ARE RELATIVE PERFORMANCE MEASURES IN CEO INCENTIVE CONTRACTS USED FOR RISK REDUCTION AND / OR STRATEGIC INTERACTION?

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ABSTRACT

ARE RELATIVE PERFORMANCE MEASURES IN CEO INCENTIVE CONTRACTS USED FOR RISK REDUCTION AND / OR STRATEGIC INTERACTION?

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A long stream of accounting research examines the use of relative performance evaluation (RPE) in CEO incentive contracting in order to remove industry-wide risk factors as predicted by agency theory. My dissertation examines whether RPE has the additional role of motivating strategic interaction between own-firm and peer-firm managers, as industrial organization theory predicts, and whether the two objectives of RPE are mutually exclusive. Using data from the U.S. airline industry, I first document empirical support for the strong-form (but not the weak-form) RPE hypothesis, suggesting that firms entirely remove noise from relative performance measures. Importantly, I further hypothesize and find that CEO pay-for-peer-group-performance sensitivity is negative (positive) when firms compete in strategic substitutes (complements), indicating that RPE has directionally opposite effects on CEO incentives (depending on the type of strategic competition) that cancel each other in aggregate. This result explains the lack of support for the weak-form RPE hypothesis. However, the information and strategic objectives of RPE are not mutually exclusive. I hypothesize and find that firms filter out common risk from CEO incentive contracts by removing the systematic (i.e., common) component of performance and use the unsystematic (i.e., unique) component of performance to influence strategic interaction. This dissertation suggests that firms provide managerial incentives that are contingent on their own and peer firms' performance in order to both influence strategic interaction with peer firms and reduce the risk placed on their own managers.

Dedicated to my parents, Vasilios and Anastasia.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I: INTRODUCTION

Agency research in accounting posits that CEO compensation is linked to firm performance in order to align managers' interests with those of shareholders (Lambert and Larcker, 1987; Sloan, 1993; Core and Guay, 1999; Bushman and Smith, 2001; Lambert, 2001; Core, Guay and Verrecchia, 2003). Within this broad literature, an extensive stream of accounting research examines whether firms use relative performance measures in CEO incentive contracts to remove industry-wide risk factors that are beyond the CEO's control, thus improving the efficiency of incentive contracting (Antle and Smith, 1986; Jensen and Murphy, 1990; Janakiraman, Lambert and Larcker, 1992; Aggarwal and Samwick, 1999a,b; Albuquerque, 2009). Agency theory (Holmstrom, 1982; Holmstrom and Milgrom, 1987) motivates the weak-form and strong-form relative performance evaluation (RPE) hypotheses. The weak-form RPE hypothesis predicts that firms partially remove noise from the CEO’s performance when firms' outcomes are correlated to some degree, i.e., the weak-form RPE hypothesis predicts negative CEO pay-for-peer-group-performance sensitivity. The strong-form RPE hypothesis predicts that firms remove the entire amount of noise from the CEO’s performance, i.e., the strong-form RPE hypothesis predicts positive CEO pay-for-unsystematic-performance sensitivity and insignificant pay-for-systematic-performance sensitivity. Unsystematic (systematic) performance is the component of firm performance that is uncorrelated (correlated) with peer-group performance. However, empirical evidence on the relative performance evaluation hypotheses is mixed.

The strategic competition that takes place among firms in some settings may offer an explanation of why empirical evidence on the RPE hypothesis is mixed. Although agency theory addresses intra-firm managerial incentive issues, it does not address the implications of managerial incentives on CEOs' strategic behavior in settings in which there are interdependencies among firms (i.e., in imperfectly competitive or oligopolistic settings). In imperfectly competitive settings, many CEO decisions are strategic in the sense that they affect both own-firm outcomes and peer-firm outcomes, thus drawing a competitive response from the CEOs of peer firms (Vickers, 1985; Fershtman, 1985). When firms compete with each other, their managers' strategic interaction is likely to be of equal importance to the mitigation of intra-firm managerial agency problems. This discussion illustrates how agency theory may provide an incomplete picture of the uses of managerial incentives and thus offer an incomplete representation of the role of accounting performance measures in managerial incentive contracting.

My dissertation addresses two research questions. First, I investigate whether relative performance measures in CEO compensation contracts are used to provide incentives to managers to either increase or reduce strategic competition with peer firms in oligopolistic settings. Second, I investigate the extent to which the use of relative performance measures in CEO compensation contracts for strategic objectives conflicts with the further use of these measures for risk-reduction objectives.

A number of industrial organization theorists argue that many results found in oligopoly theory can be understood in terms of strategic substitutes or complements (Bulow, Geanakoplos, and Klemperer, 1985; Tirole, 1988; Milgrom and Roberts, 1990). In imperfectly competitive settings, firms compete either in strategic substitutes or strategic complements (Bulow, Geanakoplos, and Klemperer, 1985). A pair of firms competes in strategic substitutes, or their decisions are strategic substitutes, when more "aggressive" play (e.g., lower price, higher output quantity, larger advertising expenditure, higher R&D investment) by one firm raises that firm's marginal profitability and lowers the peer firm's marginal profitability. For instance, market share competition in a commodity-type or slow-growth product market is often competition in strategic substitutes, as one firm's gain is directly associated with another firm's loss. A pair of firms competes in strategic complements, or their decisions are strategic complements, when more "aggressive" play by one firm raises both firms' marginal profitability. For instance, competition in a differentiated or high-growth product market often takes the form of competition in strategic complements, since all firms may profitably raise their price in a differentiated product market or profitably grow their output as "the pie gets bigger" in a high-growth product market.

Industrial organization theory predicts that in oligopolistic product markets, managerial incentives are a strategic variable (Vickers, 1985; Fershtman, 1985; Fershtman and Judd, 1987; Sklivas, 1987; Fumas 1992; Aggarwal and Samwick, 1999b). Managerial incentives motivate managers to behave aggressively in the product market when firms' decisions are strategic substitutes in order to deter competitors. In contrast, managerial incentives are geared towards softening competition in the product market when firms' decisions are strategic complements in order to foster cooperative behavior by competitors. Previous literature theorizes that when firms compete in strategic substitutes (complements), pay-for-peer-group performance sensitivity is negative (positive), i.e., the strategic interaction hypothesis (Fumas, 1992; Aggarwal and Samwick, 1999b). However, empirical evidence on the strategic interaction hypothesis is scarce and indirect (Joh, 1999; Aggarwal and Samwick, 1999b; Kedia 2006), mainly due to the difficulty of constructing a proxy that adequately captures firms' strategic conduct, i.e., whether it is competing in strategic substitutes or complements.

I utilize industry-specific financial and operational data for U.S.-based, scheduled passenger airlines to measure the degree of strategic substitutive or complementary interactions among firms. The airline industry provides an ideal setting for such an examination. First, the airline industry is characterized by both intense competition and close collaboration among firms, thus enabling both types of strategic competition, i.e., both competition in strategic substitutes and complements, to exist in the same setting and be observed in the data. Second, it is a homogeneous industry in the sense that airlines' operate in a single business sector, air transportation services, thus allowing the construction of reliable relative performance measures. Third, explicit evidence suggests that airlines make extensive use of relative performance measures for CEO evaluation purposes. Finally, industry regulation mandates that proprietary information revealing firms' strategic action choices (e.g., production capacity and output by market, detailed operating cost structure, and fare information) be publicly disclosed on a quarterly basis, thus making available abundant financial and operational data for both publicly-traded and non-publicly-traded firms.

I find that, consistent with the prediction of industrial organization theory, pay-for-peer-group-performance sensitivity is negative (positive) and significant when firms compete in strategic substitutes (complements). This finding supports the strategic interaction hypothesis and provides evidence that the effect of accounting performance measures in CEO incentive contracts is influenced by the *type* of strategic competition among firms. Contrary to predictions of the agency literature, I find no evidence in support of the weak-form RPE hypothesis. Pay-for-peer-group-performance sensitivity is insignificant when all firms (i.e., both substitutes and complements) are included in the peer group. However, I find strong evidence in support of the strong-form RPE hypothesis. Pay-for-unsystematic-performance sensitivity is positive, while pay-for-systematic-performance sensitivity is insignificant. This poses a conundrum since the weak-form RPE hypothesis is a necessary condition for the strong-form RPE hypothesis.

The absence of the finding predicted by agency theory (i.e., the weak-form RPE hypothesis) may be due to the fact that the effects of substitute- and complement-peer-group performance on CEO pay are directionally opposite, i.e, relative performance has a negative (positive) effect on CEO pay when firms compete in strategic substitutes (complements), and thus cancel each other out when using the aggregate peer group as a reference. However, this does not imply that the two objectives of RPE, reducing the risk placed on the manager and influencing strategic interaction, are mutually exclusive. Once I decompose aggregate peer-group performance into systematic (i.e., common) and unsystematic (i.e, unique) components, I find evidence that supports firms' use of relative performance evaluation for both strategic and informational objectives. The systematic component best captures the effects of common-industry-wide risk factors on firm performance, while the unsystematic component best captures the effects of CEO strategic behavior on firm performance. I find evidence suggesting that firms use the unsystematic component for relative performance evaluation aimed at influencing strategic competition, while the systematic component is employed for relative performance evaluation that is aimed at filtering common noise out of performance, thereby *both* motivating strategic behavior and improving the efficiency of incentive contracting.

My dissertation contributes to the literature in three ways. First, I contribute to the accounting literature by providing evidence that relative performance evaluation for managerial incentive contracting at the inter-firm level may have benefits additional to those that arise at the intra-firm level. The agency literature (Lazear and Rosen, 1981; Holmstrom 1982, Nalebuff and Stiglitz, 1983) generally focuses on intra-firm settings and argues that linking managerial incentives to relative performance measures has informational advantages. My dissertation provides empirical evidence that, in settings with interdependent owner-manager pairs, linking managerial incentives to relative performance measures also has strategic advantages. Further, I contribute to Aggarwal and Samwick (1999b) by distinguishing between firms competing in strategic substitutes and strategic complements and by testing in the same sample the effects of both types of strategic competition on the use of RPE in managerial contracts. Accordingly, I find that the same firm rewards its CEO negatively for substitute-peer-group performance and positively for complement-peer-group performance. This result offers empirical evidence showing that the effect of relative performance measures on managerial incentives depends on the type of strategic competition between a firm and its peers.

Second, I create tension between agency theory and industrial organization theory. An important insight of my study is that firms remove implicitly or explicitly common noise from the CEO's performance, thus fulfilling their risk reduction objective, and evaluate the CEO negatively (positively) for substitute- (complement-) peer-group performance, thus realizing their strategic interaction objective. Industrial organization theory suggests that in imperfectly competitive settings, the effects of strategic competition and risk reduction on managerial incentives are mutually exclusive and the former dominates the latter – at least in settings where firms compete in strategic complements (Fumas, 1992; Aggarwal and Samwick 1999b). However, the few empirical tests to date do not distinguish between the strategic and informational role of relative performance measures. Thus, the prior empirical literature has been unable to provide evidence either for or against theoretical assertions about the conflict between the uses of RPE for strategic and informational objectives. My study suggests that, although the two objectives of RPE have directionally different effects on managerial incentives, they may co-exist in managerial incentive contracts.

Third, I contribute to the empirical literature that examines the relative performance evaluation of managers. Most of the previous RPE empirical literature identifies industry peer groups based on 2-4 digit SIC codes. However, many firms are assigned multiple SIC codes because they operate in multiple industries, thus potentially making the relative measures used in these studies too noisy to provide a precise measure of the common uncertainty that can be removed from firm performance measures (Gibbons and Murphy, 1990; Baker, 2002). Since airlines focus exclusively on air transportation, this industry provides a robust, homogeneous setting for examining the RPE hypotheses.

The remainder of this dissertation is organized as follows. Chapter II provides the theoretical motivation for my hypotheses. Chapter III provides an overview of the data and the research setting. Chapter IV describes the measurement of the variables. Chapter V outlines the empirical specifications used to test the hypotheses, presents the results of the tests and provides the discussion of my findings. Section VI concludes this dissertation.

CHAPTER II: THEORY AND HYPOTHESIS DEVELOPMENT

2.1 Relative Performance Measurement and Agency Theory

The agency literature generally focuses on settings where one principal delegates authority to many agents in an uncertain environment where it is costly to observe agents' actions and effort levels. Agency theory argues that if the uncertainties facing different agents are correlated to some degree, then relative performance measures contain useful additional information about agents' actions. Linking managerial incentives to relative performance measures thus has informational advantages.

2.1.1 Tournament Theory and Analytical RPE Agency Literature

The relative performance evaluation (RPE) literature has its roots in the informativeness principle, which states that including in a compensation contract any performance measure that contains incremental information about the agent's actions can improve the contract's efficiency (Holmstrom, 1979). Lazear and Rosen (1981) analytically show that, when it is less costly to observe agents' relative positions than it is to measure the level of each agent's output directly, rank-order tournaments provide an efficient agent reward mechanism. Holmstrom (1982) analytically shows that rank-order tournaments dominate piece rates only if agents' outputs have a degree of interdependence. Holmstrom argues that RPE improves the efficiency of compensation contracts because it helps to remove costly background noise from agents' performance, and not, as argued in Lazear and Rosen (1981) and Nalebuff and Stiglitz (1983), because it motivates competition among agents. Holmstrom shows analytically that if agents' outcomes are correlated to some degree, optimal compensation is a function of own-performance and average peer-group performance (where the peer group is a group of firms that have correlated outcomes). This gives rise to the weak-form RPE hypothesis, which predicts that pay for peer-group performance is negative, while pay for own-firm performance is positive. Holmstrom and Milgrom (1987) argue that in a relative performance plan it is optimal to compensate agents only for unsystematic performance, which is defined as the component of an agent's (or a firm's) performance that is uncorrelated with that of other agents (or other firms). This theory gives rise to the strong-form RPE hypothesis, which predicts that pay for unsystematic performance is positive, while pay for systematic performance is not significantly different from zero (Antle and Smith, 1986; Holmstrom and Milgrom, 1987; Janakiraman, Lambert, and Larcker, 1992).

2.1.2 Empirical Agency RPE Literature

Empirical evidence about the use of RPE in order to filter out noise from the CEO's performance is mixed.

2.1.2.1 Empirical Evidence in Support of the Incentive Use of RPE for Risk Reduction

A number of studies find at least partial, implicit evidence of RPE in CEO compensation contracts. Antle and Smith (1986) find mixed results for the use of RPE in total CEO compensation using thirty nine firms in three industries over a three-decade period. They find evidence of both weak-form RPE in stock returns and of strong-form RPE in ROA, but only for sixteen out of the thirty nine firms. Gibbons and Murphy (1990) find strong evidence in support of the weak-form RPE hypothesis between cash compensation and stock returns, but not between cash compensation and ROA. Janakiraman, Lambert and Larcker (1992) examine the use of RPE in CEO cash compensation using a sample of six hundred nine firms in fifty four two-digit SIC codes. They find evidence of weak-form RPE in stock returns, but not in accounting ROE (Return on Equity). They find no evidence of strong-form RPE. Hall and Liebman (1998) use current and lagged values of the return to the S&P 500 as proxies for peer-group performance and document that CEO cash compensation varies negatively to changes in the market as a whole. They interpret this finding as supportive of the idea that CEOs are paid in part on the basis of relative performance. However, a large number of studies find no evidence of a link between RPE and CEO compensation.

2.1.2.2 Empirical Evidence that Suggests No Support for the Incentive Use of RPE for Risk Reduction

Jensen and Murphy (1990) find no association between changes in CEO cash compensation and changes in shareholder wealth in each firm's industry and in the overall market. They argue that Holmstrom's theoretical RPE model makes assumptions that are irrelevant to most compensation contracts including assumptions that shareholders know with certainty all possible actions of the CEO and the outcome distribution of each action, as well as the set of optimal CEO actions. Barro and Barro (1990) do not find evidence of a link between CEO cash compensation and relative performance in their sample of eighty three banks over a three year period. They capture relative performance using the average stock returns and ROA by year and geographical region. They attribute the lack of a finding to the possibility that the regional average values are not representative measures of the general performance that ought to be filtered out of individual performance.

Using Execucomp data to measure CEO total compensation, Aggarwal and Samwick (1999a) find no evidence of strong-form RPE and only weak evidence of weak-form RPE in stock returns. Aggarwal and Samwick (1999b) provide a theoretical explanation for why it may not be optimal to incorporate relative performance evaluation into compensation contracts because of strategic interactions between managers at rival firms. They show analytically that shareholders would be worse off if firms filtered out industry-wide effects, as doing so would provide managers with an incentive to lower industry-wide returns by engaging in excessive competition, which would, in turn, lower profits. Their empirical test finds a positive rather than negative association between total CEO compensation and industry stock returns that is decreasing in industry concentration (i.e., increasing in industry competition). They interpret this finding as evidence that the use of RPE for risk reduction objectives decreases as industry competition increases (because the positive pay-for-peer-group performance sensitivity becomes more positive). Joh (1999) uses data on Japanese firms and finds a positive rather than negative association between changes in total CEO compensation and changes in industry stock returns and ROA (stronger results in ROA). He also finds that the positive effect of industry profit on incentive compensation is higher in competitive industries than in concentrated industries and is greater in slow-growing industries than in fast-growing industries. He interprets these results as evidence of collusive behavior in Japanese industries.

Bertrand and Mullainathan (2001) find no evidence of strong-form RPE in stock returns and ROA in the oil and traded goods industries. Specifically, they find that CEO pay responds in a statistically similar manner to effects of exogenous shocks as it does to firm-specific performance concluding that CEOs are paid for performance due to luck. Because they also find that pay for exogenous luck is stronger when a large outside shareholder is absent, they conclude that CEOs are able to set pay in their own interests.

2.1.2.3 Studies that Examine Reasons for the Lack of Strong Evidence in Support of the RPE Hypothesis

The lack of strong evidence of RPE in the executive compensation literature has motivated a stream of research that investigates potential explanations for the discrepancy between RPE theory and the corresponding empirical evidence. These studies either identify issues with respect to the empirical regularities of the models used in previous RPE research or they find conditions which affect the use of RPE in CEO incentive contracting.

Dye (1992) argues that an RPE-based contract may motivate executives to invest in industries where they can outperform their direct competitors, rather than to invest in industries that offer the highest absolute returns. He shows analytically that the value of an RPE-based contract depends on the degree of the CEO's flexibility to invest in alternative industries. Parrino, (1997) examines RPE in relation to CEO turnover and finds that monitors in more homogeneous industries have access to more precise measures of CEO performance, as relative performance measures in these industries are better able to filter the effects of industry and market-wide shocks. Garvey and Milbourn, 2003 argue that the incentive use of RPE for risk reduction purposes depends on the extent to which executives can hedge against market risks in their private portfolios. Arguing that younger executives have less financial resources and thus are more constrained in their ability to hedge in their own portfolios, the authors use CEO age as a proxy for the extent to which CEOs can hedge in their private portfolios. As a second proxy, they also use a CEO's accumulated financial wealth during the sample period. They find that the use of RPE increases significantly as the executive's age and financial wealth decrease.

