRISIS

Paradoxically, a common organizational response to crisis—i.e., layoffs—tends to undermine the very relationships that help organizations cope during periods of crisis. Many studies have reported the negative effects of downsizing on organizational relationships (Cameron, 1994; 1998; Cameron, Freeman, & Mishra, 1991) including: (1) the destruction of interpersonal relationships, shared values, trust and loyalty, and commonality and strength of culture; (2) reduced information sharing and increased secrecy, deception, and duplicity; (3) increased formalization, rigidity, resistance to change, and conservatism; (4) increased conflict, anger, vindictiveness, and feelings of victimization; and (5) increased selfishness and voluntary turnover, as well as deterioration in teamwork and cooperation (also see Cole, 1993; McKinley, Sanchez, & Schick, 1995; Cascio, Young, & Morris, 1997; DeWitt, 1993). A large majority of firms that downsize experience these deleterious effects, although a few do not, primarily due to the *way* in which downsizing is implemented (Cameron 1994, 1998), paying special attention to the effects on relational reserves.

As a result of the negative impact on relationships, layoffs also have negative implications for organizational performance. Most organizations, for example, experience deteriorating profitability, product and service quality, innovation, and organizational climate after downsizing (Cameron, 1998). Three years after downsizing, the market share prices of downsized companies were an average of 26 percent below the share prices of their competitors

at the beginning of the 21st century. Among companies with similar growth rates, those that did not downsize consistently outperformed those that did in the 2001 recession. Moreover, almost all organizations that downsized—in the public sector or the private sector—experienced an emergence of the “dirty dozen” as a result of downsizing (see Bennett, 1991; Cameron, 1998; Cascio, Young, & Morris, 1997; Henkoff, 1990; Mishra, & Mishra, 1994; Cole, 1993; McKinley, Sanchez, & Schick, 1995). The dirty dozen are twelve common deleterious outcomes associated with downsizing, such as declines in trust, networks, communication, commitment, and innovation along with increases in threat-rigidity, selfishness, conflict, and goal displacement (Cameron, Kim, & Whetten, 1987).

These negative performance effects of layoffs are consistent with theories of high performance work systems and mutual gains enterprise, both of which argue that employment security is essential for achieving sustained innovation and productivity that benefit both employees and stockholders (Kochan & Osterman, 1994). These negative performance effects of layoffs are also consistent with relational theory more broadly as summarized in the previous section. When layoffs are used as a primary coping response in a crisis, such as a sharp decline in the demand for the organization’s products or services, the resulting weakened relationships mitigate the very resilience and recovery being sought.

THIS STUDY

This study investigates the extent to which the dramatic differences in resiliency and recovery in U.S. airline companies after the tragedy of September 11th can be explained by these factors—the preservation of relational and financial reserves, and the existence of viable business models. The expected interrelationships of these factors are summarized in the model below (see Figure 1).

[Insert Figure 1 about here.]

METHODS

Given the unexpected nature of the 9/11 crisis, we relied on publicly available data for our analyses. To test the impact of pre-9/11 financial reserves and business models on post-9/11 layoffs and stock price recovery, our sample included all U.S. airlines classified as major airlines at the time of the 9/11 crisis - American, America West, Alaskan, Delta, Continental, Northwest, Southwest, TWA, United and US Airways. To test the pre-9/11 portion of the model (the impact of relationships on productivity and the impact of productivity on the viability of business models), our sample included quarterly data from 1987 through 2000 for all U.S. airlines classified as major airlines in 2000, the same ten airlines as above, except that TWA no longer existed and American Trans Air (ATA) had reached the status of a major airline.

Performance Recovery

Performance recovery was measured by comparing stock prices for individual airlines to their September 10, 2001 levels, quarterly from December 10, 2001 through September 10, 2005. Recovery was measured as current stock price divided by stock price on September 10th. One hundred percent would signify that an airline's stock price had recovered to exactly its pre-crisis level of September 10th. It is important to note that we are not measuring stock prices per se; rather, we are measuring the recovery of stock prices to their pre-9/11 level in an attempt to reflect the concept of resilience or ability to bounce back from crisis.

Layoffs

Layoffs were measured using publicly available data from press announcements. As airlines announced layoffs, we recorded these data and continued to update the data as airlines adjusted their initial layoff plans in the face of further information. The numbers used in our

analyses are the final decisions regarding percentage of employees laid off in each of the major U.S. airlines.

Financial Reserves

Financial reserves were indicated for this study in two ways -- low levels of debt and high amounts of cash on hand -- and were measured using publicly available measures of debt/equity ratios and days of cash on hand as of September 10th, the day prior to the attacks. Debt is a constraint when a crisis or downturn occurs because interest payments are a fixed cost that must be paid regardless of revenues. Low debt levels thus give companies flexibility in a downturn due to lower fixed costs. Furthermore, low debt levels give a company greater flexibility to take on new debt to get through the downturn (Freear, 1980). Lower debt/equity ratios were, therefore, expected to reduce the extent of layoffs among airlines faced with the crisis of 9/11.

Cash on hand also provides flexibility in the face of a crisis, enabling organizations to pay expenses caused by a crisis. Readily available cash at least partially compensates for the shortfall in current revenues. Cash on hand was, therefore, also expected to reduce the extent of layoffs. The source of data on debt/equity ratios was Yahoo Financials and Thomson Financial. The source of data for days of cash on hand was Yahoo Financials and Merrill Lynch.

Employee Productivity

Employee productivity is typically measured as a ratio of output to labor input. However, not all airline employees have the same outputs. Following Gittell, von Nordenflycht, and Kochan (2004), we therefore measured labor productivity separately for each employee craft, using U.S. Department of Transportation Form 41 data. For pilots, we measured flight miles per pilot. For flight attendants, we measured revenue passenger miles per flight attendant. For mechanics, we measured flight departures per mechanic. Similarly for dispatchers, we measured

flight departures per dispatcher. For ground personnel, we measured number of passengers enplaned per ground employee. Our final measure of employee productivity is an index of these productivity measures, weighted according to the size of each employee group. Cronbach's alpha for this index is 0.84.

Aircraft Productivity

Aircraft productivity was computed as block hours per aircraft day, where block hours are the hours between pulling back from the airport gate, using Form 41 data. These are the hours that an aircraft is in a revenue-producing mode. Aircraft productivity can be strongly affected by the extent to which employee cooperate, coordinate and exert discretionary effort in getting planes loaded and turned around quickly (Gittell, 2001; Knez & Simester, 2001), just as employees influence the productivity of capital equipment in other industries.

Business Model (Unit Costs)

The viability of airline business models was indicated for this study as total operating costs per available seat mile, the traditional measure of unit costs in this industry. The choice of unit costs is based on the emerging consensus that low unit costs are the starting point for a viable business model in the commercial airline industry today, given an increasingly cost sensitive customer and the penetration of nearly every U.S. market by low cost competition. Unit costs per available seat mile were computed using Form 41 data.

Relationships

Following Gittell, von Nordenflycht, and Kochan (2004), the strength of employee relationships was measured for this study as the number of strikes and releases that occurred at a given airline in a given quarter, based on archival data from the Airline Industrial Relations Conference. Under the Railway Labor Act, the regulatory regime for airlines, the National

Mediation Board grants a release after its members determine that no progress is being made in negotiations.

Control Variables

To control for other factors besides relationships that are expected influence productivity and unit costs in this industry, we include measures of union representation (percent of employees who are unionized), wages (sum of wage and salary costs for all key operating personnel divided by total number of employees), flight length (miles flown per flight departure), aircraft size (seats per aircraft), and capital intensity (capital assets per employee). All of these control variables were measured using Form 41 data, except for percent union representation, which was measured using archival data from the Airline Industrial Relations Conference.

Data Analysis

To test empirically the association between pre-9/11 variables (financial reserves and business models) and the post-9/11 response (layoffs and performance recovery), we used the Spearman's rank correlation coefficient—a conservative test of associations—along with their significance levels or p-values. To test empirically associations among pre-9/11 variables (relationships, productivity and unit costs), we used the longitudinal data set described above with airline-quarter as the unit of analysis. We use random effects regressions, treating each airline as the random effect to allow our coefficients to reflect variation both within and across airlines over time (Hausman, 1978).

FINDINGS

Significant differences occurred in the strategies implemented by these ten major airlines after the attacks of 9/11, as suggested by the percent of employees laid off (see Figure 2).