Oyer (2004) analytically shows that rewarding the CEO for positive systematic performance (i.e., for performance due to exogenous luck) is optimal if the CEO's reservation wage stemming from outside employment opportunities varies with the performance of the overall economy (or the performance of the firm's industry). In other words, managers with good outside labor market prospects may quit if their firm removes the effects of systematic performance from their compensation during good years. Rajgopal, Shevlin, and Zamora (2006) find empirical evidence in support of Oyer's theoretical argument. They use two proxies for

CEO outside labor market opportunities, the visibility of the CEO in the media, and the firm's industry-adjusted ROA. They find that the sensitivity of CEO pay to systematic market-wide factors is an increasing function of the CEO's outside job opportunities. Their tests also provide support for the weak-form RPE hypothesis.

Garvey and Milbourn (2006) extend Bertrand and Mullainathan (2001) and find that CEOs are insulated from bad luck, while they are rewarded for good luck. They find that compensation is adjusted upwards for negative performance due to "bad luck", i.e., for negative exogenous (systematic) performance, but is not adjusted downwards as often for positive exogenous performance due to "good luck", i.e., for positive exogenous (systematic) performance. They explain their findings by making the following argument. At the beginning of any compensation period, luck-based pay (i.e., pay-for-systematic performance) is zero thus providing the executive with the right to participate in subsequent gains or losses in a set of market-priced assets.[1] The CEO's expected return is zero at the time the compensation contract is set. However, actual compensation is decided at the end of each fiscal year by the compensation committee of the board of directors, at which point it is known whether exogenous forces (luck) have turned out favorably or unfavorably for the firm. At this stage, the CEO's self-interest is to emphasize benchmarking and remove exogenous influences from compensation only if the benchmark is down. They also find that pay-for-luck is stronger when corporate governance is weaker.

Finally, Albuquerque (2009) finds that firm size is an important factor affecting the empirical specification of models that test RPE in incentive compensation because firm size affects the way firms respond to external shocks. Using total CEO compensation, she finds no

[1] CEO-shareholders as any other shareholders expect to be compensated only for bearing systematic risk.

evidence of weak- or strong-form RPE in either stock returns or ROA when peers are grouped only by industry, while she finds evidence of both weak- and strong-form RPE in stock returns when peers are grouped both by industry and size.

2.1.3 Weak-form and Strong-form RPE Hypotheses (H1 and H2)

Following previous agency literature, I first hypothesize that firms use relative performance measures in CEO compensation in order to filter out common uncertainty, i.e., the weak-form RPE hypothesis:

> **H1: Pay-for-own-firm-performance sensitivity is <u>positive</u>; pay-for-peer-group-performance sensitivity is <u>negative</u>.**

Further, I hypothesize that in RPE plans firms entirely remove the systematic component of performance (i.e. the component of firm performance that is correlated with peer-group performance) and reward managers only for unsystematic performance as suggested by Holmstrom and Milgrom (1987), i.e., the strong-form RPE hypothesis:

> **H2: Pay-for-systematic performance sensitivity is <u>zero</u>; pay-for-unsystematic performance sensitivity is <u>positive</u>.**

2.2 Relative Performance Measurement and Industrial Organization Theory

Hypotheses H1 and H2 are based on the informativeness principle from agency theory, which states that including in a compensation contract any performance measure that contains incremental information about the agent's actions (i.e., relative performance information) can improve the contract's efficiency (Holmstrom, 1979). However, agency models do not account for the use of relative performance evaluation to motivate managerial strategic action choices. In settings in which firms are interdependent, owners are concerned about not only intra-firm informational asymmetries, but also inter-firm competition. Owners want to provide incentives to their managers to engage in strategic interaction with the managers of peer firms (Vickers, 1985; Fershtman, 1985). The idea of rewarding own-firm managerial performance relative to that of the firm's peers in order to draw the desired competitive response of peer firms' managers has been a subject of investigation in the industrial organization (I/O) literature (Fumas 1992; Aggarwal and Samwick, 1999b). The core idea is that linking managerial incentives to relative performance measures can be used to motivate managers to take strategic actions that are observed by peers, thus inducing the desired competitive response.

2.2.1 Early Analytical I/O Literature Showing the Effect of Oligopolistic Competition on Compensation Plans

Analytical models in the 1980's show that rewarding managers strictly based on own-firm profits may not be the most efficient way to maximize own-firm value when interdependencies exist among firms. In a seminal paper, Vickers (1985) shows that when principals (e.g., firm owners) compete in an oligopoly, rewarding their managers based on both own-profits and on own-quantities other than profits (e.g., sales) yields a strategic advantage, which may result in greater profits, as it draws a favorable competitive response. Fershtman (1985) also argues that by designing managerial incentives, owners can determine the kind of competitive decisions their managers will make. These fundamental theory papers are among the first to treat managerial incentives as a strategic variable. Fershtman and Judd (1987) and Sklivas (1987) analytically show that the design of managerial incentive contracts in order to impact competing managers' behavior critically depends on the nature of the competition. In the case of market share competition, they show that each owner wants to motivate its manager toward high production in order to induce competing managers to reduce their output. Hence, owners will provide a positive incentive for both sales output and profits. In the case of differentiated product/market competition, each owner wants its manager to set a high price, thereby encouraging competing managers to similarly raise their price. Hence, owners will provide a positive incentive for profits and a negative incentive for sales output.[2]

2.2.2 Analytical I/O Literature Incorporating Both the Effects of Inter-firm Competition and of Intra-firm Informational Asymmetries on Compensation Plans

Fumas (1992) incorporates into a single model both the strategic and informational aspects of managerial incentives. His study shows that in oligopolistic settings, firms' use of relative performance measures to evaluate their managers may cause a conflict between the objective of reducing the risk placed on the manager and the implications for strategic competition derived from such performance measures, especially when firms compete in strategic complements (i.e., when more "aggressive" play by one firm raises both firms' marginal profitability).

Aggarwal and Samwick (1999b) develop an extension of Fumas's (1992) analytical model. In the Aggarwal and Samwick (1999b) analytical model, managers' strategic action choices (e.g., output or price choices aimed at influencing competitors' output or price choices) may have a personal cost in the short-term because they reduce short-term profits, and because they are non-contractible by owners.[3] On the other hand, outcomes (e.g., profits, costs, revenues) are contractible and observable. However, non-contractible strategic action choices cannot be perfectly inferred from outcomes due to noisy outcome performance measures. Thus, owners

[2] Other related theory papers include Katz (1991) and Reitman, (1993).

[3] Strategic action choices (e.g., overproduction in order to gain market share or under-production to raise prices) may reduce profits in the short term, so if managers are evaluated strictly on own-profits, strategic action choices are personally costly.

provide their respective managers with incentives designed to influence managers' costly strategic action choices.

Aggarwal and Samwick (1999b) analytically show that when firms compete in strategic substitutes, i.e., when it is more valuable to the firm in the long term to deter competitors than strictly focus on increasing its own profit in the short term, managers' pay is an increasing function of own-firm performance and a decreasing function of peer-firm performance. They attribute this result to the need to motivate managers to compete aggressively rather than the need to filter out noise from managers' performance. For instance, a firm having a stronghold in a profitable market may be better off increasing its output above the profit-maximizing level in the short term if it faces the threat of entry by another firm in order to discourage that firm from entering the market, thus avoiding prolonged profit erosion in the long term.[4] They also show that when firms compete in strategic complements, i.e., when it is more valuable to the firm in the long term to soften competition with peers than strictly focus on enhancing its own profit in the short term, managers' pay is an increasing function of both own-firm and peer-firm performance. They attribute this result to the need to motivate managers to soften their competitive behavior.[5] For instance, a firm in a differentiated product market may be better off pricing its differentiated product higher than the profit-maximizing level in the short term in

[4] The incumbent firm may need to maintain its output level above the profit-maximizing level in the long term if competitive threats justify doing so e.g., in a product market with low barriers to entry.

[5] Their model's predictions are unaffected by standard agency theoretical assumptions regarding agents' risk aversion and effort levels, as well as the nonobservability of own-firm incentive contracts to peer firm managers.

order to induce competitors to do the same, thus avoiding costly direct competition in the long term.[6]

2.2.3 Strategic Interaction Hypotheses (H3a and H3b)

The above discussion leads to the following hypotheses:

H3a: Pay-for-peer-group-performance sensitivity is <u>negative</u> when firms compete in strategic substitutes.

H3b: Pay-for-peer-group-performance sensitivity is <u>positive</u> when firms compete in strategic complements.

2.2.4 Empirical Industrial Organization RPE Literature

Empirical evidence on the strategic interaction hypothesis is scarce and indirect (Joh, 1999; Aggarwal and Samwick, 1999b; Kedia 2006), mainly due to the difficulty of constructing a reliable proxy that adequately captures firms' strategic conduct, i.e., competition in strategic substitutes or complements. Without distinguishing between strategic substitutes and complements, Joh (1999) and Aggarwal and Samwick (1999b) find evidence of overall positive pay-for-peer-group-performance sensitivity in Japanese and U.S. firms, respectively. Joh (1999) interprets this result as evidence of overall collusive behavior in Japan. Also, Aggarwal and Samwick (1999b) find that RPE for managerial contracting purposes is used less frequently in more concentrated industries in order to prevent peer-firm managers from engaging in excess competition.[7]

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[6] The incumbent firm may need to maintain its price above the profit-maximizing level in the long term if competitive threats justify doing so, e.g., in a differentiated market that begins to become saturated.

[7] Also, Kedia (2006) tests the Fershtman and Judd (1987) model by defining strategic substitutes and strategic complements according to the methodology of Sundaram, John and John (1996). He finds that firms competing in strategic substitutes reward CEOs to a lesser degree on (own-

2.2.5 Compatibility of Relative Performance Evaluation and Strategic Interaction Hypotheses

The weak-form RPE hypothesis (H1) and the strategic interaction hypothesis (H3) directly conflict with one another. When firms compete in strategic complements, the weak-form RPE hypothesis (H1) predicts a negative pay-for-peer-firm-performance sensitivity, while the strategic interaction hypothesis (H3b) predicts a positive sensitivity. As a result, the negative pay-for-substitute-peer-group-performance sensitivity and the positive pay-for-complement-peer-group-performance sensitivity likely offset each other when the reference peer group consists of all peer firms, i.e., both peers with which the firm competes in strategic substitutes and those with which it competes in strategic complements. Hypotheses H3a and H3b (the strategic interaction hypotheses) thus suggest that hypotheses H1 and H2 (the relative performance evaluation hypotheses) are incomplete because they do not account for the strategic effects of relative performance on managerial incentives. However, both the RPE hypotheses (H1 and H2) and the strategic interaction hypotheses (H3) may be incomplete.

The systematic component of firm performance, i.e., the component of performance that is correlated with peer group performance, is useless for the purpose of influencing strategic interaction because it cannot be manipulated by managers (e.g., managers have no control over commodity prices, geopolitical risks, volatility in macro-economic output and foreign exchange rates). Therefore, if firms use relative performance measures to influence competing managers' strategic behavior as industrial organization theory argues, they must employ the unsystematic component of relative performance. Consider, for instance, an industry whose input costs depend

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firm) profit and to a larger degree on (own-firm) sales. The opposite finding holds when firms compete in strategic complements. His study focuses on the emphasis of incentives on own-firm profit relative to own-firm sales, but does not address the influence of strategic competition on the role of relative performance measures in managerial compensation contracts.

on commodity prices on which managers have no control. Managers may manipulate endogenous choice variables such as production output, prices or advertising expenditures strategically in order to influence competition with other firms. However, they cannot use commodity inputs as a strategic choice variable because commodity prices are an exogenous variable. Therefore, hypotheses H3a and H3b are incomplete because they do not distinguish between systematic and unsystematic performance.

On the other hand, firms remove the systematic component of firm performance from their incentive compensation schemes in order to reduce the risk placed on the manager (as hypothesis H2 predicts). Therefore, hypotheses H1 and H2 are also incomplete because they do not account for the use of the unsystematic component of performance for the purpose of influencing strategic interaction among peer firms.

Therefore, removing systematic performance from CEO evaluations is the process through which firms reduce the risk placed on the manger, while rewarding managers for peer-group unsystematic performance depending on the type of strategic competition is the manner in which firms influence strategic interaction. Consequently, I predict that firms remove the systematic component of firm performance in CEO evaluations, thus reducing the risk placed on their managers, and employ the unsystematic component of performance to induce the CEO to compete strategically with peers. Hence, I hypothesize that the two effects of RPE on incentives are independent and can be observed separately.

2.2.6 Strategic Interaction Hypotheses Restated (H4a and H4b)

The above discussion therefore results into the following hypotheses:

H4a: Pay-for-unsystematic-peer-group-performance sensitivity is <u>negative</u> when firms compete in strategic substitutes.

H4b: Pay-for-unsystematic-peer-group-performance sensitivity is <u>positive</u> when firms compete in strategic complements.

III. RESEARCH SETTING AND DATA DESRIPTION

3.1 Research Setting and Identification of Strategic Substitutes and Complements

3.1.1 Research Setting – Network and Regional Airlines

Individual industries have important idiosyncrasies that ultimately affect potential comparisons of the degree of substitution (or market power) (Bresnahan, 1989, p. 1012). Bresnahan posits that institutional detail at the industry level will affect firms' conduct and thus the empirical measurement of market power. I test my research hypotheses by using financial and operational industry-specific data for U.S.-based, scheduled passenger airlines. I operationalize the degree of substitution among firms utilizing institutional detail at the industry level. Scheduled passenger carriers can be assigned to one of two distinct product-market segments − network carriers and regional (commuter) carriers. Table 1 provides a list of all firms in the sample (both network and regional airlines) grouped by product-market segment.

Network carriers include major airlines, such as American Airlines, United Airlines, and Delta Airlines, and low-fare airlines such as Southwest Airlines, Airtran Airways, and JetBlue. Regional carriers include independently-owned airlines such as Republic Airways, Skywest Airlines and Mesa Airlines, and wholly-owned subsidiaries of network carriers such as American Eagle Airlines, Comair, and PSA. Network and regional carriers operate under different business models and in differentiated product markets. Business model and product-market differentiation is what creates the conditions for competition in strategic complements to exist between regional and network carriers.

First, network and regional airlines operate under different business models. Network carriers connect a handful of hubs and focus cities with many other airport locations domestically or internationally and operate *independent* route systems. In contrast, regional airlines enter into *affiliations* with one or more network airlines (such affiliations typically require that the regional airline fly under the brand and colors of the network carrier). According to this affiliation, the regional airline agrees to use its smaller aircraft to carry passengers booked and ticketed by a network airline between a hub/focus city and an outlying city (JetBlue 10-K Report, 2002; Skywest 10-K Report, 2009). Regional carrier route systems serve a complementary function to network carrier route systems by allowing more frequent service, including off-peak-time-of-day departures to smaller, outlying cities, and by carrying traffic that connects with network carriers' mainline aircraft (Expressjet 10-K Report, 2003).[8]

In addition, many of the operational functions of regional carriers are often supported by their partner-network carriers, such as ground operations (e.g., gate sharing), reservations, procurement and leasing of aircraft, and fuel services. Indeed, in most cases, the network carrier performs all marketing and selling of seats and books all revenue from the regional flight segments, pays the regional airline a fixed fee for each departure or for each ASM (Available Seat Mile) produced, guarantees payment for a minimum number of departures or ASMs, and offers additional incentives based on flight completion, on-time performance and baggage handling performance (American Airlines, Delta Airlines, Skywest, Republic Airways 10-K Reports, 2009). Even when the regional carrier is a wholly-owned subsidiary of the network carrier, the parent network carrier treats its subsidiary regional carrier on a contractual basis as a profit center exactly as it treats its other regional carrier partners. A description of the commercial arrangements between network and regional carriers is provided in Appendix A.

[8] A large number of U.S. airports are served exclusively by regional carriers. According to RAA (Regional Airlines Association), 71% of U.S. airports in 1999, and 73% of them in 2008, only saw regional airline traffic (RAA 2009 Annual Report).

Second, regional and network airlines operate in differentiated product markets. Regional carriers fly in low-volume, low-frequency markets, as opposed to network carriers that fly in high-volume, high-frequency markets. Figure 1 shows a typical network-regional carrier network example where the regional carriers (Republic Airways and Skywest Airlines) operate the low-volume, low-frequency routes and the network carriers (United Airlines and Delta Airlines) operate the high-volume, high-frequency routes. This product-market differentiation requires different types of aircraft fleets and operational structures. Network carriers fly larger jet aircraft of various sizes (to accommodate routes of varying size) than regional carriers do, while their ground and other operations are structured so as to accommodate higher aircraft utilization and faster turnaround times at the airport than are those of regional carriers. As a result, the cost structure of a regional carrier is significantly higher than that of a network carrier on a production unit basis, mainly due to shorter average flight segment length and lower average seating capacity.[9]

3.1.2 Competition in Strategic Complements Between the Groups of Network and Regional Airlines

Regional airlines as a group, including both subsidiaries of and those not owned by network airlines compete in strategic complements with similarly grouped network carriers. As the example in Figure 1 shows, regional and network carriers operate in differentiated product markets, i.e., network carriers are not structured operationally to function in regional carrier

[9] The average length of a flight and average seating capacity are important determinants of an airline's cost structure (Banker and Johnston, 1993). In 1999 (2008), the average flight segment length of a regional carrier was 274 (456) miles, as opposed to a network carrier, which had segment length of 848 (1,052) miles (RAA 2009 Annual Report, DOT schedule T1). The difference also holds true for seating capacity. In 1999 (2008), the average seating capacity of a regional carrier was 39 (54) seats, while a network carrier had 165 (169) seats (RAA 2009 Annual Report, DOT schedule T1).

markets, and similarly, regional carriers are not structured operationally to function in network carrier markets. Regional and network carriers also operate different business models, i.e., regional carriers enter into affiliations with network carriers, while network carriers operate independent route systems. In fact, in many cases, the same regional carrier offers regional services to multiple network carriers, and each network carrier has arrangements with multiple regional carriers. Table 2 provides a list of all partnerships between network and regional carriers throughout the sample period. Figures 2-8 provide an explicit example of a regional carrier operating separate regional route networks for multiple network carriers. Product-market and business model differentiation give rise to competition in strategic complements and cooperative behavior between regional and network carriers.