[Insert Figure 2 about here.]

Stock price recovery since September 11th has been slow in all the major airline companies, even since the immediate crisis has passed. This is, in part, due to on-going security concerns and the increased “hassle factor,” both of which have contributed to the decline in demand for air travel (Sharkey, 2004). However, the recovery in stock prices has varied substantially across the industry (see Figure 3). In particular, performance recovery since September 11th has been fastest for Southwest Airlines, whose stock price has been at 92 percent of its pre-9/11 level over the four years post-9/11, and slowest for United Airlines and US Airways, whose stock prices have remained at 12 and 23 percent, respectively, of their pre-9/11 levels over the same period.

[Insert Figure 3 about here.]

Using Spearman’s rank order correlations, it is clear that the subsequent recovery in airline stock prices relative to their pre-crisis levels was significantly and negatively related to the extent of layoffs at the time of the crisis (see Figure 4). Resilience, as indicated by the speed of stock price recovery, is negatively correlated with the extent of layoffs, for three years following the crisis. At the start of the third year, the correlation became statistically insignificant following the exit of US Airways from bankruptcy and the hope by investors that layoffs and bankruptcy together could lead the airlines to a successful recovery. But by the end of the third year, the correlation again returned to significance. Averaged over the entire four year period, recovery of the major carriers to the stock price levels of pre-9/11 is strongly correlated with the percent layoffs they made following 9/11 ($r=-0.788$, significance = 0.007).

[Insert Figure 4 about here.]

Figures 5 and 6 report cash-on-hand and debt-equity ratios of the major U.S. airlines prior to September 11th. The figures show substantial variation in cash and debt levels among the

major airlines prior to September 11th. As noted above, debt acts as a constraint in a downturn since interest payments are a fixed cost that must be paid regardless of revenues (Freear, 1980, p. 151). Low debt levels were thus expected to give companies flexibility in a downturn due to lower fixed costs. Furthermore, low debt levels provide companies with greater flexibility to take on new debt to survive the downturn. Cash on hand also provides flexibility in the face of a downturn in revenues, enabling organizations to pay expenses from past revenues to at least partially compensate for the shortfall in current revenues. However, cash on hand does not last long with extremely high debt levels. A Spearman's rank correlation analysis of these data shows that prior cash levels of the airlines did not predict the extent of layoffs in the ten firms in the airline industry ($r = -0.426$, significance = 0.220), but their debt/equity ratios were strongly predictive ($r = 0.819$, significance = 0.004). The observed correlation between cash on hand and layoffs is relatively weak because for those companies with extremely high debt levels, like US Airways and Northwest, high levels of cash on hand could not reduce the need for layoffs.

[Insert Figures 5 and 6 about here.]

In addition to the role of financial reserves in enabling airlines to forgo layoffs and recover more quickly, we need to also explore the viability of the business models themselves prior to the crisis of 9/11. Due to the increasing threat and success of low cost competition in the industry, there was a consensus just prior to 9/11 that one critical element of a viable business model in this industry was the achievement of low unit costs. As we see from Figure 7, there was significant variation in unit costs in this industry prior to 9/11, ranging from 7.5 cents per seat mile at Southwest Airlines to over 15 cents per seat mile at US Airways, with most carriers having unit costs around 9 to 10 cents per seat mile. A Spearman's rank correlation between unit costs and layoffs shows that unit costs prior to 9/11 were predictive of the extent of layoffs after

9/11 ($r = 0.702$, significance = 0.024). Low unit costs might be expected to enable lower levels of debt, given that debt levels are driven, in part, by the failure to achieve competitive business models and the resulting lack of profits. However, firms with low unit costs might choose, nevertheless, to accumulate relatively high levels of debt, as seen in the case of ATA, and therefore to engage in higher levels of layoffs than we would otherwise expect. This suggests that low unit costs and low debt levels each play a distinct role in enabling companies to avoid layoffs and recover more quickly from crises. Indeed, the association between unit costs and debt levels, though relatively strong, does not reach statistical significance ($r=0.612$, significance=0.060).

[Insert Figure 7 about here.]

But while unit costs are often a key ingredient of a viable business model, and thus can be expected to play an important role in avoiding layoffs in the face of crisis, they are not the starting point for this story. Rather, low unit costs are themselves expected to result from the efficiencies that are achieved through positive working relationships. We conducted a longitudinal analysis of airline industry data for the 15 years prior to 9/11, considering multiple drivers of unit costs, including the quality of the employment relationship, the extent of unionization, wage levels, and productivity of both aircraft and employees. Following the lead of other studies of airline operating performance, we controlled for flight length and aircraft size, due to their known effects on creating economies of scale (e.g. Gittell, von Nordenflycht, & Kochan, 2004). Figure 8 shows the descriptive data for this model. The regression equations shown in Figure 9 show that conflictual relationships significantly decrease both aircraft and labor productivity ($r = -0.519$, significance = 0.000 for aircraft productivity, and $r = -0.179$, significance = 0.001 for labor productivity). Productivity in turn reduces unit costs ($r = -0.054$,

significance = 0.000 for aircraft productivity, and $r = -0.105$, significance = 0.000 for labor productivity).

[Insert Figures 8 and 9 about here.]

With the results from these analyses, we have updated our conceptual model to show the size and significance of the hypothesized relationships (see Figure 10).

[Insert Figure 10 about here.]

US AIRWAYS VERSUS SOUTHWEST: A QUALITATIVE COMPARISON

In this section, we illustrate the conceptual model that we developed and tested above by focusing on the contrast between Southwest and US Airways, given their similarity along several key dimensions, and their stark differences along other dimensions. Due to their focus on short haul flights (Southwest's average flight length pre-9/11 was 481 miles and US Airways' was 576 miles, relative to an average of 781 miles for the major airlines), both airlines were more vulnerable than their competitors to the "hassle factor" introduced by new airport security measures. The "hassle factor" is expected to affect disproportionately the recovery of short haul travel because airport check-in procedures represent a higher percent of total travel time for short haul travel and because short haul travel is more easily replaced by alternative forms of transportation such as trains, buses, and automobiles. In addition to anecdotal evidence (e.g. Sharkey, 2004), data from the Federal Aviation Administration show that between December 2000 and December 2003, the number of short-haul flights dropped—i.e., the number of flights shorter than 249 miles decreased by 20 percent, and flights between 250 and 499 miles dropped by 11 percent. Meanwhile, the number of long-haul flights increased—i.e., the number of flights between 500 and 999 miles increased by 8 percent, and flights of 1000 miles or more increased by 1 percent. In addition, international routes proved to be more profitable than domestic routes

during the post-September 11th period, due to less intense price competition. It might be expected, therefore, that airlines such as Southwest and US Airways that focused on short haul, primarily domestic markets would experience the largest deterioration in demand and revenue in the period following the terrorist attacks, and would, therefore, have the hardest time recovering from the crisis of September 11th.

Moreover, Southwest and US Airways shared in common higher than average levels of unionization for the industry, with Southwest 89 percent unionized and US Airways 82 percent unionized pre-9/11, relative to an average of 69 percent for the major airlines as a whole. Unionization might be expected to slow recovery given the need to renegotiate contracts with one's unionized employees, or find legal grounds for abrogating those contracts.

The fact that Southwest recovered more quickly than any other major airline, while US Airways experienced one of the slowest recoveries, suggests a need to look at other factors driving recovery. We focus here on the factors that our previous analyses have shown to be important for driving recovery as they pertain to Southwest and US Airways –in particular, layoffs, the existence of financial and relational reserves, and the unit costs underlying their business models.

Layoffs as a Response to Crisis

US Airways' leaders conducted the highest level of layoffs in the industry, a 24 percent reduction compared to the industry average of 16 percent. This strategy was not surprising given the history of the leadership at US Airways. When he became CEO in 1996, Stephen Wolf selected Rakesh Gangwal from United Airlines as president and began grooming him as his hand-picked successor (Meyer & Meyer, 2000). Wolf had a consistent and financially lucrative approach to managing airlines, though his approach did not appear to produce sustainable

performance over time. As CEO of struggling Republic Airlines, Wolf threatened bankruptcy unless his pilots took a hefty pay cut. When they did, he restored it to profitability, then sold it to Northwest. He next took on Flying Tiger, a California-based cargo carrier on the verge of collapse, squeezing out labor concessions worth \$50 million before selling the company to Federal Express. At United Airlines, he extracted \$4.9 billion in wage and benefit concessions before the airline became employee-owned, but labor demanded his departure as a condition of the buyout agreement.

In 2000 the *Denver Post* (May 28, P. 1-G) described the consequences of Wolf's strategy at United. At the same time United had achieved profitability under his leadership, "There were no fond farewells from union leaders [at United] who had to negotiate contracts during the Wolf era. 'They hated him,' said Darryl Jenkins, an aviation professor at George Washington University. 'This is a person who everybody has an opinion on, and the opinions are always strong.' 'He managed through intimidation and fear,' said Ira Levy, a United employee and general chairman of the International Association of Machinists District Lodge 141 in Denver. 'I think there's still a lot of animosity toward him.'"

Wolf's selection and tutelage of Gangwal at US Airways was, predictably, a perpetuation of the same strategic approach. Their expertise at tightening operations and extracting labor concessions was well known, so when they took the reins at US Airways, unions knew what to expect. "Some people respected Wolf for having made United a champ. Most, however, were apprehensive. They knew Wolf's track record and they expected him to come after concessions with pliers in hand" (Meyer & Meyer, 2000: 247).

Gangwal became CEO in 1998, and when the tragedy of September 11th occurred, it is not surprising, in retrospect, that his leadership approach appeared to take advantage of the situation to accomplish goals he had not previously been able to accomplish (Barakat, 2001):

“Despite US Airway’s huge losses, President Rakesh Gangwal said he is optimistic about the airline’s future. Specifically, he said the September 11 attacks have allowed the airline to restructure and downsize in ways that would have been impossible otherwise. Specifically, the attacks allow the airline to invoke *force majeure* clauses in union contracts and eliminate unprofitable routes. *Force majeure* is the legal term for an uncontrollable event that releases a party from its contractual obligations.”

“Gangwal said he expects the changes to be permanent. ‘I don’t want to take advantage of the situation, but we have to do what is right for the company,’ Gangwal said in a conference call with analysts. ‘And the events of September 11th have opened certain doors for the company that were pretty much closed before.’”

Employees responded negatively to this apparent opportunism and disregard for human relationships on the part of US Airways’ leadership, and their representatives filed a series of grievances against the airline related to its use of the *force majeure* clause. The head of the pilots’ union noted, “We’ve been saying all along that management has been using *force majeure* not as an opportunity to get through a crisis, but to take advantage of a crisis” (Barakat, 2001). Whether the actions taken by US Airways were legal or not, they are expected, based on our model, to do lasting damage to relational reserves as well as to undermine the credibility of its

leadership. Indeed, US Airway's leadership was replaced in early 2002 due in part to its loss of credibility with employees as a result of its response to the crisis of September 11th.

The case of Southwest illustrates a different strategy for responding to the crisis. Southwest was determined to avoid layoffs altogether and couched its decision in terms of "taking care of our people." Traditional wisdom suggests that avoiding layoffs in the face of a dramatic decline in demand would jeopardize Southwest's short-term well being. That is, investing in relationships by avoiding layoffs would put short-term survival at risk, as was articulated by the senior executives of US Airways. Indeed, the company was reportedly losing "millions of dollars per day" (*Wall Street Journal*, September 21, 2001) in the weeks following the terrorist attacks. "Clearly we can't continue to do this indefinitely," said Southwest's CEO Jim Parker. Still, he said, "we are willing to suffer some damage, even to our stock price, to protect the jobs of our people" (Conlin, 2001). Southwest indicated a willingness to suffer these immediate losses in order to achieve longer-term performance based on relational reserves.

The result was that while other airlines shed both employees and unprofitable routes, Southwest maintained a steady presence in the wake of the attacks, refusing to lay off any of its employees. Instead, Southwest treated the crisis as an opportunity to increase its presence and expand the availability of its service to the flying public. According to an aviation consultant: "They're doing what they do best, which is to shine in the hours of trouble" (Trottman, 2001). Southwest used the crisis as an opportunity to strengthen rather than weaken employee relationships. Southwest has the most consistently positive employee relations of any airline in the industry, while at the same time being the most highly unionized of all the airlines (Gittell, von Nordenflycht, & Kochan, 2004). As Southwest grew from an upstart to a major carrier, it continued to reach contractual agreements with its unions more quickly than any other airline

(von Nordenflycht, & Kochan, 2005). Just prior to 9/11, however, Southwest was embroiled in difficult labor negotiations. Southwest's no-layoff response to September 11th had the effect of reminding its employees of Southwest's tradition of caring. According to the president of the Transport Worker's Union local representing Southwest's ramp and operations employees (Trottman, 2001): "What may have seemed like really big issues a month ago maybe aren't quite the big issues now... When it gets bad everywhere else, it's good here."

Asked about Southwest's efforts to avoid layoffs in the wake of the September 11th attacks, a Southwest employee in the Office of Financial Analysis explained, "It's part of our culture. We've always said we'll do whatever we can to take care of our people. So that's what we've tried to do." Former Southwest's CEO Herb Kelleher explained his philosophy regarding layoffs in early 2001, before the crisis of September 11th hit (Brooker, 2001):

"Nothing kills your company's culture like layoffs. Nobody has ever been furloughed [at Southwest], and that is unprecedented in the airline industry. It's been a huge strength of ours... "We could have furloughed at various times and been more profitable, but I always thought that was short-sighted. You want to show your people that you value them and you're not going to hurt them just to get a little more money in the short term."

"Not furloughing people breeds loyalty. It breeds a sense of security. It breeds a sense of trust. So in bad times you take care of them, and in good times they're thinking, perhaps, 'We've never lost our jobs. That's a pretty good reason to stick around.'"

Whereas the views expressed by Southwest's leaders are consistent with the critical role of relational reserves in fostering organizational resilience, they contradict the prevailing

prescriptions for competitive corporate strategy. Referring to Southwest CEO Jim Parker's comment about his willingness to take a hit on Southwest's stock price, if necessary, to protect the jobs of its people, *Business Week* noted (Conlin, 2001):

“Such words would likely make famous job–slashers like Jack Welch and Al Dunlap cringe. But Southwest is a member of a tiny fraternity of contrarian companies that refuse, at least for now, to lay off . . . In the aftermath of a national tragedy that economists say makes a recession and thousands of additional job cuts inevitable, their stances seem almost noble, an old-fashioned antidote to the make-the-numbers-or-else ethos pervading Corporate America.”

The prevailing prescriptions for competitive corporate strategy advocate layoffs to protect the interests of the shareholders (Tichy, 1993). This view is consistent with a longstanding stream of thought by U.S. economists regarding the dominance of shareholder rights over those of other stakeholders (Friedman, 1970; Jensen, 1989). Consistent with this view, the relationship between organizations and their employees is often treated as a contingent one. However, as argued by the theories of high performance work systems and mutual gains enterprise, job security is essential for sustained innovation and productivity, due to the high levels of trust and commitment such an approach tends to engender (e.g. Kochan and Osterman, 1994). Indeed, Cappelli (1999) observed that employers who moved toward a more contingent approach to employment “were shocked by the collapse of employee morale” and often ended up backpedaling to regain the employee commitment without which it was difficult to operate. As even *Business Week* pointed out, there are practical benefits of a no-layoff approach in the face of crisis, namely “fierce loyalty, higher productivity, and the innovation needed to enable them

to snap back once the economy recovers” (Conlin, 2001). These arguments are consistent with the negative association between layoffs and stock price recovery discussed earlier.

The Role of Financial Reserves

According to our model and supported by our quantitative analyses, it is not sufficient to want to avoid layoffs. One must be able to sustain a downturn without resorting to layoffs, and financial reserves are one critical factor that enables companies to do so. Avoiding personnel reductions requires that an organization be financially *able* to sustain short-term losses. In particular, two factors—cash on hand and debt load—are important contributors to resilience, or the extent to which a firm can withstand financial crisis. Cash on hand is crucial for coping with the immediate term resource demands that arise in a crisis, and a low debt/equity ratio is necessary for coping with the medium and long term exigencies of a crisis. Avoiding employee layoffs altogether, or maintaining a contractual commitment to severance pay for those who are laid off, is highly related to the extent to which the organization has the financial reserves with which to operate. Retaining cash to cover immediate financial pressures, and maintaining low debt levels, thereby allowing the firm to finance longer-term expenses, are key elements in preserving relational reserves in a firm. Organizations without sufficient financial reserves may be forced to break their commitments with employees and customers when faced with crisis simply because they cannot meet payroll. On the other hand, relational reserves can be significantly enhanced in the presence of financial slack.