Affiliated regional and network carriers have incentives to foster cooperation due to bilateral dependence and a large degree of operational integration.[10] Indeed, affiliated regional and network carriers collaborate in cost reduction and other operational initiatives such as aircraft procurement and leasing, and ground and fuel services (United Airlines, Continental Airlines 10-K Reports, 2009). Non-affiliated regional and network carriers also have strong incentives to soften competition. First, non-affiliated network carriers are potential future customers for regional carriers and, similarly, non-affiliated regional carriers are potential future partners for network carriers. Second, if a regional carrier displays aggressive competitive behavior towards non-affiliated network carriers (e.g., enter with its own brand into non-affiliated network carrier markets), it will inadvertently signal to its affiliated network carriers that its strategy of vertical integration might make it a competitive threat in the future. Similarly,

[10] The regional carrier's transfer prices are the network carrier's input costs, and similarly, the network airline's transfer fees are the regional airline's revenues. Affiliated carriers share various operational functions ensuring seamless service and operational reliability throughout their combined route networks.

if a network carrier displays aggressive behavior towards non-affiliated regional carriers, it will send the wrong signal to its affiliated regional carrier partners.[11] For instance, Republic Airways Holdings, the largest regional carrier in the United States, recognizes that its 2009 acquisition of its two former network carrier partners, financially distressed Frontier Airlines and Midwest Airlines, bears a risk factor by placing it in "intense competition" with network carriers including United Airlines and Delta Airlines (two of its affiliated network airline partners) (Republic Airways 10-K report, 2009). Consequently, I classify regional airlines as a group as competing in strategic complements with similarly grouped network carriers.

3.1.3 Competition in Strategic Substitutes Within the Groups of Network and Regional Airlines

Network carriers compete in strategic substitutes with rival network carriers due to homogeneous product markets, i.e., network carriers have similar business models and are structured operationally, so that they can fly in each other's markets (see Figure 1). Network carriers' route systems are highly substitutive, as is evident when two network carrier route systems overlap to a large degree. However, even when two network carriers' route systems have only a small degree of overlap or no overlap at all, their route systems are still substitutive, due to connecting flights in network carriers' route systems. Network carriers compete for market share, thus they will lower prices and expand production output aggressively to defend key markets and discourage rivals' expansion. As a result, I classify all network carriers in a single group as competing in strategic substitutes.

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[11] An example of a similar market structure in the computer hardware industry is the one where chipmakers such as Intel and AMD cooperate with PC assemblers such as Dell and Hewlett Packard.

Regional carriers also compete in strategic substitutes with rival regional carriers, although their route systems rarely overlap to a significant geographic degree. Regional carriers operate in homogeneous markets (see Figure 1) and directly compete for contracts for network carrier regional business. Even the regional subsidiaries of network airlines are compared by their parents with non-owned regional airlines in terms of cost and service quality (American Airlines, Delta Airlines, Alaska Airlines 10-K Reports, 2009). Regional airlines compete for market share of regional services, thus they act aggressively by trying to offer better deals than rivals in order to gain network carrier business. Therefore, I classify all regional carriers in a single group as competing in strategic substitutes.

Importantly, explicit evidence from airline proxy statements reveals that network airlines define the group of their direct competitors as exclusively consisting of other network airlines, while regional airlines solely define the group of their direct competitors by other regional airlines (including wholly-owned subsidiaries of network airlines) (American Airlines, Delta Airlines, Expressjet, Skywest 10-K Reports, 2009).

3.2 Data Sample

My data consists of firm-year observations for 46 U.S.-based scheduled passenger carriers from 1992 through 2009 (a total of 540 firm-year observations). The subsample of publicly traded firms for which compensation data are available (compensation is the dependent variable of this dissertation) consists of 30 firms and 277 firm-year observations.[12] Based on data that are available through the U.S. Department of Transportation (DOT), I calculate proxies for peer-group performance measures using all airlines with more than $20 million in sales (both

[12] Firm-year observations in the regression models turn out to be 247 because I use changes specification.

publicly traded airlines and those that are not, as well as subsidiaries of network airlines), i.e., 46 firms and 540 firm-year observations.[13] Including information about non-publicly traded peer firms of substantial size results in less noisy proxies of peer-group performance measures, as publicly traded airlines have access to and make use of the information of their non-publicly traded peers (see Table 1). The dependent variable (compensation) is based only on data of publicly traded firms. Petroni and Safieddine (1999) find a significant positive association between accounting returns (ROA) and executive compensation in publicly traded firms, but find no significant association in non-publicly traded firms. Consistent with contracting theory, their study suggests that CEO compensation of non-publicly traded firms is less based on objective measures such as accounting information and more on subjective measures. Therefore, using the subsample of publicly traded firms in my analysis increases the statistical power of my tests.

I obtain data for CEO compensation, CEO characteristics, and firm governance characteristics from the ExecuComp database and from company proxy statements (via hand collection).[14] I obtain financial data and operational statistics, which I use to calculate the average production unit cost (CASM - Cost per Available Seat Mile) and the return on assets (ROA), the proxies for firm performance in this study, and entity-specific control variables from the DOT carriers' financial and operational statistics database including schedules P-12/11, P-6, P-52/51, P10, B43, T1, and T3.[15] I also obtain firm-specific financial data for the construction of

[13] My sample includes the 21 largest regional airlines that are either under code sharing agreements or are wholly-owned subsidiaries of network airlines. These airlines accounted for more than 96% of all regional passenger enplanements in 2005 (Regional Airlines Association, 2006 Annual Report).

[14] Information for 13 of the 30 publicly traded airlines was found in ExecuComp.

[15] The term 'entity-specific' refers to data at the subsidiary level when an airline has wholly-owned regional airline subsidiaries. Unlike carriers' SEC financial reports, DOT financial reports contain detailed data at the subsidiary level and separately itemize all non-air-transport-related

control variables such as book-to-market and leverage from firms' annual reports.[16] The DOT databases contain quarterly airline financial data and operational statistics from the first quarter of 1992 through the fourth quarter of 2009. Table 3, Panel A describes the sample construction. Table 3, Panels B and C contain the frequency of sample observations by firm and year, respectively. Table 3, Panel D presents selected financial information for the subsample of publicly traded firms.

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expenses and revenues. This allows for the construction of finer firm performance proxies for benchmarking objectives.

[16] The term 'firm-specific' refers to data at the corporate (parent) level. These data are used for the calculation of ROA, as well as the financial leverage and book-to-market ratios.

IV. VARIABLE MEASUREMENT

A summary of variable definitions (and predicted associations from the previous literature for control variables) is presented in Table 4.

4.1 Measurement of Managerial Incentives

I construct managerial incentives, the dependent variable in this dissertation, as the change in the natural logarithm of total CEO compensation (ΔlnCOMP). Total compensation includes the CEO's salary, bonus, the value of the stock option portfolio, the value of earned but unvested restricted stock portfolio, and long term (non-equity) incentive payouts (LTIP). I use the value of the CEO's total stock option and restricted stock portfolio, instead of only the value of the annual stock option and restricted stock grants, as incentives from a CEO's existing holdings of options and stock impact the firm's current year compensation structure decision. Core and Guay (1999) show that grants of new incentives from options and restricted stock are negatively related to deviations between the value of a CEO's existing holdings of equity incentives and optimal levels. Hence, firms issue new grants to provide their CEO with incentives, taking into account the value of the CEO's existing stock and stock option holdings.

The value of the stock option portfolio is computed using the Black Scholes option pricing model, as modified by Merton to account for dividend payouts (Black, Scholes, 1973; Merton, 1973). The value of unexercised stock options (granted in previous years) for fiscal years prior to SFAS 123 implementation is computed using the approximation method suggested in Core and Guay (2002). Using the natural logarithm of total compensation mitigates heteroskedasticity and other problems resulting from skewness and extreme observations (Wooldridge, 2006, p.198-9), and facilitates a comparison with previous studies (Murphy, 1999).

I use differences-in-differences specification to control for the effects on CEO compensation of unobserved, firm-specific factors that remain relatively unchanged over time (Wooldridge, 2006, p. 491-2).

4.2 Measurement of Own- and Peer-Group Performance

I measure firm performance using two performance measures, CASM (Cost per ASM) and ROA (Return on Assets). First, own-CASM is used by boards of directors in managerial incentive contracting both explicitly and subjectively, as well as relative to peer-group CASM (see Appendix B). CASM is also one of the most important measures used by airline executives and boards of directors in assessing quarterly and annual cost performance, and it is commonly used by Wall Street analysts as the basis by which they compare airlines (Alaska Airlines 10-K Report, 2009). For example, comparisons of CASM among carriers abound in airline financial reports, in airline presentations to the media and the investment community, and in Wall Street analyst reports.[17] Importantly, CASM is the basis on which regional and network carriers transact in capacity purchase transactions.[18] Also, Francis, Humphreys, and Fry (2005) conduct a survey of senior executives from the world's 200 largest airlines. They find that CASM is used by 90% of respondents and ranks as the most useful measure in the operational performance measure category.

Second, ROA is an important accounting performance measure in the capital intensive airline industry as it measures profitability scaled by asset utilization. ROA is also used in

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[17] CASM excludes the effects of cash flow hedges, as by DOT rules gains/losses from derivative contracts are reported in non-operating income.

[18] In fixed-fee arrangements, network carriers compensate their regional partners on Cost per ASM (or cost per departure) plus a pre-negotiated profit markup.

previous accounting RPE literature thus it provides a basis for the comparison of the results of my dissertation to those of previous research. An advantage of using CASM and ROA as measures of firm performance is that using DOT financial and operational statistics to calculate these proxies, I am not limited to publicly-traded companies. Detailed financial and operating cost data, as well as production output data are reported quarterly to the DOT on a segment reporting basis, in accordance with regulations; these data are made available to the public.[19]

In my tests, I use as proxies for firm performance: (a) the change in the natural logarithm of CASM (ΔlnCASM), and (b) the change in the natural logarithm of one plus the ROA ratio (ΔROA). I calculate CASM by dividing the firm's total operating costs by its total ASMs. The numerator in CASM (total operating cost) includes all operating costs while excluding operating-lease-financing costs and transport-related costs.[20] Including transport-related expenses would greatly and unequally overstate airlines' average production unit costs (Tsoukalas, Belobaba, and Swelbar, 2008).[21] Consistent with previous RPE literature, I calculate ROA as the ratio of net

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[19] Although stock returns are also used in previous accounting literature, data limitations do not allow the use of stock returns as a CEO performance measure in my study because of the limited number of publicly-traded firms throughout the sample period (especially publicly-traded regional carriers). On the other hand, the availability of DOT financial data allows me to measure CASM and ROA using both publicly- and non-publicly-traded firms.

[20] As operating leases are the off-balance-sheet rentals of aircraft, buildings and equipment, the implied interest component is not an operating cost and must be removed in order to ensure a fair comparison among airlines with different amounts of on- and off-balance sheet assets and liabilities. I use the conventional rule of estimating the implied interest on operating leases in the airline industry by multiplying the total annual rentals by 1/3 (W. Greene, Morgan Stanley Equity Research, 2008 and 2009).

[21] Transport-related expenses predominantly include fees paid to other airlines under capacity-purchase and code-sharing agreements where the capacity (ASMs) purchased is reported only by the operating carrier.

income excluding income from discontinued operations, extraordinary items and effects of accounting changes to total assets, including capitalized operating leases.[22]

In my tests of the relative performance evaluation hypothesis, I measure peer-group performance as the change in the natural logarithm of the average CASM of the total group of airlines in the sample excepting the same firm (i.e., both substitutes and complements are included in the calculation of the average) (ΔlnPEER_CASM). I also measure peer-group performance as the change in the natural logarithm of one plus the average ROA of the total group of airlines in the sample excluding the same firm (ΔPEER_ROA). Hypothesis H1 predicts a positive association between ΔlnCOMP and ΔROA and a negative association between ΔlnCOMP and ΔPEER_ROA. Because CASM is inversely related to performance, H1 predicts a negative association between ΔlnCOMP and ΔlnCASM, and a positive association between ΔlnCOMP and ΔlnPEER_CASM.

I measure a firm's substitute-peer-group performance as the change in the natural logarithm of the average CASM, or one plus the average ROA ratio, of the group of airlines, which compete in strategic substitutes with the firm (excluding the same firm) (ΔlnSUBS_CASM or ΔSUBS_ROA, respectively). Similarly, I measure a firm's complement-peer-group performance as the change in the natural logarithm of the average CASM, or one plus the average ROA ratio, of the group of airlines, which compete in strategic complements with the firm (ΔlnCOMPL_CASM or ΔCOMPL_ROA, respectively).

The average peer group production unit costs, SUBS_CASM and COMPL_CASM, are weighted by firm size (ASMs), while the average ROA, SUBS_ROA and COMPL_ROA, are

[22] I use the conventional rule of capitalizing operating leases in the airline industry by multiplying the total annual rentals by 7 (W. Greene, Morgan Stanley Equity Research, 2008 and 2009).

weighted by total assets including capitalized operating leases. The weighted average in each case is appropriate because the strategic actions (e.g., production output and price choices) of larger competitors have a more profound impact on the industry than do the actions of smaller competitors. Hypotheses H3a and H3b predict a negative association between ΔlnCOMP and ΔlnSUBS_ROA, and a positive association between ΔlnCOMP and ΔlnCOMPL_ROA. Because CASM is inversely related to performance, hypotheses H3a and H3b predict a positive association between ΔlnCOMP and ΔlnSUBS_CASM, and a negative association between ΔlnCOMP and ΔlnCOMPL_CASM.

4.3 Measurement of Control Variables

I control for a number of variables including CEO-specific, firm-governance, and airline-industry-specific variables. I use levels specification when a variable does not change significantly year over year; otherwise I use changes.

The natural logarithm of the CEO's tenure (lnCEO_TENURE) is positively associated with compensation, as uncertainty about the CEO's ability is resolved over time (Core and Guay, 1999; Milbourn, 1998; Gibbons and Murphy, 1992; Dechow and Sloan, 1991). The extent to which the firm's ownership structure consists of transient investors (TRANSIENT) is positively associated with CEO compensation, as the investment horizon of the firm's owners affects that of the firm's CEO (Dikolli, Kulp, and Sedatole, 2009; Bushee, 1998; Bushee, 2001; Bushee, 2001). I measure TRANSIENT as the combined voting power (percentage of total voting shares) of private equity funds, activist investor funds, and hedge funds. The natural logarithm of the CEO's age (lnCEO_AGE) is positively associated with compensation, as CEO compensation rises with experience (Garvey and Milbourn, 2003; Brickley, Linck, and Coles, 1999; Gibbons and Murphy, 1992; Dechow and Sloan, 1991). The status of the CEO as the chairman of the board (CEO_CHAIR) and the CEO's voting power (CEO_VOT_PWR) are both positively associated with compensation since board chairmanship and high voting power provide the CEO with significant bargaining power over the compensation committee, (Core, Holthausen and Larcker, 1999; Core, 1997; Yermack, 1996; Lambert, Larcker, and Weigelt, 1993). I measure CEO_CHAIR with an indicator variable that equals one if the CEO is also the chairman of the board, otherwise it equals zero. I calculate CEO_VOT_PWR as the CEO's voting shares as a percentage of total voting shares.

The book-to-market ratio (BTM) is positively associated with compensation because CEO pay rises as the firm's investment opportunities increase. I measure BTM as the ratio of book assets including capitalized operating leases to the sum of book liabilities including capitalized operating leases and the market value of equity. The firm's leverage ratio (LEVERAGE) is negatively related with CEO compensation, as highly levered firms have fewer growth opportunities and are constrained in their ability to pay high compensation (Smith and Watts, 1992; John and John, 1993). I calculate LEVERAGE as the ratio of book liabilities including capitalized operating leases to book assets including capitalized operating leases. The change in the natural logarithm of total assets (ΔlnASSETS) is positively associated with compensation, as firm size is widely documented in the literature to be positively associated with CEO compensation (Smith and Watts, 1992; Core and Guay, 1999; Baker and Hall, 2004). I measure total assets as the sum of book assets and capitalized operating leases.

I control for situations where the airline is a low-cost / low-fare carrier (LOW_COST), as all other things being equal, low-cost / low-fare carriers have tighter controls on costs and are likely to pay lower CEO compensation (Doganis, 2002). I measure LOW_COST using an indicator variable that equals one if the carrier is a low-cost / low-fare carrier, otherwise it equals zero. Further, I control for the change in the natural logarithm of the carrier's average flight segment length (ΔlnSEGMENT_ LENGTH) and the change in the natural logarithm of the carrier's average seating capacity (ΔlnSEAT_DENSITY), as both of these operating variables affect a carrier's cost structure and financial results (Banker and Johnston, 1993; Caves, Christensen, and Tretheway, 1984). The change in the natural logarithm of an airline's load factor, i.e., the percentage of seats that are sold on average on every flight, (ΔlnLOAD_FACTOR) is likely to be positively associated with both an airline's financial results and the CEO's compensation. Finally, the extent of unionization of an airline's work force (UNIONIZATION) is likely to be negatively associated with the level of CEO compensation, as labor unions in the airline industry often have seats on the board of directors, special voting rights, and other powers, and thus have a say in CEO compensation matters. I measure UNIONIZATION as the percentage of an airline's FTEs (Full-time Equivalent Employees) who are members of a labor union organization.

Descriptive statistics for the total sample (both network and regional airlines) are presented in Table 5, Panel A. Table 5, Panels B and C present separate descriptive statistics for network and regional airlines, respectively. Table 6, Panel A presents the correlation matrix for the variables used to test the strategic interaction hypotheses. Table 6, Panel B presents the correlation matrix for the variables used to test the RPE hypotheses.

V. HYPOTHESIS TESTS, EMPIRICAL RESULTS, AND DISCUSSION

5.1 Tests of the Relative Performance Evaluation Hypotheses (H1 and H2)

To test hypothesis H1 (weak-form RPE hypothesis), I estimate the following empirical model:

$$\Delta \ln COMP_{it} = \beta 0 + \beta 1\ \Delta \ln[PERF]_{it} + \beta 2\ \Delta \ln PEER\_[PERF]_{it} + \langle \text{control variables} \rangle + \langle \text{year indicators} \rangle + \varepsilon_{it}, \quad (1)$$

where [PERF] is CASM or ROA. Hypothesis H1 predicts negative values for β1 and positive values for β2 in equation (1) when PERF is CASM (because lower values of CASM indicate higher performance), and positive values for β1 and negative values for β2 in equation (1) when PERF is ROA. Albuquerque (2009) finds that grouping peer firms by both industry and size is important in RPE tests because firms of similar size experience similar external shocks and respond to these shocks with similar flexibility. Therefore, I split my sample into quartiles in terms of total operating revenue and recalculate the peer-group average performance measures ΔlnPEER_CASM and ΔlnPEER_ROA for each quartile separately (for the tests of the RPE hypotheses only).[23] I estimate equation (1) and all subsequent models using OLS with pooled data and adjust for inflated t-statistics according to Froot's (1989) robust standard errors with firm-level clustering to compute p-values.