Southwest’s ability to resist layoffs can be attributable to its long-standing policy of maintaining low debt levels and an abundant supply of cash on hand. As people throughout the company have pointed out repeatedly over the years: “At Southwest, we manage in good times as though we were in bad times”. Maintaining high levels of financial reserves has not been

common business practice in the airline industry, however. For years, Southwest has been the only single-A-rated airline company. Prior to September 11th, Kelleher explained Southwest's financial policy and how it has enabled Southwest to thrive during past downturns (Brooker, 2001):

“Most people think of us as this flamboyant airline, but we're really very conservative from the fiscal standpoint. We have the best balance sheet in the industry. We've always made sure that we never overreached ourselves. We never got dangerously in debt, and never let costs get out of hand. And that gave us a real edge during [the Gulf War crisis of 1990 to 1994].”

Over time, Southwest Airlines made a conscious, strategic choice to maintain substantially greater reserves than is the norm in its industry. Southwest protects these reserves by sticking to its policy of gradual steady growth, despite the fact that there is sufficient demand for Southwest's service to permit a far-faster rate of growth. According to John Denison, Southwest's Executive Vice President of Corporate Services (Gittell, 2003, p. 245):

“We promise the marketplace 10 percent growth, but we are only going to grow as fast as we can manage. Sometimes we have grown faster strategically. We acquired Morris Air in 1994 at the right time to compete. But we try to maintain the balance sheet. It is no accident that we are the only single-A-rated company in the industry.”

US Airways, like other U.S. airlines, had taken on high levels of debt over the years, responding to pressures from Wall Street. At the time of the 9/11 attacks, for example, the airline had incurred almost \$8 billion in debt obligations and had lost money for eight straight quarters. Wall Street analysts complained publicly about the high costs of labor contracts at US

Airways, and the airline's strategy for coping with these financial pressures had been to borrow more money from sources such as J.P. Morgan Chase (\$71 million), Wilmington Trust (\$50 million) and EDS (\$47 million) (*CNN Money*, 2002). High debts levels coupled with high labor costs led to severely restricted financial flexibility when the 9/11 crisis occurred.

These results suggest that it is not merely the desire to invest in relational reserves by avoiding layoffs that accounts for resilience in the face of crisis. *Wanting* to avoid layoffs to preserve relationships is different than being *able* to do it. It is both the desire and ability to avoid damaging relational reserves that accounts for long-term resilience. Financial reserves, particularly in the form of low debt levels, serve as a supplementary coping resource for organizations by giving them room to maneuver in the face of crisis. Organizations can avoid relying on layoffs as the primary response to crisis if they have the necessary financial reserves.

These results are expected to be relevant beyond the airline industry as well. Indeed, financial theory indicates that interest payments create a form of financial risk that becomes greater when interest payments are higher and when there is variability of operating earnings (Freear, 1980). By implication, financial reserves play a more important role in fostering organizational resilience when the variability of operating earnings in the industry is greater.

If the lack of financial reserves makes an organization vulnerable to crisis and more dependent on using layoffs as a coping strategy—and, therefore, less resilient—why then are high levels of debt a common feature of so many companies? One answer is illustrated by the fact that Southwest has been criticized by Wall Street analysts for its policy of maintaining high levels of financial reserves. The business press reported that Southwest's "conservative approach has been criticized by Wall Street analysts, who have argued that the airline should use its extra cash to make acquisitions or buy back stock. Goldman Sachs airline analyst, Glenn Engel, called

the balance sheet 'too strong' [although] Engel allowed, 'this has meant that when times are tough, they have a lot more flexibility' (Mount, 2002).

The Role of a Viable Business Model and of Relationships for Achieving It

As suggested by our model and supported by our quantitative analyses, another reason that Southwest could avoid layoffs in the face of September 11th was its low operating costs. Low operating costs had become the *sine qua non* for a viable business model in the airline industry over the course of the 1990s. Consumer behavior shifted in the early 1990s toward greater price sensitivity, with consumers demanding lower costs and comparing airline travel more carefully with other modes of transportation and communication. After a low point in the early 90's, passenger willingness to pay rebounded somewhat after 1994. But from 2000 to 2001 (prior to 9/11), revenue per passenger mile dropped by more than 10 percent. The *Wall Street Journal* featured two prominent articles reflecting the growing consensus that these changes in customer willingness to pay, as in the case of the retail industry, reflected the new reality for the airline industry (Brannigan, et al, 2001; Trottman & McCarthy, 2002). "Anyone who has a modicum of Internet capability and wants to take what is now a modest amount of time can very rapidly find out and comparison shop," said Leo Mullin, CEO of Delta Airlines. "There is almost perfect information out there" (Brannigan, et al, 2001).

While most major airlines had unit operating costs in the range of 9 to 11 cents per available seat mile prior to 9/11, Southwest's were just 7.7 cents per seat mile. According to Merrill Lynch analyst Michael Linenberg, "They tend to have some of the lowest costs in the industry, so in times of depressed business, they can make money while others are losing money" (*USAToday*, 2002). US Airways, by contrast, faced the crisis of September 11th with the highest operating costs of any major airline in the U.S. industry, at 15.4 cents per seat mile.

The key to low unit costs in this industry is productivity of the airline's most costly assets – employees and aircraft. Southwest's strategy for achieving low costs has focused over the years on increasing productivity, rather than lowering wages and benefits. In his 1995 Message to the Field, CEO Herb Kelleher said, "We want to reduce all of our costs, except our wages and benefits and profit-sharing. This is Southwest's way of competing, unlike others who lower their wages and benefits" (Gittell, 2003). Southwest has achieved the highest levels of productivity for both employees and aircraft, based on its legendary levels of teamwork and "relational coordination," enabling employees to turn aircraft quickly at the gate, thus maximizing the time that aircraft are in the air, earning revenue. The role of positive working relationships for achieving these outcomes is supported by the analyses conducted above, but was also established in a study that compared Southwest in a more detailed way to some of its major competitors (Gittell, 2003). This study showed that relationships of shared goals, shared knowledge and mutual respect support high levels of coordination among employees, and explain much of the variation in employee and aircraft productivity between Southwest and its competitors.

Starting in the 1990s, US Airways also made concerted efforts to achieve low unit costs. In the case of US Airways, however, there were two distinct strategies – improving productivity, and reducing wages and benefits. After losing most of the intra-California market to Southwest in 1992, US Airways endured a strike with its mechanics, resulting in lower wages than several of its key competitors, including Southwest. After Southwest's invasion of its Baltimore hub in 1993, US Airways tried a second strategy for reducing unit costs -- setting up its own quick turnaround operation under the name Project High Ground in 1994. Project High Ground was designed to "speed the way [USAir] services and turns around planes at airports. Borrowing a page from Southwest, USAir is trying to halve the time its planes spend on the ground"

(McCarthy & O'Brian, 1994). According to US Airways' Boston station manager, "On our regular flights, we get 40 to 45 minutes to turn the plane around. Under High Ground, we do it in 20 to 25 minutes for some and 30 to 35 minutes for others, depending on the routing."

US Airways announced in spring 1994 that it would expand its new business model from 22 to 100 aircraft. But some industry observers expected US Airways to fail unless pay and benefits were cut further (McCarthy & O'Brian, 1994). Strong pressures from investors for pay cuts and strong stands from union leaders against them put top management in a difficult position. Moody's lowered US Airways' bond ratings, citing "concern that the company's recent operating changes designed to reduce its cost structure will not be sufficient to offset the anticipated revenue losses from price competition" (Feldman, 1994). The pilots' union argued that the airline's costs were too high, not because of labor, but because it was not deploying its assets wisely. A June 1994 proposal to the union to save \$175 million through management and staff reductions and by subcontracting mail and freight operations was met by a pilot counterproposal for an employee buyout with board representation. A year later, after stalled negotiations, the airline's fifth crash in five years, a perceived threat of bankruptcy, and threats by management to shrink the airline, the parties reached agreement, but the animosity and ill-will continued.

In 1997, still suffering from the animosity of negotiations over pay cuts, US Airways sought again to reduce unit costs by raising employee and aircraft productivity, launching a new low cost business model called MetroJet (*Wall Street Journal*, 1998). Two dozen volunteers were recruited who wanted to take part in a "new kind of airline." The team consisted of representatives from all the major employee groups and spent six months designing MetroJet from the ground up. According to media reports, "Even the staunchest foes of management were

won over by this innovative experiment in human resource management and empowerment.”

At the same time, however, US Airways’ leadership continued to extract pay concessions from employees. Labor strife continued throughout the rest of the 90’s, culminating in 2000 with a work action threatened by flight attendants, who were fed up after four years of failing to secure a contract for themselves. The bold experiment to build a new and viable business model for US Airways never fully succeeded, due in large part to poor working relationships, and was terminated by Ghangwal in the aftermath of September 11th.

Summary

The contrasting stories of Southwest Airlines and US Airways illustrate the model of resilience we tested in this paper. A viable low cost business model achieved through long term positive employee relations, along with adequate financial reserves, enabled Southwest to return quickly to business as usual, following the crisis of 9/11. As early as February 2002, Southwest announced plans to hire about 4,000 new employees, drawing in part from the employees laid off from other airlines. Its ability to hire new employees was even further strengthened by the fact that it did not conduct layoffs in the downturn after 9/11. According to a press report (*USAToday*, February 18, 2002), “Ron Jackson, a former United Airlines flight attendant and electrician who joined Southwest last year, said the carrier’s stability was a factor. ‘We are always made to feel comfortable that we are going to keep our jobs,’ said Jackson.” A Merrill Lynch financial analyst speculated that “Southwest’s ability to avoid layoffs last fall has probably raised employee loyalty and improved its productivity – already considered the strongest among major carriers.”

US Airways, by contrast, continued to rely on layoffs as a strategy of recovery. In 2002, the company announced that an additional 471 pilots would be let go, adding to a previously

announced layoff of 286 pilots after September 11th. Moreover, an additional 915 flight attendants were furloughed, making a total reduction of 3,675 flight attendants out of 10,000 that were employed before the September 11th tragedy (*People's Daily*, 2002). According to a *San Francisco Chronicle* (2004) report: "It is certainly a management truism that low morale among workers inevitably results in low productivity, low quality, erosion of customer loyalty, and, ultimately, profits. US Airways employees, who have seen their pay cut by more than 20 percent and their health insurance and pension plans shrink, are certainly an unhappy lot. 'People are giving 110 percent, but they are totally beaten down,' said Francis Smith, 53, a 24-year employee . . . Dianne Fogarty, a US Airways flight attendant with 33 years of service, has lost pay and vacation days and said she was resentful that, in her view, management sees her as only a dollar sign. Nonetheless, she said, 'they will not take away my work ethic, my sense of humor, or my smile.'" Actual wages at US Airways were no higher, and in many cases (e.g., for pilots and mechanics) were lower than those paid by Southwest, but high operating costs coupled with high levels of debt inhibited resiliency. Although US Airways' stock price recovery began to outperform some of its competitors following the drastic cost-cutting achieved in bankruptcy, by the end of the fourth year it was again the airline that had recovered least from the tragedy of 9/11.

CONCLUSION

In the normal pattern of organizational behavior, an organization's leadership responds to financial crises with layoffs and cutbacks. The organization's performance subsequently suffers because of the resulting deterioration in relationships. The relationships that could serve as a collective coping mechanism in the face of adversity are, instead, weakened by layoffs. This

scenario represents a dilemma for organizations, in which measures taken for short-term survival appear to undermine the conditions for longer-term success.

However, some organizations respond differently to crisis, accepting the short-term costs of excess staffing levels in order to maintain positive human relationships in the face of adversity. By avoiding layoffs, these organizations maintain or even strengthen human relationships, creating coping resources that enable organizational members to respond cohesively to the crisis in innovative ways. As a result, the deterioration of organizational performance caused by the crisis is ameliorated. Furthermore, once the immediate crisis has passed, organizational performance can return more quickly to pre-crisis performance levels due to the maintenance of relationships during the period of the crisis. To avoid layoffs, however, organizations must be financially able to do so. Financial reserves and viable business models thus play a significant role in minimizing layoffs and in sustaining the relationships that enable organizations to return more quickly to pre-crisis performance levels. Moreover, the achievement of a viable business model over time is itself enabled by positive working relationships, as in the case of Southwest Airlines, and prevented by their absence, as has thus far been the case for US Airways. While viable business models play an important role in minimizing layoffs, the high levels of productivity and low unit costs underlying these models are made possible in part by the careful nurturing of relational reserves over the years. Financial reserves contribute further to the ability to minimize layoffs in the face of crisis. The results of our investigation of U.S. airline companies provide support for this model.

Our findings are consistent with Meyer's (1982) conclusion that financial reserves, coupled with a strong commitment to employees, are pivotal to an organization's ability to cope with environmental jolts. Our resilience model explains the role that relational reserves play in

coping with crisis, and the role that financial reserves play in enabling organizations to maintain relational reserves. Relational reserves are clearly damaged by layoffs, and numerous studies have provided evidence that layoffs lead to deterioration in employee relationships (Cameron, 1994, 1998; Cameron, Freeman, & Mishra, 1993). The violation of the psychological contract resulting from downsizing (Rousseau, 1995) causes trust and cooperation to be replaced by distrust and antagonism, so layoffs almost always cause a deterioration in relational reserves. For these reasons, employment security has long been identified as a key component of high performance work systems or mutual gains enterprises (e.g. Kochan & Osterman, 1994). Airline companies that avoided layoffs and maintained commitments to employees showed more resiliency than those that violated contractual commitments, instituted layoffs, and cancelled severance benefits.

Wanting to maintain commitments in the face of crisis is only half the story. The other half is being *able* to do so, which requires having a viable business model, as well as financial reserves in place for that purpose. The relationship-based performance of Southwest Airlines contradicts the leveraged buy-out movement of the 1980s and 90s in which corporate leaders were encouraged to rid their organizations of financial reserves, with the promise that this would make them efficient, lean, and more accountable to shareholders. The fact that there would be few reserves in place to preserve relationships and commitments in the face of crises, and that a decline in organizational resilience was the risk, is the often-neglected aspect of that phenomenon.

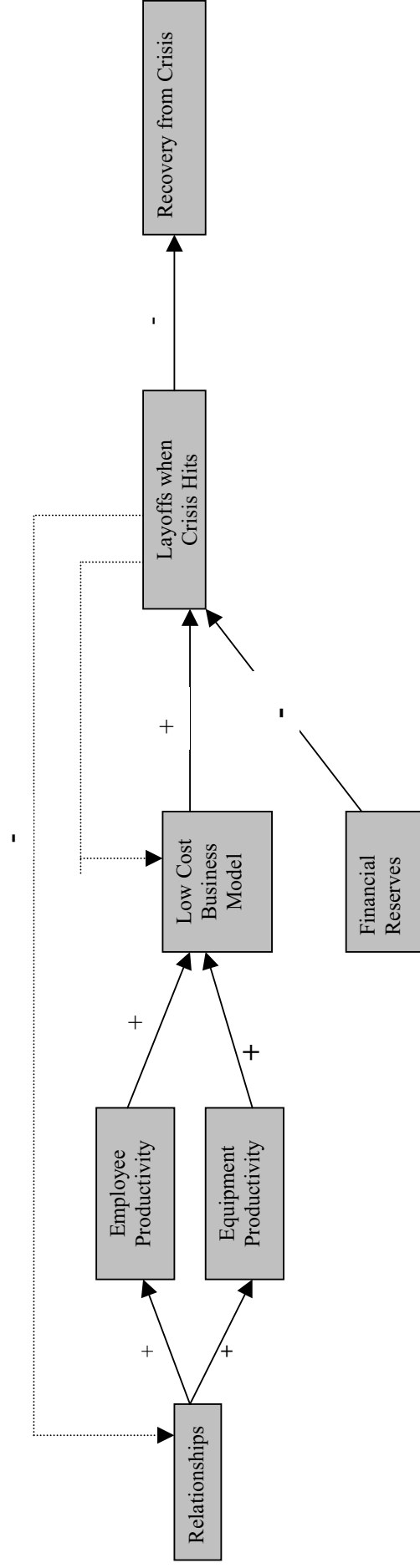
The model developed here combines insights from the literature on high performance work systems and mutual gains enterprise (e.g. Kochan & Osterman, 1994), with insights from the literature on high reliability work organizations and relational models of resilience (e.g.