The results of the estimation are presented in Table 7. The adjusted R-squared of the model with CASM (Model 1) is 8.0%; that of the model with ROA (Model 2) is 8.7% (all VIFs < 2.5 in both models). Consistent with H1, the coefficient on own-firm performance is negative

[23] Also, grouping peers firms in quartiles by firm size substantially reduces the collinearity of the models used to test hypotheses H1 and H2.

in the model with CASM and positive in the model with ROA (coefficients of -.810 and 2.253; one-tailed p<.01 and <.05, respectively). Changes in compensation are strongly and positively associated with changes in own-firm performance. However, inconsistent with H1, pay-for-peer-group-performance sensitivity has the opposite from the predicted sign in the model with ROA (Model 2) and is statistically insignificant in both models. This evidence provides no support for the weak-form RPE hypothesis.[24]

Next I test hypothesis H2 (strong-form RPE hypothesis) (Holmstrom, 1982; 1987), following the methodology proposed by Antle and Smith (1986).[25] The strong-form RPE test is performed in two stages. In the first stage, I regress own-firm performance on average peer-group performance and obtain the estimated co-efficients and residuals using the following model:

$$\ln[\text{PERF}]_{it} = \lambda + \rho \ \ln\text{PEER\_[PERF]}_{it} + \eta_{it} \qquad \text{(2A)}$$

I construct estimates of systematic and unsystematic firm performance as follows:

$\text{SYS\_[PERF]}_{it} = \hat{\lambda} + \hat{\rho} \ \ln\text{PEER\_[PERF]}_{it}$, and $\text{UNSYS\_[PERF]}_{it} = \hat{\eta}_{it}$,

where SYS_[PERF] is the systematic firm performance and UNSYS_[PERF] is the unsystematic firm performance. Then I use the estimates of systematic and unsystematic performance in the second stage regression (the compensation regression) according to the following model:

$$\Delta\ln\text{COMP}_{it} = \beta0 + \beta1 \ \Delta\text{UNSYS\_[PERF]}_{it} + \beta2 \ \Delta\text{SYS\_[PERF]}_{it} + \langle\text{control variables}\rangle + \langle\text{year indicators}\rangle + \varepsilon_{it}. \qquad \text{(2B)}$$

[24] In untabulated results, I test the same models: (a) without grouping by size and (b) by using levels specification instead of changes. The results are qualitatively similar in every case.
[25] Albuquerque (2009) also employs the same methodology to perform a test of the strong-form RPE hypothesis.

This methodology partials out the effects of peer-group performance by first regressing own-firm performance on peer-group performance and then using the residual of the first-stage regression in the second-stage regression. In other words, UNSYS_[PERF] in the second-stage regression is ln[PERF] after the effects of lnPEER_[PERF] have been partialled out, thus the coefficients $\beta 1$ in equations (1) and (2B) will be equal by the design of the two-stage regression model (Wooldridge, 2006, p.83-84). However, it is important to note that equation (2B) offers additional information to that provided by equation (1) with respect to the association between CEO pay and own-firm performance. Equation (2B) provides information on both the association between CEO pay and the unique component of own-firm performance (i.e., unique relative to peer-group performance) and the association between CEO pay and the common component of performance (i.e., common between the firm and its peer group).

Hypothesis H2 predicts that in equation (2B), $\beta 2$ will not be significantly different from zero, while $\beta 1$ will be negative when PERF is CASM, and positive when PERF is ROA. The results of the second stage regression are presented in Table 8, Models 1 and 2. The adjusted R-squared of the model with CASM (Model 1) is 8.0%; that of the model with ROA (Model 2) is 8.7% (all VIFs < 2.5 in both models). Consistent with H2, pay-for-systematic-performance sensitivity is not significantly different from zero, while pay-for-unsystematic performance sensitivity is negative in the model with CASM and positive in the model with ROA (coefficients of -.810 and 2.253; one-tailed $p<.01$ and $<.05$, respectively).[26] This finding provides strong evidence in support of the strong-form RPE hypothesis and suggests that firms

[26] The minimum sample size for a test of the null hypothesis is 122 observations (alpha level = .05, desired statistical power level = .8).

implicitly remove the optimal amount of noise from performance measures used in executive compensation contracts (Holmstrom, 1987).

An advantage of the research setting in this dissertation is that I am able to uniquely measure a significant source of systematic performance in the airline industry; namely, the effect of jet fuel price volatility. As Appendix B shows, there is ample evidence that airlines explicitly remove the fuel expense component of CASM in all cases where CASM is used to evaluate CEO performance.[27] Holmstrom (1982) notes that "if we knew the exogenous shock ex post, this common uncertainty could and should be filtered away to yield an improved solution to the agency problem". As an additional test of hypothesis H2, I calculate fuel CASM (FUEL_CASM) by dividing fuel expenses by ASMs, and non-fuel CASM (EXFUEL_CASM) by dividing total operating costs excluding fuel expenses by ASMs. I estimate equation (2B) again using ΔlnFUEL_CASM as the systematic component of CASM performance and ΔlnEXFUEL_CASM as the unsystematic component. The results are presented in Table 8, Model 3. The adjusted R-squared of Model 3 is 8.5% (all VIFs < 3.6). Consistent with H2, pay for fuel-CASM performance is not significantly different from zero, while pay for non-fuel-CASM performance is negative (coefficient of -1.481; one-tailed p<.05). This evidence confirms that firms explicitly remove the effects of exogenous shocks known ex post from performance measures used in compensation contracts. However, when the effects of exogenous shocks are unknown ex post (e.g., the effects of jet fuel price volatility such as fuel price surcharges, on revenues), firms remove them implicitly from performance measures by evaluating managerial performance on a relative basis (hence, the support that I find for the strong-form RPE hypothesis).

[27] Fuel expense is one of the most volatile components of an airline's operating costs, earnings, and cash flow. Average fuel expense per annum (calculated cross-sectionally) as a percentage of total operating expense varies in my sample from a low of 11.0% in 1998 to a high of 32.4% in 2008.

5.2 Tests of the Strategic Interaction Hypotheses (H3a/H3b)

Hypotheses H3a and H3b hypothesize a strategic role for pay-for-peer-group performance in addition to the information role predicted by hypotheses H1 and H2. To test hypotheses H3a and H3b, I estimate the following empirical model:

$$\Delta\text{lnCOMP}_{it} = \beta0 + \beta1\ \Delta\text{ln[PERF]}_{it} + \beta2\ \Delta\text{lnSUBS\_[PERF]}_{it} + \beta3\ \Delta\text{lnCOMPL\_[PERF]}_{it} + $$

$$+ \langle\text{control variables}\rangle + \langle\text{year indicators}\rangle + \varepsilon_{it} \qquad (3)$$

where [PERF] is CASM or ROA. Hypotheses H3a and H3b predict negative values for β1 and β3, and positive values for β2 in equation (3) when PERF is CASM (because CASM is inversely related to performance). Hypotheses H3a and H3b predict positive values for β1 and β3, and negative values for β2 in equation (3) when PERF is ROA.

The results of the estimation are presented in Table 9, Models 1-4. Models 1 and 3 show the estimation of equation (3) when the peer group consists of peers which compete in strategic substitutes with the firm (i.e., ΔlnSUBS_[PERF]). Models 2 and 4 show the estimation of equation (3) when the peer group consists of peers which compete in strategic complements with the firm (i.e., ΔlnCOMPL_[PERF]). In Models 1 through 4 the adjusted R-squared is 9.7%, 10.4%, 10.4%, and 11.0%, respectively (VIFs < 3.3, < 6.8, < 3.0, and < 2.5 in Models 1 through 4, respectively). Pay-for-own-firm-performance sensitivity is negative in Models 1 and 2 (coefficients of -.711 and -1.016; one-tailed p<.05 in Model 1, and <.01 in Model 2), as CASM is inversely related with performance, and is positive in Models 3 and 4 (coefficients of 1.902 and 2.804; one-tailed p<.10 in Model 3, and <.05 in Model 4).

Consistent with H3a, β2 is positive in the model with CASM (Model 1) (coefficient of 5.728; one-tailed p<.01), and is negative in the model with ROA (Model 3) (coefficient of

-4.943; one-tailed $p<.10$) indicating that pay-for-peer-group-performance sensitivity is negative when firms compete in strategic substitutes. Also, consistent with H3b, $\beta 3$ is negative in the model with CASM (Model 2) (coefficient of -6.799; one-tailed $p<.01$), and is positive in the model with ROA (Model 4) (coefficient of 6.230; one-tailed $p<.05$) indicating that pay-for-peer-group-performance sensitivity is positive when firms compete in strategic complements. Hence, the data offer strong support for hypotheses H3a and H3b.

From an empirical standpoint, it is worth noting that the magnitudes of the coefficients on own-firm performance (in absolute values) are all lower than those on peer-group performance whether the peer group consists of peers which compete on strategic substitutes or complements with the firm. One explanation is provided by Aggarwal and Samwick (1999b) who predict analytically (as a comparative static of their main analytical model) and find empirically that industry competition has a stronger effect on the association between pay and peer-group performance compared to its effect on the association between pay and own-firm performance whether firms compete in strategic substitutes or complements.[28] Given that the airline industry is highly competitive compared to many other industries, it may be the case that a large part of pay-for-performance in the airline industry is determined by strategic objectives (i.e., it is aimed at influencing strategic competition). However, given that my data are industry-specific, I cannot test the validity of this explanation cross-sectionally in my sample.

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[28] When firms compete in strategic substitutes, as competition rises, it is more valuable to each firm to provide incentives to its CEO to take actions that deter competitors (e.g., by gaining market share or fending off against new entrants) than take actions that strictly increase the firm's own performance. Similarly, when firms compete in strategic complements, as competition rises, it is more valuable to each firm to provide incentives to its CEO to take actions that soften competition and/or foster cooperation (e.g., by further differentiating the firm's product mix or doing advertising that is targeted at growing the market as a whole) than take actions that strictly increase the firm's own performance.

5.3 Tests of the Modified Strategic Interaction Hypotheses (H4a/H4b)

The evidence from the tests of the hypotheses H3a/b (the strategic interaction hypotheses) suggests that hypotheses H1 and H2 (the relative performance evaluation hypotheses) are incomplete because they do not account for the strategic effects of relative performance on CEO pay. However, hypotheses H3a and H3b may also be incomplete because they assume that both the systematic (i.e., common) and unsystematic (i.e., unique) components of firm performance are used in order to influence strategic competition with other firms. If firms use RPE to induce their CEO to compete strategically with other firms, they must use the unsystematic component of performance since the CEO has no control over systematic performance. If this is the case, then the RPE hypotheses and the strategic interaction hypotheses are not in conflict with one another, and the two objectives of RPE may be separately observed if an alternative empirical specification is adopted. Hypotheses H4a and H4b investigate this possibility.

To test hypotheses H4a and H4b, I estimate the following empirical model:

$$\Delta \ln COMP_{it} = \beta 0 + \beta 1\ \Delta \ln[PERF]_{it} + \beta 2\ \Delta \ln SUBS\_[PERF]_{it} + \beta 3\ \Delta \ln COMPL\_[PERF]_{it} +$$

$$+ \text{<control variables>} + \text{<year indicators>} + \varepsilon_{it}, \qquad (4)$$

where [PERF] is UNSYS_CASM, EXFUEL_CASM, or UNSYS_ROA. For each firm, [PERF] is the unsystematic performance variable that was calculated in the test of hypothesis H2. I calculate SUBS_[PERF] as the weighted average of the unsystematic performances of peers that compete in strategic substitutes with the firm. Similarly, I calculate COMPL_[PERF] as the weighted average of the unsystematic performances of peers that compete in strategic complements with the firm. The average is weighted by ASMs when [PERF] is CASM or EXFUEL_CASM and by total assets including capitalized operating leases when [PERF] is ROA.

Hypotheses H4a and H4b predict negative values for β1 and β3, and positive values for β2 in equation (4) when [PERF] is CASM or EXFUEL CASM (because CASM is inversely related to performance). Hypotheses H4a and H4b predict positive values for β1 and β3, and negative values for β2 in equation (4) when [PERF] is ROA. The results of the estimation are presented in Table 10, Panels A and B. The adjusted R-squared of the models with CASM (Panel A, Models 1-2) is 9.9% and 10.2%, respectively (all VIFs < 2.5 in Model 1 and < 5.6 in Model 2); that of the models with non-fuel CASM (Panel A, Models 3-4) is 9.0% and 10.4%, respectively (all VIFs < 2.6 in Model 3 and < 5.8 in Model 4). The adjusted R-squared of the models with ROA (Panel B, Models 1-2) is 10.3, and 10.7%, respectively (all VIFs < 2.7 in Model 1 and < 2.5 in Model 2). Pay-for-own-unsystematic-performance sensitivity is negative in the models with CASM and non-fuel CASM (Panel A, Models 1-4) (coefficients of -.692, -1.095, -1.042, and -1.031; one-tailed p<.05 in Models 1-3, and <.01 in Model 4), as CASM is inversely related with performance, and is positive the models with ROA (Panel B, Models 1 and 2) (coefficients of 1.570 and 2.496; one-tailed p<.10 in Model 1, and <.05 in Model 2).

Consistent with H4a, in the models with CASM and non-fuel CASM, pay-for-unsystematic-peer-group-performance sensitivity is negative (i.e., β2 is positive) when firms compete in strategic substitutes (Panel A, Models 1 and 3) (coefficients of 4.048 and 3.582; one-tailed p<.05 and < .10, respectively). Similarly, consistent with H4a, in the models with ROA, pay-for-unsystematic-peer-group-performance sensitivity is negative (i.e., β2 is negative) when firms compete in strategic substitutes (Panel B, Model 1) (coefficient of -4.609; one-tailed p<.10).

Also, consistent with H4b, in the models with CASM and non-fuel CASM, pay-for-unsystematic-peer-group-performance sensitivity is positive (i.e., β3 is negative) when firms compete in strategic complements (Panel A, Models 2 and 4) (coefficients of -4.657 and -5.944; one-tailed p<.05, and <.01, respectively). Similarly, consistent with H4b, in the models with ROA, pay-for-unsystematic-peer-group-performance sensitivity is positive (i.e., $\beta 3$ is positive) when firms compete in strategic complements (Panel B, Model 2) (coefficient of 5.647; one-tailed p<.10).

Hence, the evidence from the tests of hypotheses H4a and H4b suggests that firms filter out (explicitly and implicitly) the entire amount of noise from performance measures used in executive compensation, and utilize the unsystematic component of performance in order to influence peer firms' strategic behavior. Therefore, this implies that the two hypothesized RPE effects, on risk reduction and strategic interaction, are not mutually exclusive. The component of performance that best captures the effects of common risk (SYS_CASM, FUEL_CASM, or SYS_ROA) is used to reduce the risk placed on the manager, while the component that best captures the effects of strategic competition (UNSYS_CASM, EXFUEL_CASM, or UNSYS_ROA) is used to influence strategic interaction with other firms; thereby, both the risk-reduction and strategic effects are evident. These results therefore suggest that firms' use of relative performance measures in order to influence strategic interaction with peer firms is independent of the noisiness of own-firm performance measures.

5.4 Sensitivity Analysis

Garvey and Milbourn (2006) find that CEO compensation is adjusted upwards for negative performance due to "bad luck", i.e., for negative exogenous or systematic performance, while it is not adjusted downwards as often for positive performance due to "good luck", i.e., for positive exogenous or systematic performance. If this is the case, then it is possible that my findings in the tests of hypotheses H2 and H4a/b are influenced by the asymmetry between pay for good versus bad luck. Consequently, I examine whether my results are driven by asymmetric benchmarking due to CEO pay for luck.

I construct an indicator variable (LUCK_[PERF]), which equals one in years that firm i's year-over-year change in systematic performance (ΔSYS_[PERF]) is positive and zero otherwise. I interact this indicator variable with the firm's change in systematic performance in year t (LUCK_[PERF] × ΔSYS_[PERF]). To test for CEO pay for luck, I use the following empirical specification:

$$\Delta \text{lnCOMP}_{it} = \beta 0 + \beta 1\ \Delta \text{UNSYS\_[PERF]}_{it} + \beta 2\ \Delta \text{SYS\_[PERF]}_{it} + \beta 3\ \text{LUCK\_[PERF]}_{it} +$$

$$+ \beta 4\ \text{LUCK\_[PERF]}_{it} \times \Delta \text{SYS\_[PERF]}_{it} + \text{<control variables>} +$$

$$+ \text{<year indicators>} + \varepsilon_{it}. \qquad (5)$$

where [PERF] is CASM or ROA. If CEOs in my setting are paid asymmetrically for "good" versus "bad luck", I expect to find a significant association between CEO pay and the interaction term, negative when [PERF] is CASM and positive when [PERF] is ROA. I mean-center the interacted variables in equation (5) to reduce multi-collinearity (Jaccard and Turrisi, 2003, pg. 27-28).

The results of this estimation are reported in Table 11, Models 1 and 2. The adjusted R-squared of the model with CASM (Model 1) is 7.5%; that of the model with ROA (Model 2) is 9.0% (all VIFs < 2.7 in Model 1 and < 2.9 in Model 2). The unsystematic component of performance is significant as is in the test of hypothesis H2 both when performance is measured by CASM and ROA (coefficients of -.721 and 2.119, respectively; p<.05 in both models). However, both the main and interaction effects of systematic performance on CEO pay are statistically insignificant indicating that asymmetric pay for “good” versus “bad luck” is not a factor in my setting and does not affect the estimation of the models used to test hypotheses H2 and H4a/b.

VI. CONLCUDING REMARKS

This dissertation examines whether firm owners use relative performance measures in managerial incentive contracting both in order to reduce the risk placed on their managers and to manipulate the competitive behavior of peer firms' managers. Agency theory commonly serves to explain the use of relative performance measures in managerial incentive contracts in order to resolve agency problems between a firm's owner and manager. Pay-for-peer-group-performance sensitivity is used to reduce the effects of exogenous shocks on the CEO's performance, thus effectively reducing the cost of incentive compensation to the firm's owners.

However, industrial organization theory posits that when the firm's owner competes with counterparts at other firms, relative performance measures in managerial incentive contracts take on the additional role of influencing the competitive response of managers of other firms. A firm uses pay-for-peer-group-performance sensitivity to motivate its CEO to take strategic actions that bring on the desired reaction from the managers of peer firms. Therefore, in a setting with interdependent owner-manager pairs, relative performance measures provide strategic as well as informational advantages.

The agency literature and the industrial organization literature offer competing explanations for the incentive uses of relative performance measures and provide an incomplete picture of the use of RPE in managerial incentive contracts. For instance, when firms compete in strategic complements, Aggarwal and Samwick (1999b) analytically show that shareholders would be worse off if firms filtered out industry-wide effects, as doing so would provide managers with an incentive to lower industry-wide returns by engaging in excessive competition, which would, in turn, lower profits.

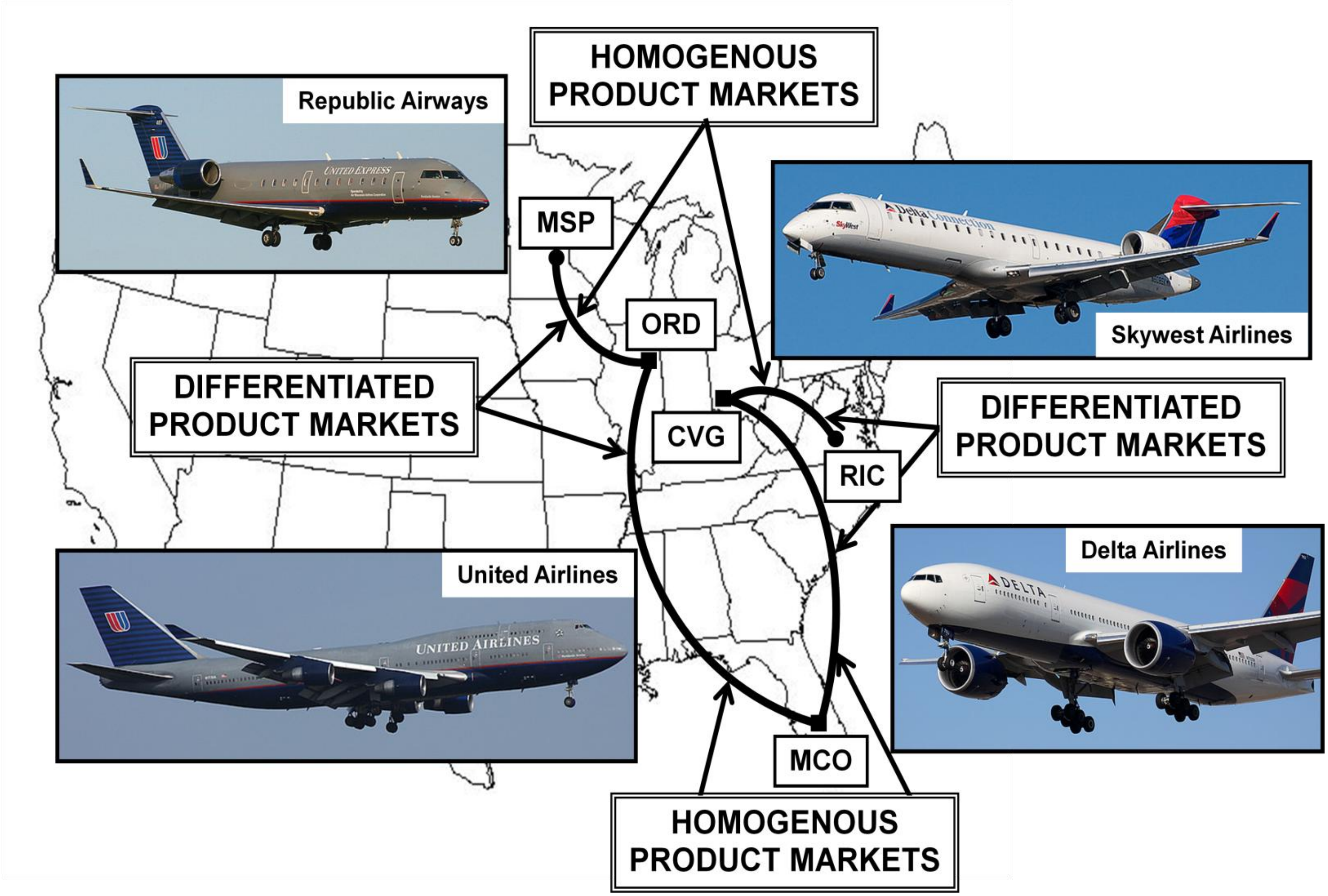
In this dissertation, first, I examine whether RPE is used both to improve the efficiency of incentive contracting between the firm's owner and CEO (i.e., the informational effect), and to influence the competitive behavior of other firms' CEOs (i.e., the strategic effect). In addition, I examine whether the hypothesized strategic and informational effects of relative performance evaluation conflict with each other.

I examine the research questions of this dissertation using financial and operational data for U.S.-based scheduled passenger airlines. I find strong support for the strong-form RPE hypothesis of the agency literature and the strategic interaction hypothesis of the industrial organization literature using both CASM and ROA as proxies for firm performance. However, I find no support for the weak-form relative performance evaluation hypothesis predicted by agency theory. The lack of support for the weak-form RPE hypothesis may be due to the fact that the effects of relative performance on managerial incentives are directionally opposite depending on the type of strategic competition, thus they cancel each other in aggregate. Finally, the two hypothesized RPE effects – reducing the risk placed on the manager and influencing the strategic behavior of peer-firm managers – are not mutually exclusive. I find that firms remove the effects of systematic (industry-wide) shocks from performance measures used in incentive contracting, and employ the unsystematic component of performance to influence strategic interaction.

My dissertation offers important insight into the strategic effects of accounting variables, a research area overlooked by prior accounting literature. While previous studies extensively research agency theoretical predictions on the incentive use of relative performance measures in managerial incentive contracts, they overlook the influence of competitive dynamics in imperfectly competitive settings. While it is possible that in intra-firm settings, the area of primary focus for agency theory, relative performance measures have only informational effects, industrial organization theory shows that relative performance measures have strategic effects in inter-firm settings.

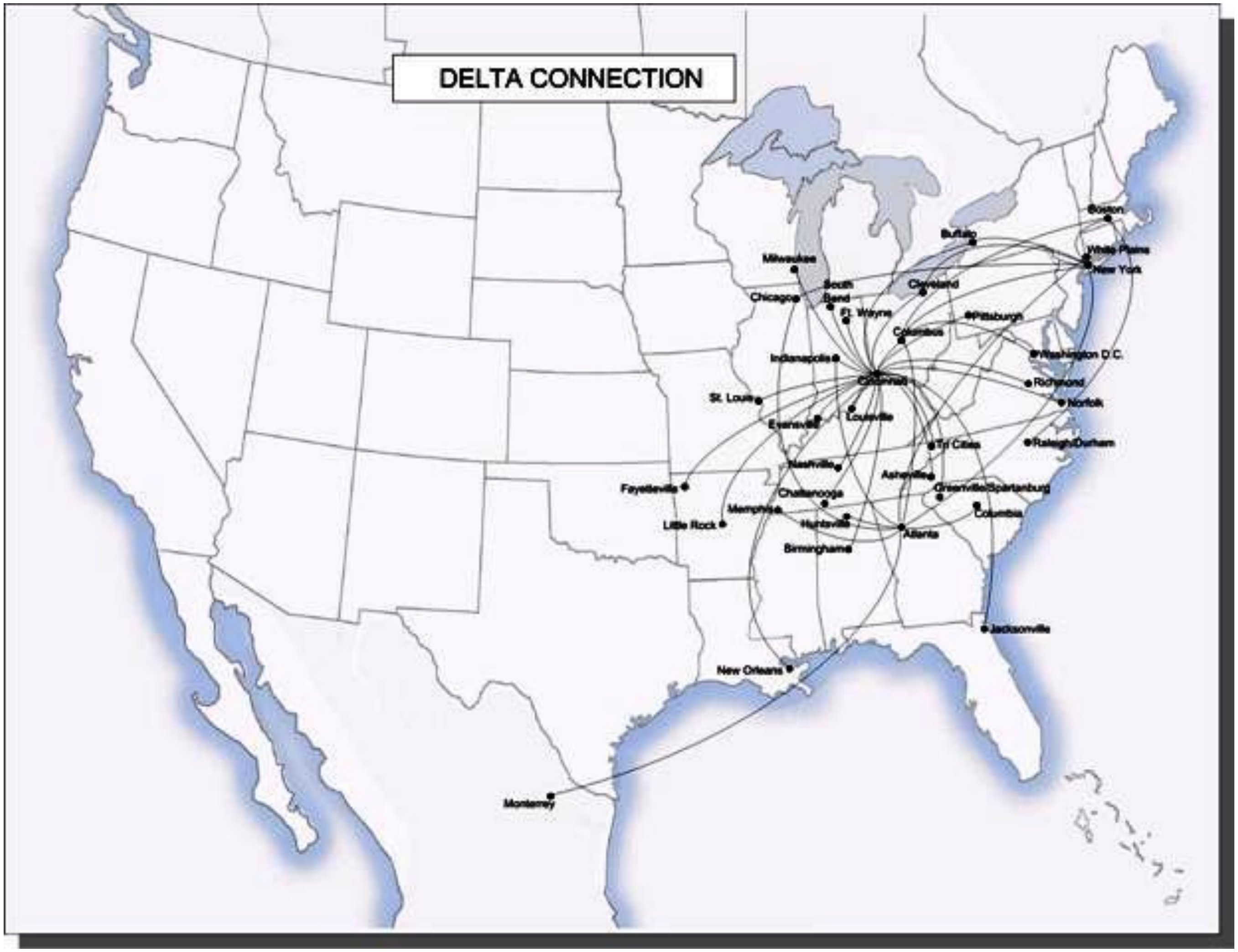
The strategic interaction hypothesis significantly expands the role of accounting information in managerial incentive contracting. The role of accounting performance measures in managerial incentive contracts is influenced not only by the need to mitigate the effects of informational asymmetries between a firm's owner and managers, but also by the need to commit a firm's managers to strategic behavior in the product market. However, not only may the objectives of risk-reduction and strategic interaction not conflict as previous research argues, they may, in fact, be compatible. My research offers evidence that, when seeking to improve the efficiency of managerial incentive contracts, firms may take advantage of the common components of performance and utilize the unique components of performance to influence managers' competitive behavior.

Figure 1
Network-regional Carrier Route Systems



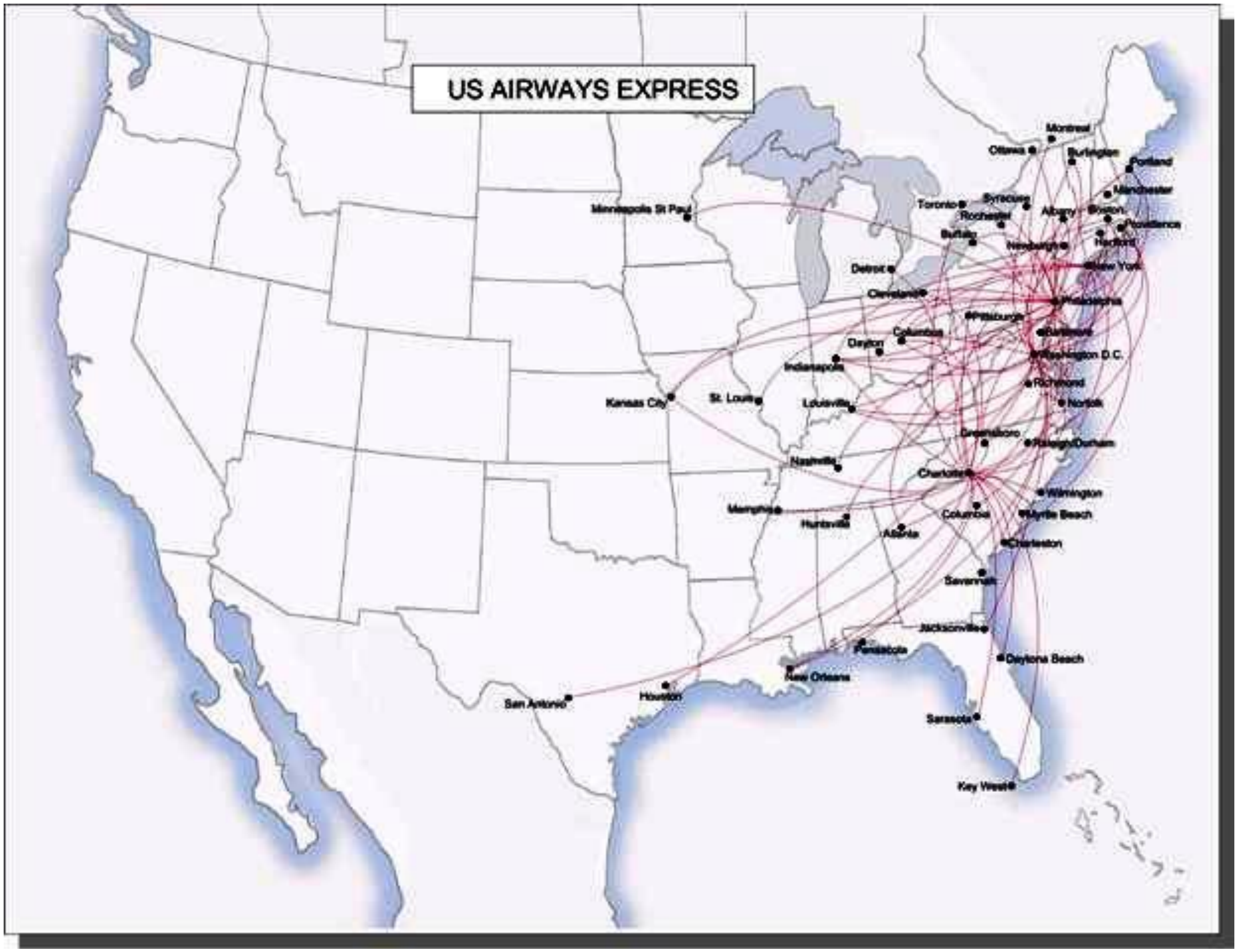
<u>Note:</u> For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this dissertation.

Figure 2
Republic Airways operating as Delta Connection



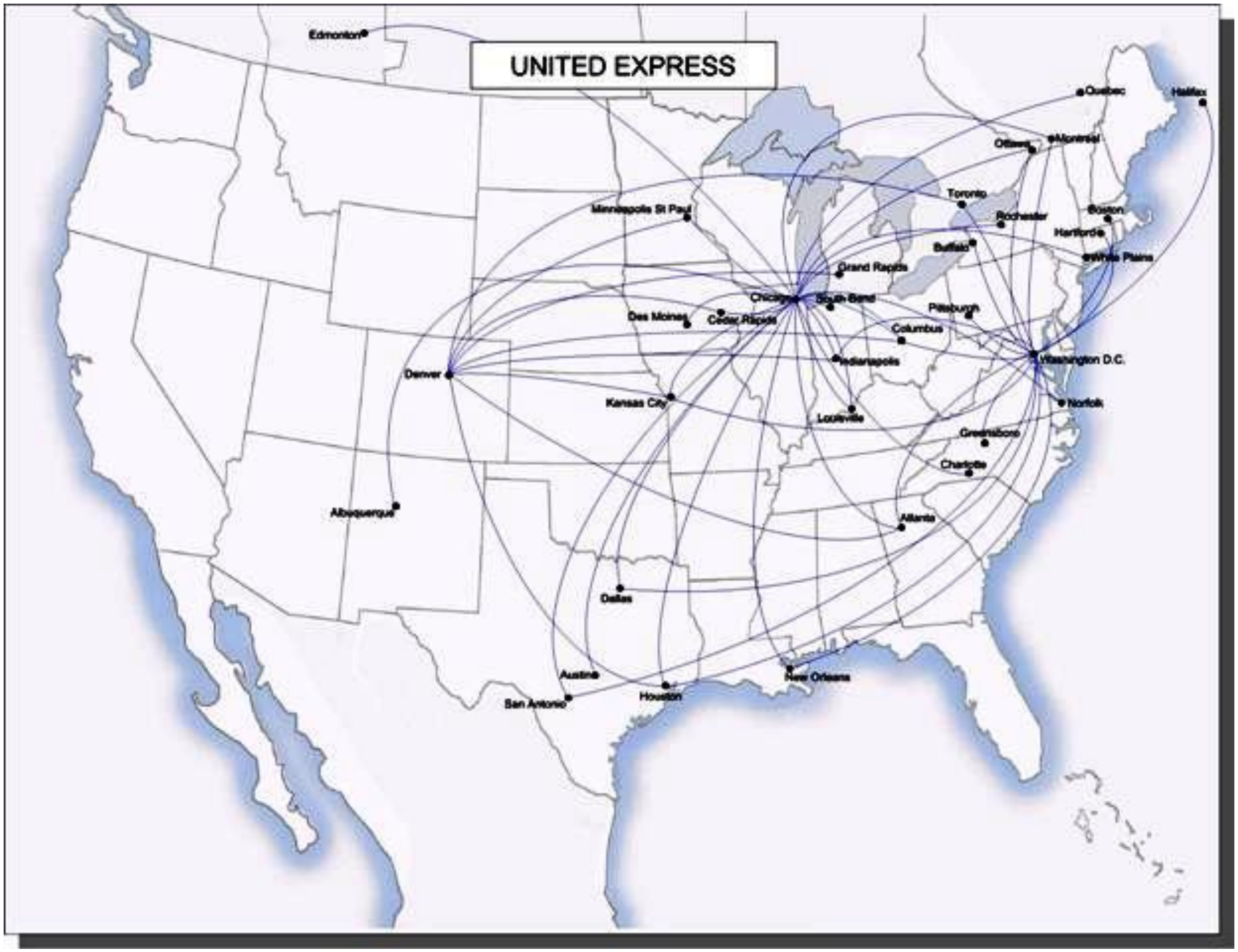
<u>Source:</u> http://www.sec.gov/Archives/edgar/data/1159154/000115915409000008/form10k.htm, as of March 16, 2009.

Figure 3
Republic Airways operating as US Airways Express



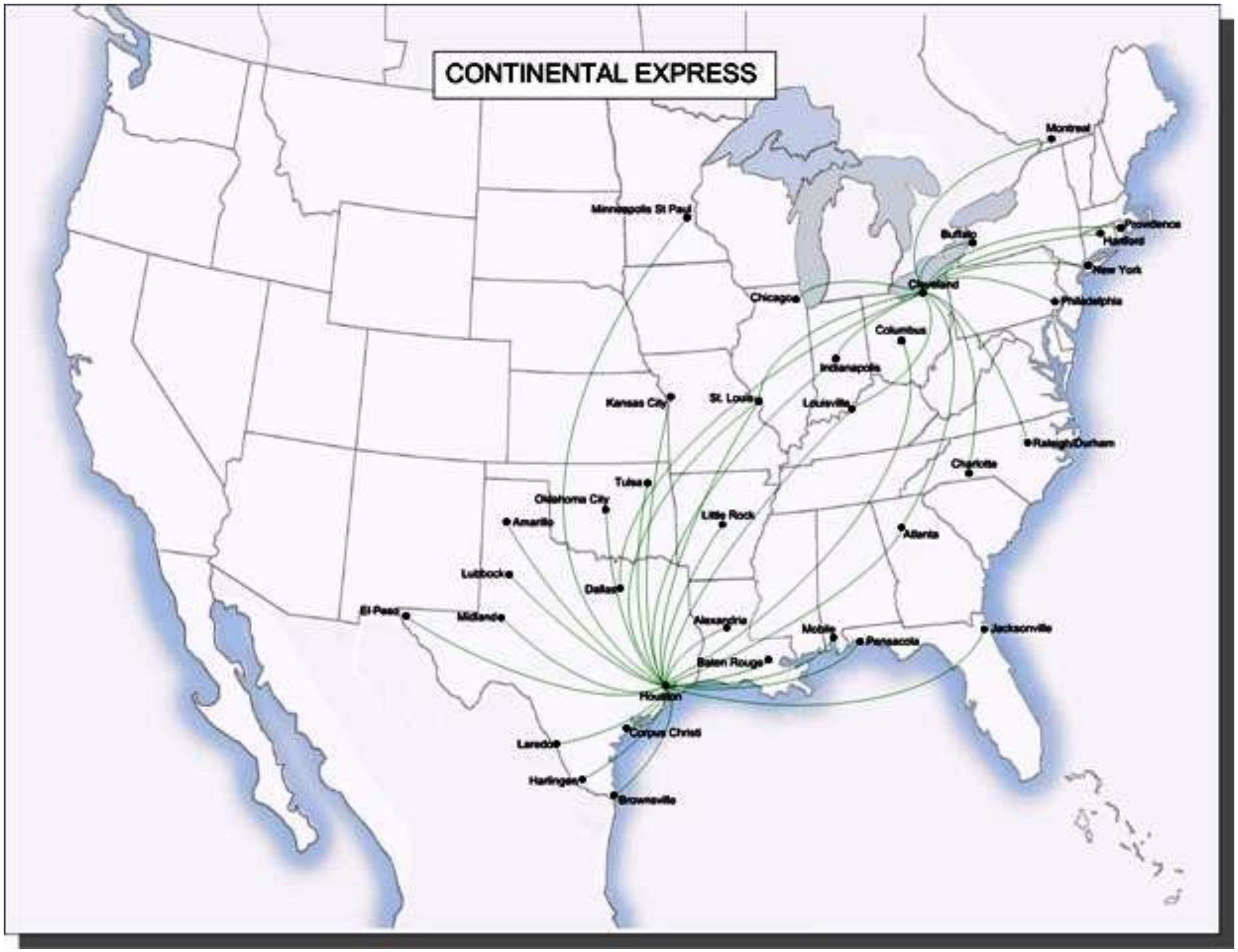
Source: http://www.sec.gov/Archives/edgar/data/1159154/000115915409000008/form10k.htm, as of March 16, 2009.