Weick, Sutcliffe & Obstfeld, 1999), and with insights from positive relationships in organizations (e.g., Dutton & Ragins, 2006). The literature on high performance work systems and mutual gains enterprise has long argued for the role that employee commitment plays in achieving productivity and other outcomes, and for the role that employment security plays in achieving employee commitment. This literature has further highlighted pressures from financial stakeholders as working to undermine employment security. The literature on high reliability work organizations and relational models of resilience has highlighted the importance of relationships and financial reserves for achieving resilience in the face of environmental jolts. The literature on positive social relationships uncovers salutary individual and organizational effects of strong relational reserves.

The model we developed in this paper weaves together these three distinct literatures to explain how the airline industry responded to the crisis of September 11th. Moreover, this model has received considerable support from the available data. The most powerful implication of our model is that the outcomes of relationships tend to be self-reinforcing. Positive relationships tend to produce lower costs and lower debt levels over time, making it easier to sustain external shocks without breaking commitments, thus further strengthening relationships and performance. Likewise, negative relationships tend to produce high costs and high debt levels over time, making it harder to sustain external shocks without breaking commitments, thus further weakening relationships and performance. Interventions that focus on building relationships as a method of performance improvement may be one way to break this negative cycle, particularly if outside investors can be persuaded of the benefits of supporting such interventions.

FIGURE 1

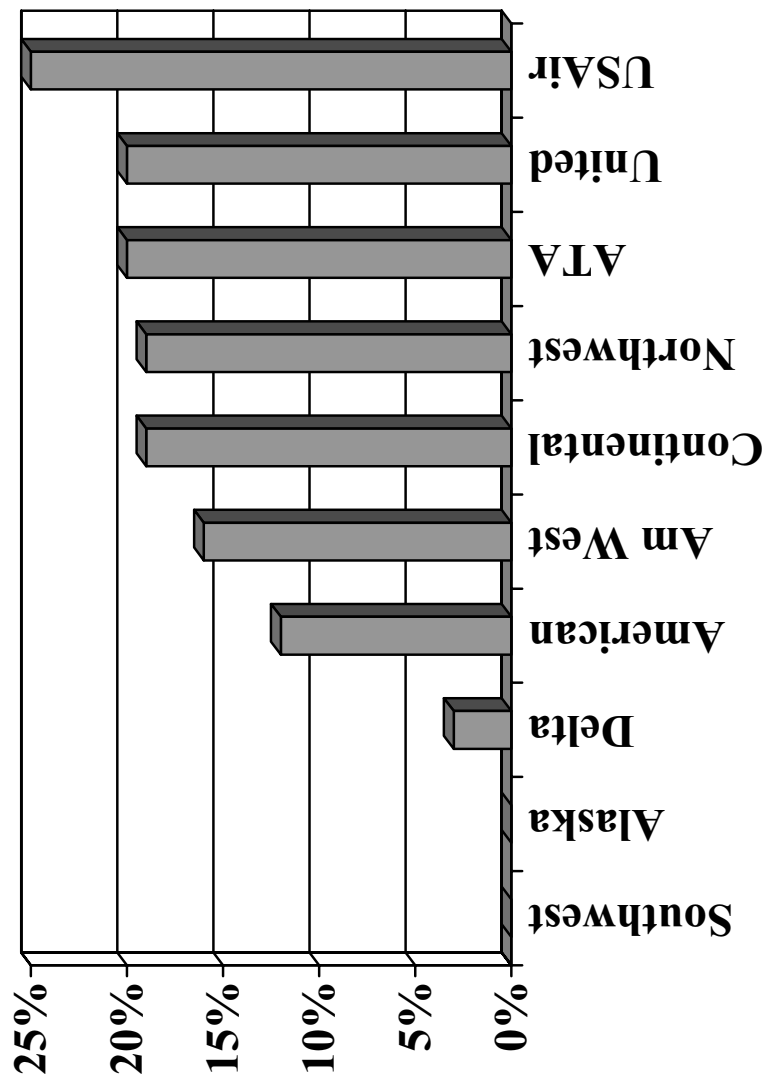
Conceptual Model of Organizational Resilience¹



¹ Solid arrows indicate relationships that will be tested statistically. Dotted arrows indicate relationships that are expected, but not tested in this paper.

FIGURE 2

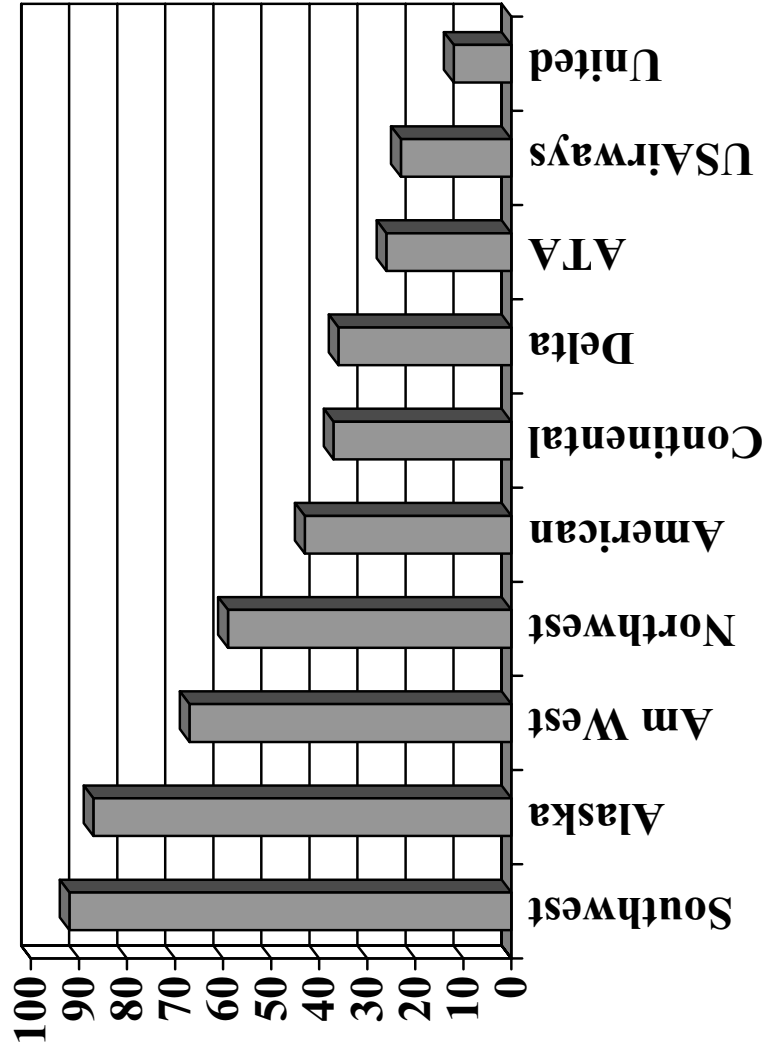
Employee Layoffs After September 11th2



² Source: Layoffs reported in press after September 11, divided by year-end employment for 2000 as reported by Bureau of Transportation Statistics.

FIGURE 3

Average Stock Price Recovery from Dec. 10, 2001 to Sept. 10, 2005, to Sept. 10, 2001 Levels³



³ Percent change in stock price relative to Sept. 10, 2001 levels, measured quarterly from December 10, 2001 to September 10, 2005. Source: Yahoo Financials.