Figure 4
Republic Airways operating as United Express



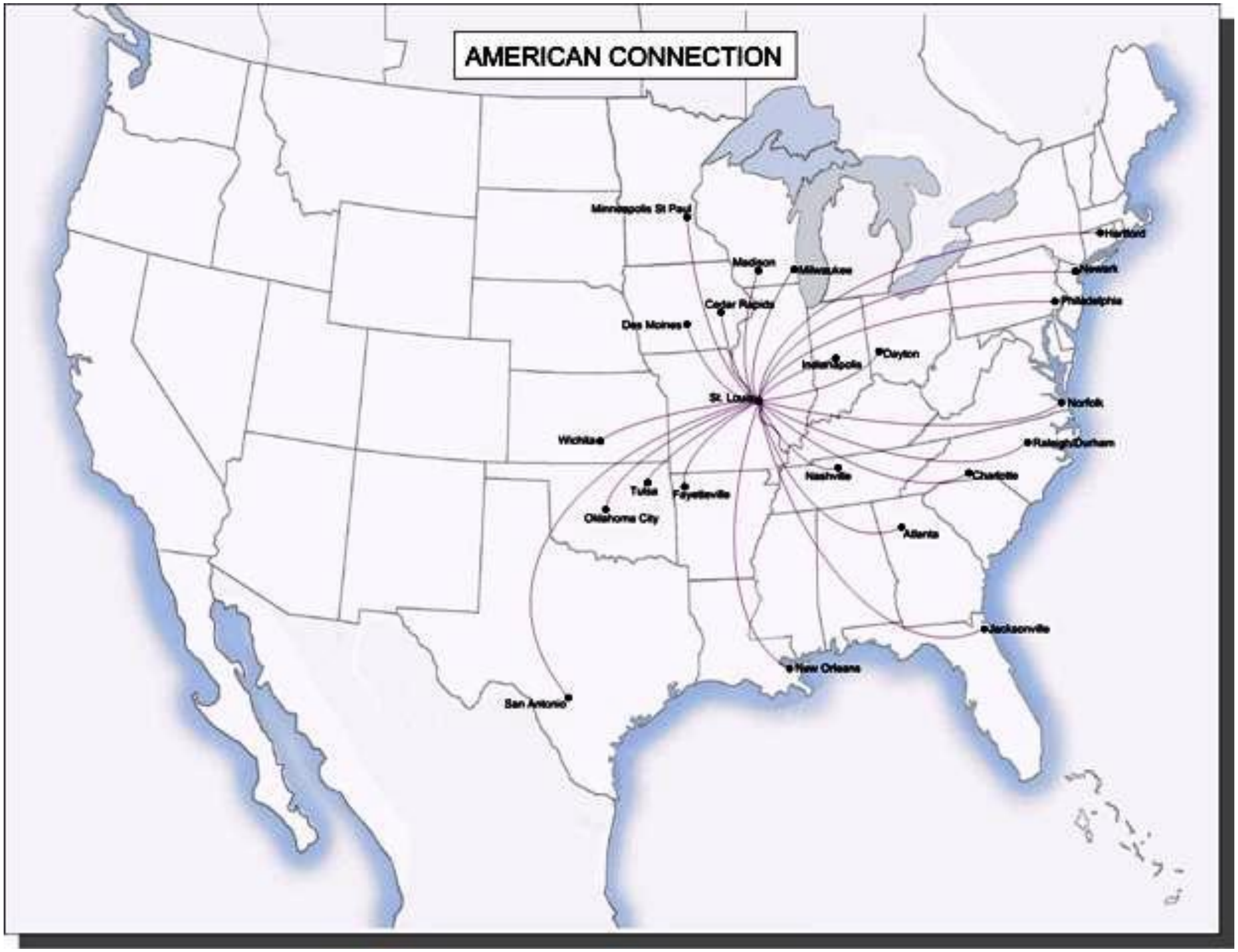
Source: http://www.sec.gov/Archives/edgar/data/1159154/000115915409000008/form10k.htm, as of March 16, 2009.

Figure 5
Republic Airways operating as Continental Express



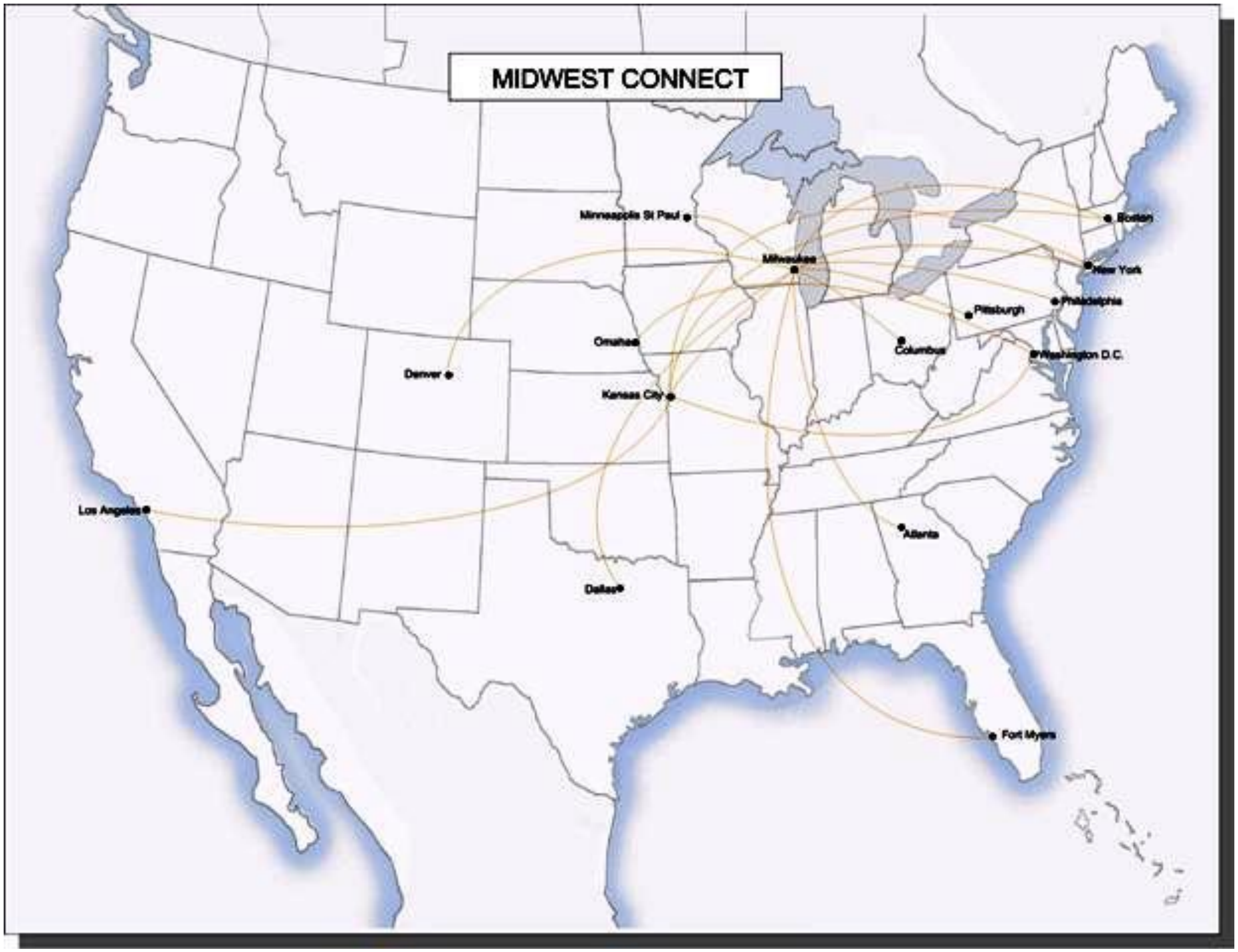
Source: http://www.sec.gov/Archives/edgar/data/1159154/000115915409000008/form10k.htm, as of March 16, 2009.

Figure 6
Republic Airways operating as American Connection



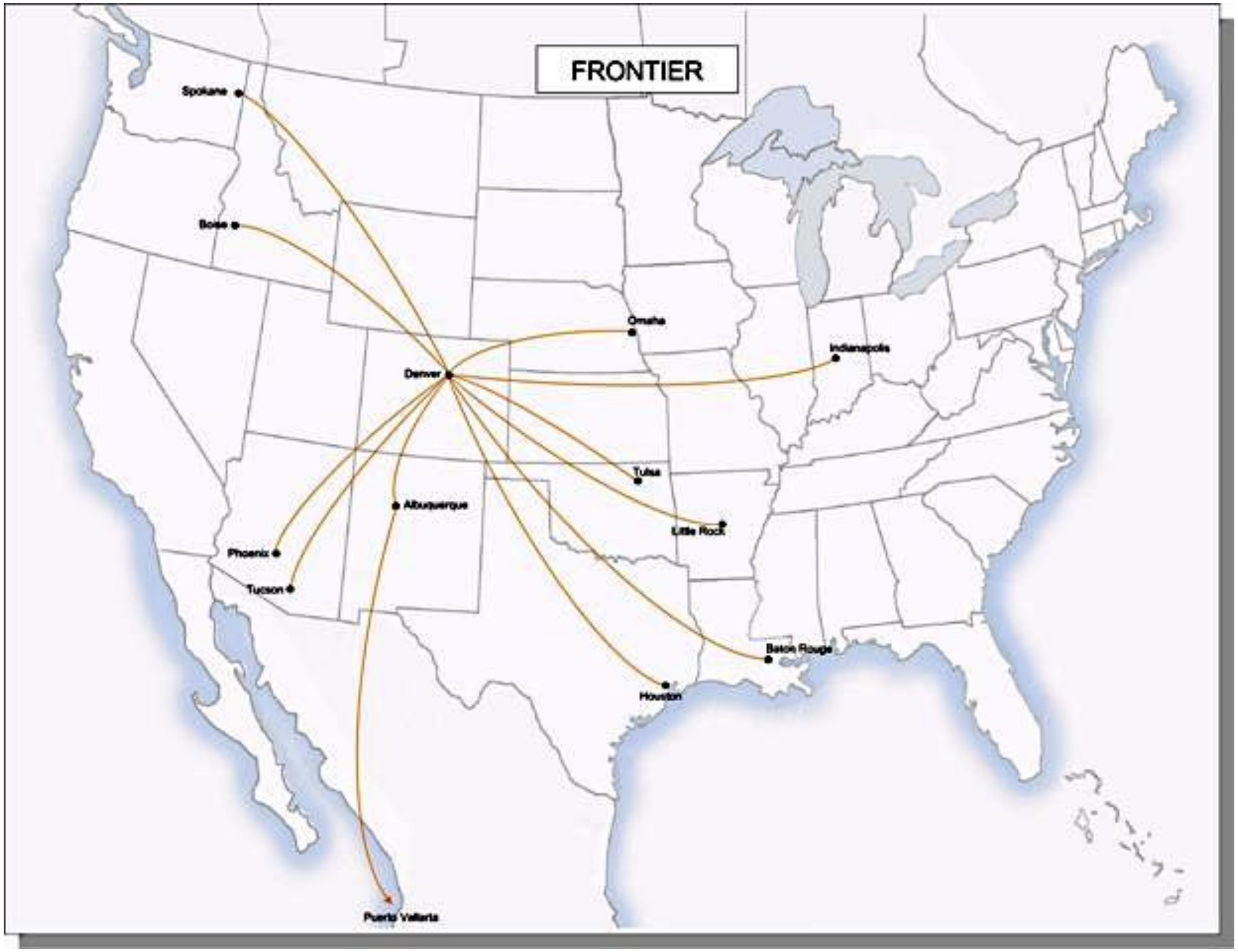
Source: http://www.sec.gov/Archives/edgar/data/1159154/000115915409000008/form10k.htm, as of March 16, 2009.

Figure 7
Republic Airways operating as Midwest Connect



Source: http://www.sec.gov/Archives/edgar/data/1159154/000115915409000008/form10k.htm, as of March 16, 2009.

Figure 8
Republic Airways operating as Frontier



Source: http://www.sec.gov/Archives/edgar/data/1159154/000115915409000008/form10k.htm, as of March 16, 2009.

Table 1
Airlines by Product Market Segment, Type of Ownership and Frequency

Airline	Network	Regional	Public	Private	# Obs	Frequency
Air Wisconsin		✓		✓	18	3.3%
AirTran Airways	✓		✓		15	2.8%
Alaska Airlines	✓		✓		18	3.3%
Allegiant Air	✓		✓		6	1.1%
Aloha Airlines	✓			✓	17	3.1%
America West Airlines	✓		✓		13	2.4%
American Airlines	✓		✓		18	3.3%
American Eagle		✓		✓	18	3.3%
ATA Airlines	✓		✓		16	3.0%
Atlantic Southeast		✓	✓		12	2.2%
Business Express		✓		✓	5	0.9%
Comair		✓		✓	8	1.5%
Compass Airlines		✓		✓	3	0.6%
Continental Airlines	✓		✓		18	3.3%
Continental Micronesia		✓		✓	16	3.0%
Delta Airlines	✓		✓		18	3.3%
Executive Airlines		✓		✓	18	3.3%
Expressjet Airlines		✓	✓		14	2.6%
Flagship Airlines		✓		✓	1	0.2%
Frontier Airlines	✓		✓		16	3.0%
Hawaiian Airlines	✓		✓		18	3.3%
Horizon Air		✓		✓	18	3.3%
Independence Air		✓	✓		3	0.6%
JetBlue Airways	✓		✓		10	1.9%
Mesa Airlines Inc.		✓	✓		11	2.0%
Mesaba Airlines		✓	✓		13	2.4%
Midway Airlines	✓		✓		7	1.3%
Midwest Airlines	✓		✓		18	3.3%
Northwest Airlines	✓		✓		16	3.0%
Pan American	✓			✓	3	0.6%

Table 1, cont.

Airline	**Network**	**Regional**	**Public**	**Private**	**# Obs**	**Frequency**
Pinnacle Airlines		✓	✓		6	1.1%
PSA Airlines		✓		✓	6	1.1%
Reno Air	✓		✓		7	1.3%
Republic Airlines		✓	✓		5	0.9%
Skywest Airlines		✓	✓		7	1.3%
Southwest Airlines	✓		✓		18	3.3%
Spirit Air	✓			✓	15	2.8%
Tower Air	✓		✓		8	1.5%
Trans States Airlines		✓		✓	18	3.3%
Trans World Airways	✓		✓		9	1.7%
United Airlines	✓		✓		18	3.3%
US Airways	✓		✓		18	3.3%
USAir Shuttle		✓		✓	9	1.7%
Vanguard Airlines	✓		✓		6	1.1%
Westair Airlines		✓		✓	2	0.4%
Western Pacific Air	✓		✓		3	0.6%
Total Airlines	**25**	**21**	**30**	**16**	**540**	**100.0%**
Network Airlines			**22**	**3**	**329**	**60.9%**
Regional Airlines			**8**	**13**	**211**	**39.1%**

Note: Non-publicly traded airline data are used in the calculation of average peer-group performance measures.

Table 2
Network-Regional Airline Affiliations

CARRIER NAME	CALENDAR YEAR	REGIONAL AIRLINE AFFILIATES
AirTran Airways	2009	Skywest Airlines
AirTran Airways	2008	
AirTran Airways	2007	
AirTran Airways	2006	
AirTran Airways	2005	
AirTran Airways	2004	
AirTran Airways	2003	
AirTran Airways	2002	
AirTran Airways	2001	
AirTran Airways	2000	
AirTran Airways	1999	
AirTran Airways	1998	
AirTran Airways	1997	
AirTran Airways	1996	
Alaska Airlines	2009	Horizon Air (wholly-owned), American Eagle Airlines, Skywest Airlines, Atlantic Southeast Airlines, Era Alaska, PenAir
Alaska Airlines	2008	Horizon Air (wholly-owned), American Eagle Airlines, Skywest Airlines, Atlantic Southeast Airlines, Era Aviation, PenAir, Mokulele Airlines
Alaska Airlines	2007	Horizon Air (wholly-owned), American Eagle Airlines, Skywest Airlines, Atlantic Southeast Airlines, Era Aviation, PenAir, Mesaba (Big Sky Airlines)
Alaska Airlines	2006	Horizon Air (wholly-owned), American Eagle Airlines, Skywest Airlines, Atlantic Southeast Airlines, Era Aviation, PenAir, Mesaba (Big Sky Airlines)
Alaska Airlines	2005	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, PenAir, Mesaba (Big Sky Airlines)
Alaska Airlines	2004	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, PenAir, Mesaba (Big Sky Airlines), Helijet International
Alaska Airlines	2003	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, PenAir, Mesaba (Big Sky Airlines), Helijet International
Alaska Airlines	2002	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, PenAir, Mesaba (Big Sky Airlines), Helijet International
Alaska Airlines	2001	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, PenAir

Table 2, cont.

Alaska Airlines	2000	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, Harbor Airlines, Trans States Airlines, PenAir
Alaska Airlines	1999	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, Harbor Airlines, Trans States Airlines, PenAir, Reeve Aleutian Airlines
Alaska Airlines	1998	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, Harbor Airlines, Trans States Airlines, PenAir, Reeve Aleutian Airlines
Alaska Airlines	1997	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, Harbor Airlines, Trans States Airlines, PenAir, Reeve Aleutian Airlines
Alaska Airlines	1996	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, Harbor Airlines, Trans States Airlines, PenAir, Reeve Aleutian Airlines
Alaska Airlines	1995	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, Harbor Airlines, Trans States Airlines, PenAir, Reeve Aleutian Airlines
Alaska Airlines	1994	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, Harbor Airlines, Trans States Airlines, PenAir, Reeve Aleutian Airlines
Alaska Airlines	1993	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, Harbor Airlines, Trans States Airlines, PenAir, Reeve Aleutian Airlines
Alaska Airlines	1992	Horizon Air (wholly-owned), American Eagle Airlines, Era Aviation, Harbor Airlines, Trans States Airlines, PenAir, Reeve Aleutian Airlines
Allegiant Air	2009	
Allegiant Air	2008	
Allegiant Air	2007	
Allegiant Air	2006	
America West	2004	Mesa Air Group, Mesaba (Big Sky Airlines)
America West	2003	Mesa Air Group, Mesaba (Big Sky Airlines)
America West	2002	Mesa Air Group, Mesaba (Big Sky Airlines)
America West	2001	Mesa Air Group, Expressjet, Chautauqua Airlines, Mesaba (Big Sky Airlines)
America West	2000	Mesa Air Group, Continental Express, Chautauqua Airlines, Mesaba (Big Sky Airlines)
America West	1999	Mesa Air Group, Continental Express
America West	1998	Mesa Air Group, Continental Express
America West	1997	Mesa Air Group, Continental Express
America West	1996	Mesa Air Group, Continental Express
America West	1995	Mesa Air Group, Continental Express
America West	1994	Mesa Air Group, Continental Express

Table 2, cont.

America West	1993	Mesa Air Group, Continental Express
America West	1992	Mesa Air Group
American Airlines	2009	American Eagle Airlines (wholly-owned), Executive Airlines (wholly-owned), Republic Airways (Chautauqua), Trans States Airlines, Horizon Air
American Airlines	2008	American Eagle Airlines (wholly-owned), Executive Airlines (wholly-owned), Republic Airways (Chautauqua), Trans States Airlines, Horizon Air
American Airlines	2007	American Eagle Airlines (wholly-owned), Executive Airlines (wholly-owned), Republic Airways (Chautauqua), Trans States Airlines, Horizon Air
American Airlines	2006	American Eagle Airlines (wholly-owned), Executive Airlines (wholly-owned), Republic Airways (Chautauqua), Trans States Airlines, Horizon Air, RegionsAir (Corporate Airlines)
American Airlines	2005	American Eagle Airlines (wholly-owned), Executive Airlines (wholly-owned), Republic Airways (Chautauqua), Trans States Airlines, Horizon Air, RegionsAir (Corporate Airlines)
American Airlines	2004	American Eagle Airlines (wholly-owned), Executive Airlines (wholly-owned), Republic Airways (Chautauqua), Trans States Airlines, Horizon Air, RegionsAir (Corporate Airlines)
American Airlines	2003	American Eagle Airlines (wholly-owned), Executive Airlines (wholly-owned), Republic Airways (Chautauqua), Trans States Airlines, Horizon Air
American Airlines	2002	American Eagle Airlines (wholly-owned), Executive Airlines (wholly-owned), Republic Airways (Chautauqua), Trans States Airlines, Horizon Air
American Airlines	2001	American Eagle Airlines (wholly-owned), Executive Airlines (wholly-owned), Republic Airways (Chautauqua), Trans States Airlines, Horizon Air
American Airlines	2000	American Eagle Airlines (wholly-owned), Executive Airlines (wholly-owned), Business Express Airlines (wholly-owned), Horizon Air
American Airlines	1999	American Eagle Airlines (wholly-owned), Executive Airlines (wholly-owned), Business Express Airlines (wholly-owned), Horizon Air
American Airlines	1998	American Eagle Airlines (wholly-owned), Executive Airlines (wholly-owned), Business Express Airlines (wholly-owned), Horizon Air
American Airlines	1997	Flagship Airlines (wholly-owned), Simmons Airlines (wholly-owned), Executive Airlines (wholly-owned), Wings West Airlines (wholly-owned)

Table 2, cont.

American Airlines	1996	Flagship Airlines (wholly-owned), Simmons Airlines (wholly-owned), Executive Airlines (wholly-owned), Wings West Airlines (wholly-owned)
American Airlines	1995	Flagship Airlines (wholly-owned), Simmons Airlines (wholly-owned), Executive Airlines (wholly-owned), Wings West Airlines (wholly-owned)
American Airlines	1994	Flagship Airlines (wholly-owned), Simmons Airlines (wholly-owned), Executive Airlines (wholly-owned), Wings West Airlines (wholly-owned)
American Airlines	1993	Flagship Airlines (wholly-owned), Simmons Airlines (wholly-owned), Executive Airlines (wholly-owned), Wings West Airlines (wholly-owned)
American Airlines	1992	Flagship Airlines (wholly-owned), Simmons Airlines (wholly-owned), Executive Airlines (wholly-owned), Wings West Airlines (wholly-owned)
ATA Airlines	2004	Chicago Express (wholly-owned)
ATA Airlines	2003	Chicago Express (wholly-owned)
ATA Airlines	2002	Chicago Express (wholly-owned)
ATA Airlines	2001	Chicago Express (wholly-owned)
ATA Airlines	2000	Chicago Express (wholly-owned)
ATA Airlines	1999	Chicago Express (wholly-owned)
ATA Airlines	1998	Chicago Express
ATA Airlines	1997	Chicago Express
Continental Airlines	2009	Continental Micronesia (wholly-owned), Expressjet, Republic Airways, Pinnacle Airlines (Colgan Air), Champlain Entreprises (Commutair), Cape Air, Gulfstream International Airlines
Continental Airlines	2008	Continental Micronesia (wholly-owned), Expressjet, Republic Airways, Pinnacle Airlines (Colgan Air), Champlain Entreprises (Commutair), Cape Air, Gulfstream International Airlines
Continental Airlines	2007	Continental Micronesia (wholly-owned), Expressjet, Republic Airways, Pinnacle Airlines (Colgan Air), Gulfstream International Airlines, Horizon Airlines, Champlain Entreprises (Commutair), Hyannis Air Service (Cape Air), Hawaii Island Air, American Eagle Airlines
Continental Airlines	2006	Continental Micronesia (wholly-owned), Expressjet, Republic Airways, Gulfstream International Airlines, Horizon Airlines, Champlain Entreprises (Commutair), Hyannis Air Service (Cape Air), Colgan Air, Hawaii Island Air, American Eagle Airlines

Table 2, cont.

Continental Airlines	2005	Expressjet (8.6%-owned), Continental Micronesia (wholly-owned), Gulfstream International Airlines, Horizon Airlines, Champlain Entreprises (Commutair), Hyannis Air Service (Cape Air), Colgan Air, Hawaii Island Air, American Eagle Airlines
Continental Airlines	2004	Expressjet (30.8%-owned), Continental Micronesia (wholly-owned), Gulfstream International Airlines, Skywest Airlines, Horizon Airlines, Champlain Entreprises (Commutair), Hyannis Air Service, Colgan Air, American Eagle Airlines
Continental Airlines	2003	Expressjet (41%-owned), Continental Micronesia (wholly-owned), Gulfstream International Airlines, Skywest Airlines, Horizon Airlines, Champlain Entreprises (Commutair), Hyannis Air Service, American Eagle Airlines
Continental Airlines	2002	Expressjet (53.1%-owned), Continental Micronesia (wholly-owned), Gulfstream International Airlines, Mesaba Aviation, Horizon Airlines, Champlain Entreprises (Commutair), Hyannis Air Service, American Eagle Airlines
Continental Airlines	2001	Expressjet (wholly-owned), Continental Micronesia (wholly-owned), Gulfstream International Airlines (28%-owned), Mesaba Aviation, Horizon Airlines, Champlain Entreprises (Commutair), American Eagle Airlines
Continental Airlines	2000	Continental Express (wholly-owned), Continental Micronesia (wholly-owned), Gulfstream International Airlines (28%-owned), Mesaba Aviation, Horizon Airlines, Champlain Entreprises (Commutair), American Eagle Airlines
Continental Airlines	1999	Continental Express (wholly-owned), Continental Micronesia (wholly-owned), Gulfstream International Airlines, Mesaba Aviation, Horizon Airlines
Continental Airlines	1998	Continental Express (wholly-owned), Continental Micronesia (wholly-owned), Gulfstream International Airlines, Colgan Air, Mesaba Aviation
Continental Airlines	1997	Continental Express (wholly-owned), Continental Micronesia (wholly-owned), Skywest Airlines, Gulfstream International Airlines, Colgan Air
Continental Airlines	1996	Continental Express (wholly-owned), Continental Micronesia (91% owned), Skywest Airlines, Gulfstream International Airlines
Continental Airlines	1995	Continental Express (wholly-owned), Continental Micronesia (91%-owned), G.P. Express Airlines

Table 2, cont.

Continental Airlines	1994	Continental Express (wholly-owned), Continental Micronesia (91%-owned), G.P. Express Airlines
Continental Airlines	1993	Continental Express (wholly-owned), Continental Micronesia (91%-owned)
Delta Airlines	2009	Comair (wholly-owned), Compass (wholly-owned), Mesaba Aviation (wholly-onwned), Altlantic Southeast Airlines, Skywest Airlines, Republic Airways (Chautauqua, Shuttle America), Freedom Airlines, Mesa Air Group, Pinnacle Airlines, American Eagle Airlines, Horizon Air, US Helicopters
Delta Airlines	2008	Comair (wholly-owned), Compass (wholly-owned), Mesaba Aviation (wholly-onwned), Altlantic Southeast Airlines, Skywest Airlines, Republic Airways (Chautauqua, Shuttle America), Freedom Airlines, Mesa Air Group, Pinnacle Airlines, American Eagle Airlines, Horizon Air, Gulfstream International Airlines
Delta Airlines	2007	Comair (wholly-owned), Altlantic Southeast Airlines, Skywest Airlines, Republic Airways (Chautauqua, Shuttle America), Freedom Airlines, Mesa Air Group, Pinnacle Airlines, Expressjet, American Eagle Airlines
Delta Airlines	2006	Comair (wholly-owned), Altlantic Southeast Airlines, Skywest Airlines, Republic Airways (Chautauqua, Shuttle America), Freedom Airlines, Mesa Air Group, American Eagle Airlines, Expressjet, Mesaba (Big Sky Airlines)
Delta Airlines	2005	Comair (wholly-owned), Altlantic Southeast Airlines, Skywest Airlines, Republic Airways (Chautauqua, Shuttle America), Freedom Airlines, Mesa Air Group, American Eagle Airlines
Delta Airlines	2004	Altlantic Southeast Airlines (wholly-owned), Comair (wholly-owned), Skywest Airlines, Republic Airways (Chatauqua, Republic Airlines), American Eagle Airlines
Delta Airlines	2003	Altlantic Southeast Airlines (wholly-owned), Comair (wholly-owned), Skywest Airlines, Republic Airways (Chatauqua, Republic Airlines), American Eagle Airlines, Atlantic Coast Airlines (FLYI/Independence Air)
Delta Airlines	2002	Altlantic Southeast Airlines (wholly-owned), Comair (wholly-owned), Skywest Airlines, Republic Airways (Chautaqua), American Eagle Airlines, Atlantic Coast Airlines (FLYI/Independence Air)
Delta Airlines	2001	Altlantic Southeast Airlines (wholly-owned), Comair (wholly-owned), Skywest Airlines, Atlantic Coast Airlines (FLYI/Indpendence Air)

Table 2, cont.

Delta Airlines	2000	Altlantic Southeast Airlines (wholly-owned), Comair (wholly-owned), Skywest Airlines, Atlantic Coast Jet, Trans States Airlines
Delta Airlines	1999	Altlantic Southeast Airlines (wholly-owned), Comair (22%-owned), Skywest Airlines (13%-owned), Business Express Airlines, Trans States Airlines
Delta Airlines	1998	Altlantic Southeast Airlines (27%-owned), Comair (21%-owned), Skywest Airlines (13%-owned), Business Express Airlines, Trans States Airlines
Delta Airlines	1997	Altlantic Southeast Airlines (27%-owned), Comair (21%-owned), Skywest Airlines (15%-owned), Business Express Airlines
Delta Airlines	1996	Altlantic Southeast Airlines (26%-owned), Comair (21%-owned), Skywest Airlines (15%-owned), Business Express Airlines
Delta Airlines	1995	Altlantic Southeast Airlines (24.2%-owned), Comair (21.3%-owned), Skywest Airlines (15.0%-owned), Business Express Airlines
Delta Airlines	1994	Altlantic Southeast Airlines (23.3%-owned), Comair (20.6%-owned), Skywest Airlines(13.6%-owned), Business Express Airlines
Delta Airlines	1993	Altlantic Southeast Airlines (23.3%-owned), Comair (20.6%-owned), Skywest Airlines (13.6%-owned), Business Express Airlines
Delta Airlines	1992	Altlantic Southeast Airlines (23.3%-owned), Comair (20.6%-owned), Skywest Airlines (13.6%-owned), Business Express Airlines
Frontier Airlines	2009	Great Lakes Aviation, Republic Airways (Republic Airlines, Lynx Aviation), Horizon Air
Frontier Airlines	2008	Great Lakes Aviation, Republic Airways (Lynx Aviation), Horizon Air
Frontier Airlines	2007	Great Lakes Aviation, Republic Airways (Lynx Aviation), Horizon Air
Frontier Airlines	2006	Great Lakes Aviation, Republic Airways (Republic Airlines, Lynx Aviation), Horizon Air
Frontier Airlines	2005	Great Lakes Aviation, Horizon Air
Frontier Airlines	2004	Great Lakes Aviation, Horizon Air
Frontier Airlines	2003	Great Lakes Aviation, Mesa Air Group
Frontier Airlines	2002	Great Lakes Aviation, Mesa Air Group
Frontier Airlines	2001	Great Lakes Aviation, Mesa Air Group
Frontier Airlines	2000	
Frontier Airlines	1999	
Frontier Airlines	1998	Aspen Mountain Air
Hawaiian Airlines	2009	Continental Micronesia

Table 2, cont.

Hawaiian Airlines	2008	Continental Micronesia
Hawaiian Airlines	2007	Continental Micronesia
Hawaiian Airlines	2006	Continental Micronesia, Horizon Air
Hawaiian Airlines	2005	Continental Micronesia, Horizon Air
Hawaiian Airlines	2004	Continental Micronesia, Horizon Air
Hawaiian Airlines	2003	Continental Micronesia, Horizon Air
Hawaiian Airlines	2002	Continental Micronesia, Horizon Air
Hawaiian Airlines	2001	Continental Micronesia, Horizon Air
Hawaiian Airlines	2000	Continental Micronesia
Hawaiian Airlines	1999	Continental Micronesia
Hawaiian Airlines	1998	Continental Micronesia
Hawaiian Airlines	1997	Continental Micronesia
Hawaiian Airlines	1996	Mahalo Air
Hawaiian Airlines	1995	Mahalo Air
JetBlue Airways	2009	Cape Air
JetBlue Airways	2008	Cape Air
JetBlue Airways	2007	Cape Air
JetBlue Airways	2006	Cape Air, Nantucket Airlines
JetBlue Airways	2005	
JetBlue Airways	2004	
JetBlue Airways	2003	
JetBlue Airways	2002	
Midway Airlines	2000	Corporate Airlines
Midway Airlines	1999	Corporate Airlines
Midway Airlines	1998	Corporate Airlines
Midway Airlines	1997	Corporate Airlines
Midwest Airlines	2009	Skywest Airlines, Republic Airways (Republic Airlines, Chautauqua Airlines)
Midwest Airlines	2008	Skywest Airlines, Republic Airways (Republic Airlines, Chautauqua Airlines)
Midwest Airlines	2007	Skywest Airlines
Midwest Airlines	2006	Skyway Airlines (wholly-owned), Mesa Air Group (Air Midwest subsidiary)
Midwest Airlines	2005	Skyway Airlines (wholly-owned), Mesa Air Group (Air Midwest subsidiary)
Midwest Airlines	2004	Skyway Airlines (wholly-owned), Mesa Air Group (Air Midwest subsidiary)
Midwest Airlines	2003	Skyway Airlines (wholly-owned), Mesa Air Group (Air Midwest subsidiary)
Midwest Airlines	2002	Astral Aviation (Skyway Airlines) (wholly-owned), Mesa Air Group (Air Midwest subsidiary)
Midwest Airlines	2001	Astral Aviation (Skyway Airlines) (wholly-owned), Mesa Air Group (Air Midwest subsidiary)
Midwest Airlines	2000	Astral Aviation (Skyway Airlines) (wholly-owned)

Table 2, cont.

Midwest Airlines	1999	Astral Aviation (Skyway Airlines) (wholly-owned)
Midwest Airlines	1998	Astral Aviation (Skyway Airlines) (wholly-owned)
Midwest Airlines	1997	Astral Aviation (Skyway Airlines) (wholly-owned)
Midwest Airlines	1996	Astral Aviation (Skyway Airlines) (wholly-owned)
Northwest Airlines	2007	Compass Airlines (wholly-owned), Mesaba Aviation, Pinnacle Airlines, Horizon Air, American Eagle, Comair, Big Sky Airlines, Gulfstream International Airlines
Northwest Airlines	2006	Compass Airlines (wholly-owned), Mesaba Aviation, Pinnacle Airlines, Horizon Air, American Eagle, Big Sky Airlines, Gulfstream International Airlines
Northwest Airlines	2005	Pinnacle Airlines (11.2%-owned), Mesaba Aviation, Horizon Air, American Eagle, Big Sky Airlines, Gulfstream International Airlines
Northwest Airlines	2004	Pinnacle Airlines (11.3%-owned), Mesaba Aviation, Horizon Air, American Eagle, Big Sky Airlines, Gulfstream International Airlines
Northwest Airlines	2003	Pinnacle Airlines (11.4%-owned), Mesaba Aviation, Horizon Air, American Eagle, Big Sky Airlines, Gulfstream International Airlines
Northwest Airlines	2002	Pinnacle Airlines (wholly-owned), Mesaba Aviation, Horizon Air, American Eagle, Big Sky Airlines, Expressjet Airlines, Gulfstream International Airlines
Northwest Airlines	2001	Express Airlines I (wholly-owned), Mesaba Aviation, Horizon Air, American Eagle, Big Sky Airlines, Expressjet Airlines, Gulfstream International Airlines
Northwest Airlines	2000	Express Airlines I (wholly-owned), Mesaba Aviation, Horizon Air, Business Express, Big Sky Airlines, Continental Express Airlines, Midwest Express Airlines, Gulfstream International Airlines, American Eagle Airlines
Northwest Airlines	1999	Express Airlines I (wholly-owned), Mesaba Aviation, Horizon Air, Business Express, Big Sky Airlines, Continental Express Airlines
Northwest Airlines	1998	Mesaba Aviation, Express Airlines I (wholly-owned), Horizon Air, Trans States Airlines, Business Express
Northwest Airlines	1997	Mesaba Aviation, Express Airlines I (wholly-owned), Horizon Air, Trans States Airlines, Business Express, Midwest Express
Northwest Airlines	1996	Mesaba Aviation, Express Airlines I, Horizon Air, Trans States Airlines
Northwest Airlines	1995	Mesaba Aviation, Express Airlines I, Horizon Air, Trans States Airlines
Northwest Airlines	1994	Mesaba Aviation, Express Airlines I, Horizon Air, Trans States Airlines

Table 2, cont.