FIGURE 4

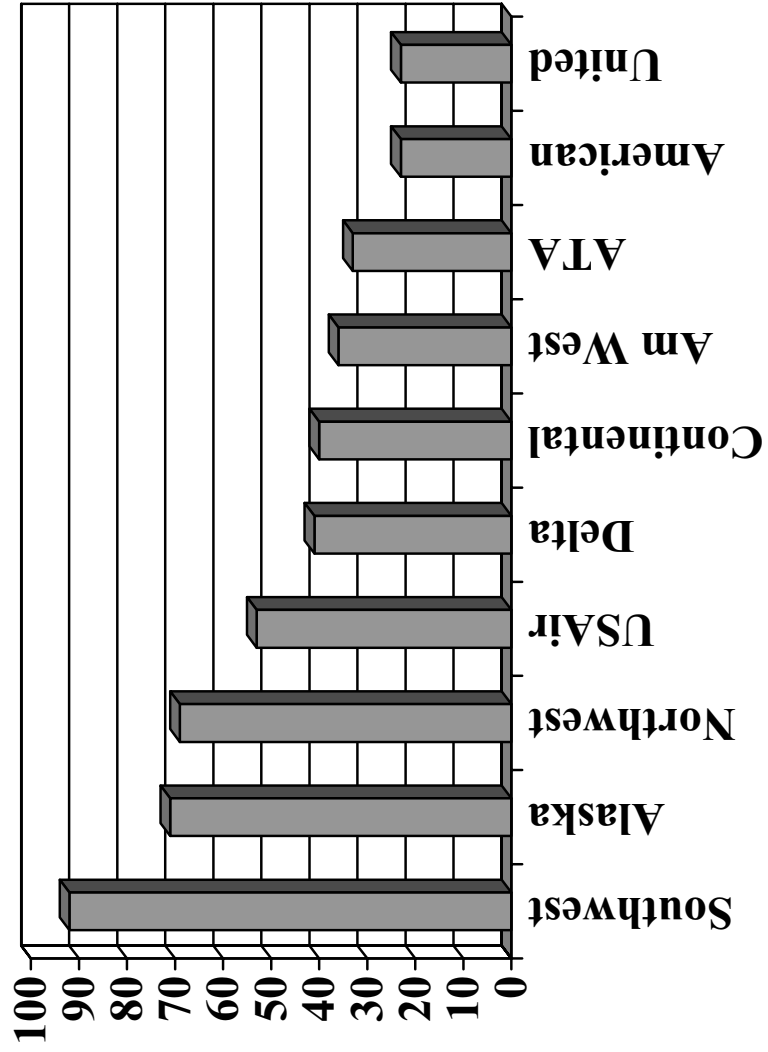
Percent Layoffs and Stock Price Recovery⁴

	Year 1				Year 2				Year 3				Year 4			
	Dec 10 2001	March 10 2002	June 10 2002	Sept 10 2002	Dec 10 2002	March 10 2003	June 10 2003	Sept 10 2003	Dec 10 2003	March 10 2004	June 10 2004	Sept 10 2004	Dec 10 2004	March 10 2005	June 10 2005	Sept 10 2005
Percent Layoffs	-0.665 (.036)	-0.751 (.012)	-0.763 (.010)	-0.874 (.000)	-0.849 (.002)	-0.788 (.007)	-0.825 (.003)	-0.394 (.260)	-0.364 (.301)	-0.492 (.148)	-0.566 (.088)	-0.652 (.041)	-0.591 (.072)	-0.751 (.012)	-0.763 (.010)	-0.825 (.003)

⁴ Spearman's rank correlation of layoffs conducted post-Sept. 11th (news reports) as a percent of employment against stock price recovery relative to September 10th levels (source: Yahoo Financials). P-values in parentheses. Sample: Ten major U.S. airlines. The correlation between percent layoffs and average stock price recovery over the entire four year period was -0.788 (p=0.007).

FIGURE 5

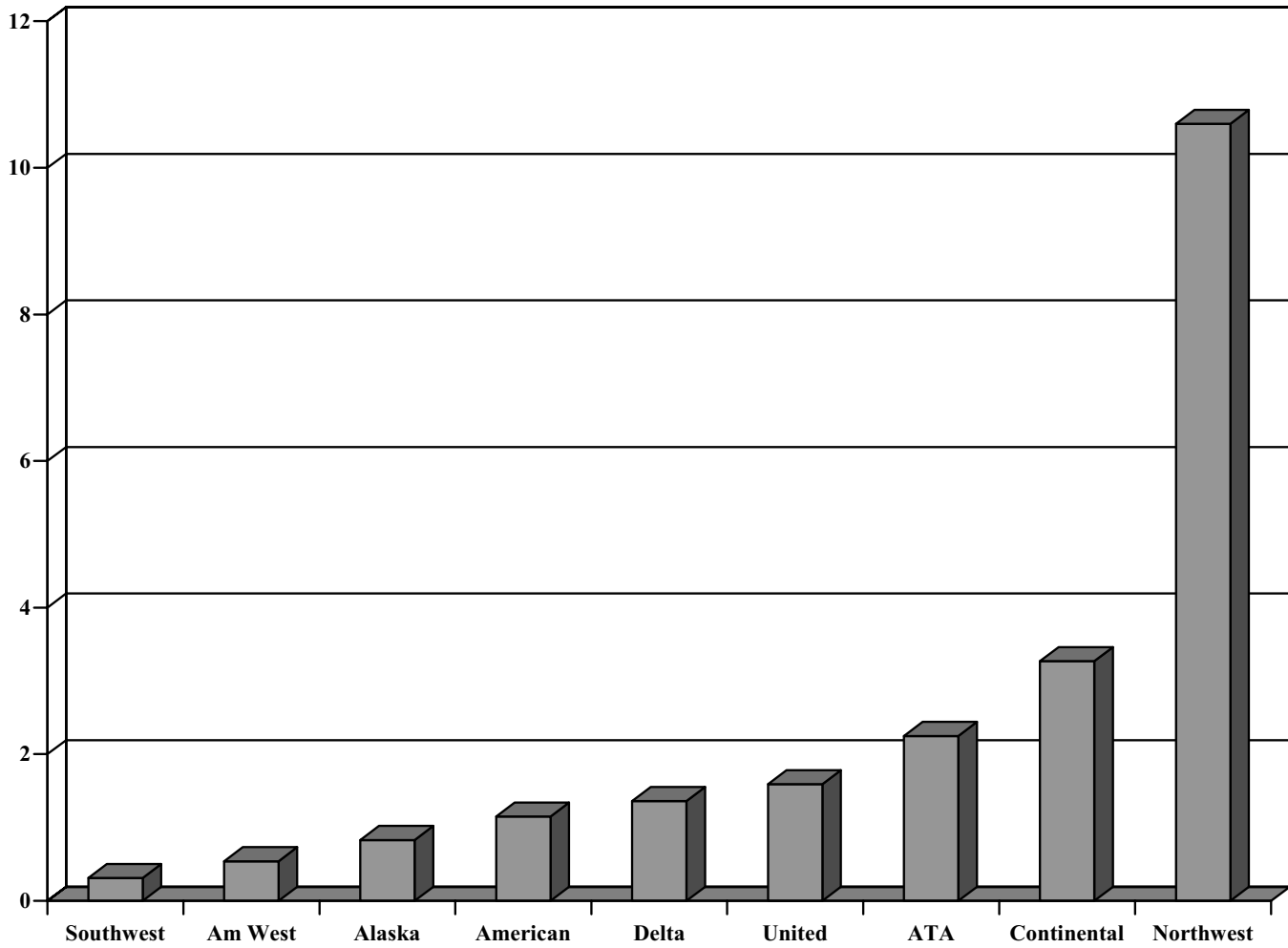
Days of Cash on Hand Preceding September 11th5



⁵ Sources: Aviation Week and Space Technology and Merrill Lynch.

FIGURE 6

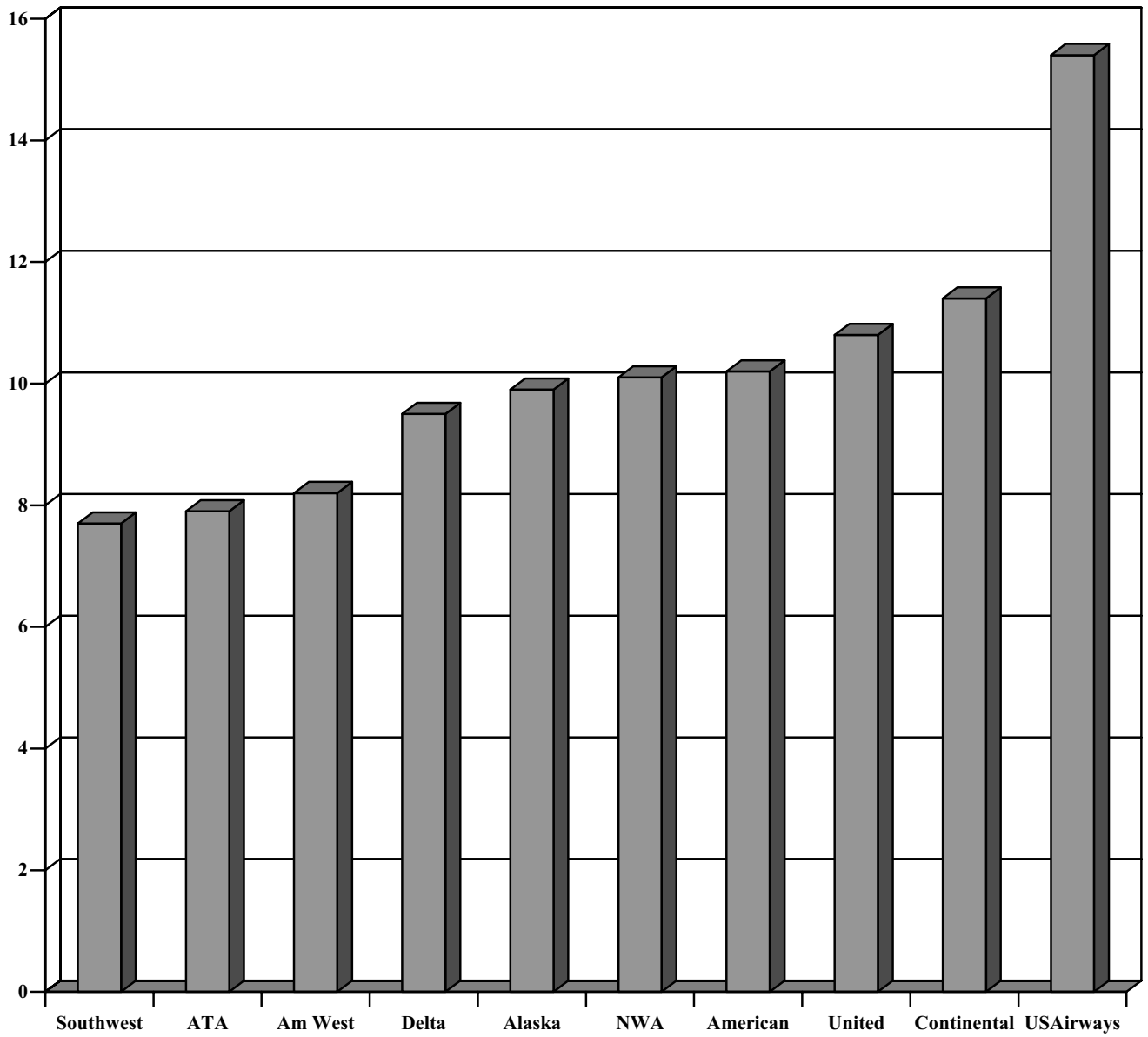
Debt to Equity Ratios Preceding September 11th⁶



⁶ Sources: Yahoo Finance and Thomson Financial. Note: US Airways was off the chart with a debt/equity ratio of 300.

FIGURE 7

Unit Costs Preceding September 11th⁷



⁷ Total operating costs (cents) per available seat mile. Source: Form 41, US Department of Transportation.

FIGURE 8

Descriptive Data for Model of Conflictual Relationships, Productivity and Unit Costs

	Mean (SD)	Obs	Unit Costs	Emp Prod	Aircraft Prod	Conflict	Union Rep	Wages	Leg Length	Aircraft Size
Unit Costs	9.0 (1.6)	500	--							
Employee Productivity	.055 (.656)	495	-.440 (.000)	--						
Aircraft Productivity	9.9 (.90)	500	-.522 (.000)	.580 (.000)	--					
Conflictual Relationships	.036 (.197)	500	.124 (.005)	-.105 (.019)	-.164 (.000)	--				
Union Representation	.575 (.265)	500	.018 (.691)	.079 (.078)	-.050 (.262)	.042 (.350)	--			
Wages	56,206 (13,446)	489	.270 (.000)	-.254 (.000)	-.471 (.000)	.063 (.162)	.077 (.091)	--		
Leg Length	682 (157)	500	.133 (.003)	-.245 (.000)	-.132 (.002)	.045 (.312)	-.152 (.001)	.054 (.237)	--	
Aircraft Size	121 (14)	500	-.102 (.023)	-.052 (.250)	-.099 (.026)	-.035 (.433)	-.365 (.000)	-.019 (.668)	.666 (.000)	--
Capital Intensity	186,630 (69,519)	500	.253 (.000)	.062 (.169)	-.192 (.000)	.067 (.133)	.345 (.000)	.204 (.000)	.405 (.000)	.342 (.000)

FIGURE 9
Impact of Conflictual Relationships on Productivity and Unit Costs⁸

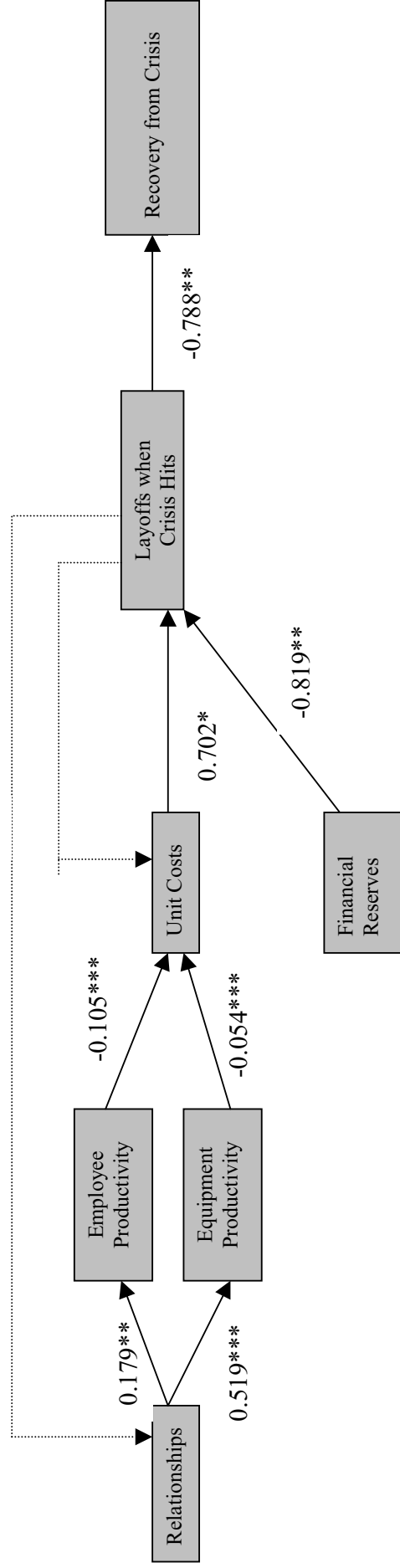
	Employee Productivity	Aircraft Productivity	Unit Costs	Unit Costs
Conflictual Relationships	-.179** (.001)	-5.19*** (.000)	.027 (.157)	.061*** (.000)
Employee Productivity	----	----	-.105*** (.000)	----
Aircraft Productivity	-----	----	-.054*** (.000)	----
% Union Representation	.262 (.216)	1.18*** (.000)	-.116*** (.000)	.155* (.012)
Wages	2.47*** (.000)	.364 (.466)	.744*** (.000)	.337*** (.000)
Flight Length (000)	-.388 (.145)	1.9*** (.000)	-.199*** (.000)	-.361*** (.000)
Aircraft Size (00)	2.44*** (.000)	2.33*** (.000)	-.301*** (.000)	-.602*** (.000)
Capital Intensity (000,000)	-.754* (.022)	-.543*** (.000)	-.318*** (.000)	.296** (.003)
Chi Square	980.64	405.42	1543.70	580.08
Prob > Chi Square	0.000	0.0000	0.0000	0.0000
Observations	485	489	489	489

* p< 0.05, ** p<0.01, *** p<0.001

⁸ Random effect regressions with quarterly data, and with airline (n=10) as the random effect. Regression coefficients and p-values are shown. Each model includes quarterly dummies to capture changes in the industry environment.

FIGURE 10

Conceptual Model of Organizational Resilience⁹



⁹ Solid arrows indicate relationships that are shown statistically. Dotted arrows indicate relationships that are expected, but not tested in this paper.

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