Reno Air	1998	American Eagle Airlines
Reno Air	1997	Wings West Airlines
Southwest Airlines	2009	Morris Air (wholly-owned)
Southwest Airlines	2008	Morris Air (wholly-owned)
Southwest Airlines	2007	Morris Air (wholly-owned)
Southwest Airlines	2006	Morris Air (wholly-owned)
Southwest Airlines	2005	Morris Air (wholly-owned)
Southwest Airlines	2004	Morris Air (wholly-owned)
Southwest Airlines	2003	Morris Air (wholly-owned)
Southwest Airlines	2002	Morris Air (wholly-owned)
Southwest Airlines	2001	Morris Air (wholly-owned)
Southwest Airlines	2000	Morris Air (wholly-owned)
Southwest Airlines	1999	Morris Air (wholly-owned)
Southwest Airlines	1998	Morris Air (wholly-owned)
Southwest Airlines	1997	Morris Air (wholly-owned)
Southwest Airlines	1996	Morris Air (wholly-owned)
Southwest Airlines	1995	Morris Air (wholly-owned)
Southwest Airlines	1994	Morris Air (wholly-owned)
Southwest Airlines	1993	
Southwest Airlines	1992	
Tower Air	1998	
Tower Air	1997	
Tower Air	1996	
TWA	1999	Trans States Airlines, Corporate Airlines, Gulfstream International Airlines
TWA	1998	Trans States Airlines, Corporate Airlines

Table 2, cont.

TWA	1997	Trans States Airlines, Corporate Airlines
TWA	1996	Trans States Airlines, Corporate Airlines
TWA	1995	Trans States Airlines, Corporate Airlines
TWA	1994	Trans States Airlines, Corporate Airlines
United Airlines	2009	Skywest Airlines, Atlantic Southeast Airlines, Mesa Air Group, Pinnacle Airlines (Colgan Air), Trans States Airlines, Republic Airways (Chautauqua, Shuttle America), GoJet Airlines, Expressjet
United Airlines	2008	Skywest Airlines, Mesa Air Group, Pinnacle Airlines (Colgan Air), Trans States Airlines, Republic Airways (Chautauqua, Shuttle America), GoJet Airlines, Expressjet, Great Lakes Aviation
United Airlines	2007	Skywest Airlines, Mesa Air Group, Pinnacle Airlines (Colgan Air), Trans States Airlines, Republic Airways (Chautauqua, Shuttle America), GoJet Airlines, Expressjet, Great Lakes Aviation
United Airlines	2006	Skywest Airlines, Mesa Air Group, Colgan Air, Trans States Airlines, Republic Airways (Chautauqua, Shuttle America), GoJet Airlines
United Airlines	2005	Skywest Airlines, Mesa Air Group, Trans States Airlines, Republic Airways (Chautauqua, Shuttle America), GoJet Airlines
United Airlines	2004	Air Wisconsin, Skywest Airlines, Mesa Air Group, Trans States Airlines, Republic Airways (Chautauqua, Shuttle America)
United Airlines	2003	Air Wisconsin, Skywest Airlines, Mesa Air Group, Trans States Airlines
United Airlines	2002	Air Wisconsin, Atlantic Coast Airlines (FLYI/Independence Air), Skywest Airlines
United Airlines	2001	Air Wisconsin, Atlantic Coast Airlines (FLYI/Independence Air), Skywest Airlines
United Airlines	2000	Air Wisconsin, Atlantic Coast Airlines (FLYI/Independence Air), Great Lakes Aviation, Skywest Airlines
United Airlines	1999	Air Wisconsin, Atlantic Coast Airlines (FLYI/Independence Air), Great Lakes Airlines, Skywest Airlines
United Airlines	1998	Air Wisconsin, Atlantic Coast Airlines (FLYI/Independence Air), Great Lakes Airlines, Skywest Airlines
United Airlines	1997	Air Wisconsin, Atlantic Coast Airlines (FLYI/Independence Air), Great Lakes Airlines, Skywest Airlines

Table 2, cont.

United Airlines	1996	Air Wisconsin, Atlantic Coast Airlines (FLYI/Independence Air), Great Lakes Airlines, Mesa Air Group, Trans States Airlines
United Airlines	1995	Air Wisconsin, Atlantic Coast Airlines (FLYI/Independence Air), Great Lakes Airlines, Mesa Air Group, Trans States Airlines
United Airlines	1994	Air Wisconsin, Atlantic Coast Airlines (FLYI/Independence Air), Great Lakes Airlines, Mesa Air Group, Trans States Airlines
United Airlines	1993	Air Wisconsin, Atlantic Coast Airlines (FLYI/Independence Air), Great Lakes Airlines, Mesa Air Group, Trans States Airlines
United Airlines	1992	Air Wisconsin, Atlantic Coast Airlines (FLYI/Independence Air), Great Lakes Airlines, Mesa Air Group
US Airways	2009	Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), Mesa Air Group (Mesa Airlines), Republic Airways (Republic Airlines, Chautauqua Airlines), Trans States Airlines, Pinnacle Airlines (Colgan Air), Air Wisconsin
US Airways	2008	Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), Mesa Air Group (Mesa Airlines, Air Midwest), Republic Airways (Republic Airlines, Chautauqua Airlines), Trans States Airlines, Pinnacle Airlines (Colgan Air), Air Wisconsin
US Airways	2007	Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), Mesa Air Group (Mesa Airlines, Air Midwest), Republic Airways (Republic Airlines, Chautauqua Airlines), Trans States Airlines, Pinnacle Airlines (Colgan Air), Air Wisconsin
US Airways	2006	Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), Mesa Air Group (Mesa Airlines, Air Midwest), Republic Airways (Republic Airlines, Chautauqua Airlines), Trans States Airlines, Colgan Airlines, Air Wisconsin
US Airways	2005	Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), MidAtlantic Airways (wholly-owned), Mesa Air Group (Mesa Airlines, Air Midwest), Republic Airways (Republic Airlines, Chautauqua Airlines), Trans States Airlines, Colgan Airlines, Air Wisconsin

Table 2, cont.

US Airways	2004	Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), MidAtlantic Airways (wholly-owned), Mesa Air Group (Mesa Airlines, Air Midwest), Republic Airways (Chautauqua Airlines), Trans States Airlines, Colgan Airlines
US Airways	2003	Allegheny Commuter Airlines (wholly-owned), Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), MidAtlantic Airways (wholly-owned), Mesa Air Group (Mesa Airlines, Air Midwest), Chautauqua Airlines, Trans States Airlines, Shuttle America, Colgan Airlines
US Airways	2002	Allegheny Commuter Airlines (wholly-owned), Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), Potomac Air (wholly-owned), Mesa Air Group (Mesa Airlines, Air Midwest), CCAir, Chautauqua Airlines, Trans States Airlines, Shuttle America, Colgan Airlines, Republic Airlines
US Airways	2001	Allegheny Commuter Airlines (wholly-owned), Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), Mesa Air Group (Mesa Airlines, Air Midwest), CCAir, Chautauqua Airlines, Trans States Airlines, Shuttle America, Colgan Airlines, Republic Airlines
US Airways	2000	Allegheny Commuter Airlines (wholly-owned), Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), Potomac Air (wholly-owned), Mesa Air Group (Mesa Airlines, Air Midwest), CCAir, Champlain Entreprises (Commutair), Chautauqua Airlines, Trans States Airlines
US Airways	1999	Allegheny Commuter Airlines (wholly-owned), Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), Shuttle (wholly-owned), Mesa Air Group (Mesa Airlines, Air Midwest), CCAir, Champlain Entreprises (Commutair), Chautauqua Airlines
US Airways	1998	Allegheny Commuter Airlines (wholly-owned), Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), Shuttle (wholly-owned), Mesa Air Group (Mesa Airlines, Air Midwest), CCAir, Champlain Entreprises (Commutair)
US Airways	1997	Allegheny Commuter Airlines (wholly-owned), Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), Shuttle, Mesa Air Group (Air Midwest, FloridaGulf Airlines, Liberty Express Airlines), Paradise Island Airlines, CCAir, Champlain Entreprises (Commutair)

Table 2, cont.

US Airways	1996	Allegheny Commuter Airlines (wholly-owned), Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), Shuttle, Mesa Air Group (Air Midwest, FloridaGulf Airlines, Liberty Express Airlines), Paradise Island Airlines, CCAir, Champlain Entreprises (Commutair)
US Airways	1995	Allegheny Commuter Airlines (wholly-owned), Piedmont Airlines (wholly-owned), PSA Airlines (wholly-owned), Shuttle, Mesa Air Group (Air Midwest, FloridaGulf Airlines, Liberty Express Airlines), Paradise Island Airlines, CCAir, Champlain Entreprises (Commutair)
US Airways	1994	Allegheny Commuter Airlines (wholly-owned), Piedmont Airlines (wholly-owned), Jetstream International Airlines (wholly-owned), PSA Airlines (wholly-owned), Shuttle, Mesa Air Group (Air Midwest, FloridaGulf Airlines, Liberty Express Airlines), Paradise Island Airlines, CCAir, Champlain Entreprises (Commutair)
US Airways	1993	Allegheny Commuter Airlines (wholly-owned), Piedmont Airlines (wholly-owned), Jetstream International Airlines (wholly-owned), PSA Airlines (wholly-owned), Shuttle, Mesa Air Group (Air Midwest, FloridaGulf Airlines), Paradise Island Airlines, CCAir, Champlain Entreprises (Commutair), StatesWest Airlines
US Airways	1992	Allegheny Commuter Airlines (wholly-owned), Piedmont Airlines (wholly-owned), Jetstream International Airlines (wholly-owned), PSA Airlines (wholly-owned), Shuttle, Mesa Air Group (Air Midwest, FloridaGulf Airlines), Paradise Island Airlines, CCAir, Champlain Entreprises (Commutair), StatesWest Airlines
Vanguard Airlines	2001	
Vanguard Airlines	2000	
Western Pacific	1996	Mountain Air Express
Sources: Annual reports and RAA (Regional Airlines Association).		

Table 3
Composition of Sample

Panel A: Sample Selection Criteria *

	Total firms	**Total firm-years**
Airline operating cost and operational statistics (DOT) [1]	78	940
Less all-cargo carriers and passenger charter carriers	32	400
Less airline compensation data missing from EXECUCOMP [2]	33	379
Data included both in DOT schedules and EXECUCOMP	13	161
Plus airline compensation data hand-collected from firms' DEF-14A reports	17	116
Final sample	**30**	**277**

[1] Schedules P-12/11, P-6, P-52/51, P10, B43, T1, and T3; years 1992-2009.

[2] Includes subsidiaries.

* The DOT databases contain data on all airlines with $20 million or more in annual revenues (including both public and private airlines, as well as subsidiaries of network carriers), resulting in data for 78 U.S.-based air carriers yielding a total of 940 firm-years. I drop all-cargo airlines and passenger charter airlines, reducing the number of firms by 32 and the number of firm-years by 400. Several years during the period from 1992 through 2009 are, for various reasons, missing for a number of airlines. For example, some airlines were founded during this period while others merged with other carriers or ceased operations. The DOT maintains separate records for merged carriers until they receive a single operating certificate (SOC); thus for my sample purposes, I combine all financial and operating statistics once the two entities merge. I drop airlines for which no records exist in either ExecuComp or in the SEC's database of proxy filings, further reducing the number of airlines by 33 and the number of firm-years by 379. The final sample for which all data are available consists of 30 publicly traded, U.S.-based, scheduled passenger carriers from 1992 through 2009, for a total of 277 firm-year observations.

Table 3, cont.

Panel B: Frequency by Airline

Airline	**Network**	**Regional**	**# Obs**	**Frequency**
AirTran Airways	✓		14	5.1%
Alaska Airlines	✓		18	6.5%
Allegiant Air	✓		4	1.4%
America West Airlines	✓		12	4.3%
American Airlines	✓		18	6.5%
ATA Airlines	✓		8	2.9%
Atlantic Southeast Airlines		✓	6	2.2%
Continental Airlines	✓		17	6.1%
Delta Airlines	✓		16	5.8%
Expressjet Airlines		✓	7	2.5%
Frontier Airlines	✓		9	3.2%
Hawaiian Airlines	✓		15	5.4%
Independence Air		✓	2	0.7%
JetBlue Airways	✓		8	2.9%
Mesa Airlines Inc.		✓	8	2.9%
Mesaba Airlines		✓	9	3.2%
Midway Airlines	✓		4	1.4%
Midwest Airlines	✓		11	4.0%
Northwest Airlines	✓		11	4.0%
Pinnacle Airlines		✓	6	2.2%
Reno Air	✓		2	0.7%
Republic Airlines		✓	5	1.8%
Skywest Airlines		✓	7	2.5%
Southwest Airlines	✓		18	6.5%
Tower Air Inc.	✓		3	1.1%
Trans World Airways	✓		6	2.2%
United Airlines	✓		14	5.1%
US Airways	✓		16	5.8%
Vanguard Airlines Inc.	✓		2	0.7%
Western Pacific Airlines	✓		1	0.4%
Total Airlines	**22**	**8**	**277**	**100.0%**
Network Airlines			**227**	**81.9%**
Regional Airlines			**50**	**18.1%**

Table 3, cont.

Panel C: Frequency by Year

Year	**# Obs**	**Frequency**
1992	6	2.2%
1993	9	3.2%
1994	11	4.0%
1995	13	4.7%
1996	18	6.5%
1997	19	6.9%
1998	18	6.5%
1999	17	6.1%
2000	17	6.1%
2001	16	5.8%
2002	14	5.1%
2003	18	6.5%
2004	19	6.9%
2005	16	5.8%
2006	18	6.5%
2007	17	6.1%
2008	16	5.8%
2009	15	5.4%
Total	**277**	**100.0%**
Network Airlines	**227**	**81.9%**
Regional Airlines	**50**	**18.1%**

Table 3, cont.

Panel D: Selected Financial Data (N=277)

$millions except when stated otherwise	**Mean**	**SD**	**10th percentile**	**Median**	**90th percentile**
Sales	5,526.9	6,378.0	384.3	2,177.2	16,216.8
Book value of assets [1]	9,842.6	11,400.0	541.5	4,324.8	28,614.0
Operating income	157.8	569.5	(162.4)	56.1	825.4
Net income	9.4	1,642.7	(556.2)	20.4	465.2
Market value of equity	3,108.6	10,874.2	95.3	779.7	5,787.2
Leverage (%) [2]	88.1	13.0	71.6	89.8	101.2
Book-to-market (%) [3]	87.4	17.6	64.6	91.7	101.7
Return on Assets (%) [4]	0.2	7.0	(6.2)	0.9	5.5

[1] Includes capitalized operating leases.
[2] Book value of liabilities including capitalized leases divided by book value of assets including capitalized leases.
[3] Book value of assets including capitalized operating leases divided by the sum of book value of liabilities including capitalized leases and market value of equity.
[4] Net income divided by the book value of assets including capitalized operating leases.

Table 4
Variable Definitions

Variable		Definition	Pred. assoc.	Previous literature / reasoning
ΔlnCOMP	≡	Change in the natural logarithm of the CEO's salary + bonus + value of stock option portfolio + value of earned but unvested restricted stock portfolio + long term (non-equity) incentive payouts (LTIP).		
ΔlnCASM	≡	Change in the natural logarithm of own-firm operating cost per ASM.	-	H1, H3a/b
ΔlnPEER_CASM		Change in the natural logarithm of average total-peer-group operating cost per ASM.	+	H1
ΔlnSUBS_CASM	≡	Change in the natural logarithm of average substitute-peer-group operating cost per ASM.	+	H3a/b
ΔlnCOMPL_CASM	≡	Change in the natural logarithm of average complement-peer-group operating cost per ASM.	-	H3a/b
ΔROA	≡	Change in own-firm ROA.	+	H1
ΔPEER_ROA	≡	Change in average peer-group ROA.	-	H1
ΔlnSUBS_ROA	≡	Change in the natural logarithm of one plus the average substitute-peer-group ROA.	+	H3a/b
ΔlnCOMPL_ROA	≡	Change in the natural logarithm of one plus the average complement-peer-group ROA.	-	H3a/b
SYS_CASM	≡	The systematic component of a firm's CASM, i.e., the component of CASM that is correlated with the CASM of the firm's peer group of airlines.	0	H2
UNSYS_CASM	≡	The unsystematic component of a firm's CASM, i.e., CASM excluding the component that is correlated with the CASM of the firm's peer group of airlines.	-	H2
SYS_ROA	≡	The systematic component of a firm's ROA, i.e., the component of ROA that is correlated with the ROA of the firm's peer group of airlines.	0	H2

Table 4, cont.

Variable		Definition	Pred. assoc.	Previous literature / reasoning
UNSYS_ROA	≡	The unsystematic component of a firm's ROA, i.e., ROA excluding the component that is correlated with the ROA of the firm's peer group of airlines.	+	H2
FUEL_CASM	≡	Fuel expenses divided by the number of ASMs.	0	H2
EXFUEL_CASM	≡	Total operating expenses excluding fuel expenses divided by the number of ASMs.	-	H2
UNSYS_SUBS_CASM	≡	The average substitute-peer-group unsystematic CASM (average is weighted by ASMs).		H4a/b
UNSYS_COMPL_CASM	≡	The average complement-peer-group unsystematic CASM (average is weighted by ASMs).		H4a/b
UNSYS_SUBS_ROA	≡	The average substitute-peer-group unsystematic ROA (average is weighted by assets).		H4a/b
UNSYS_COMPL_ROA	≡	The average complement-peer-group unsystematic ROA (average is weighted by assets).		H4a/b
lnCEO_TENURE	≡	The natural logarithm of the CEO's tenure in the CEO position.	+	Dechow and Sloan, 1991; Gibbons and Murphy, 1992; Milbourn, 1998; Core and Guay, 1999.
TRANSIENT (%)	≡	The combined voting power in the firm's ownership structure of private equity funds, activist investor funds, and hedge funds. This is a proxy for the firm's equityholders' investment horizon. The greater the % of transient investors in the firm's ownership structure, the shorter is the firm's equityholders' investment horizon.	+	Dikolli, Kulp, and Sedatole, 2009; Bushee, 1998; Bushee, 2001; Bushee, 2001.
lnCEO_AGE	≡	The natural logaritm of the CEO's age.	+	Dechow and Sloan, 1991; Gibbons and Murphy, 1992; Brickley, Linck, and Coles, 1999; Garvey and Milbourn, 2003.

Table 4, cont.

Variable		Definition	Pred. assoc.	Previous literature / reasoning
CEO_CHAIR (1/0)	≡	1 if the CEO is also the chairman of the board, otherwise 0.	+	Yermack, 1996; Core, Holthausen and Larcker, 1999.
LOW_COST (1/0)	≡	1 if the airline is classified as a low-cost carrier, 0 otherwise.	-	Doganis, 2002. Low-cost carriers have lower CASM are likely to pay lower compensation to the CEO.
BTM (%)	≡	The book-to-market ratio calculated as the ratio of book assets including capitalized operating leases to the sum of book liabilities including capitalized operating leases and the market value of equity.	+	Smith and Watts, 1992; Gaver and Gaver, 1993; Core and Guay, 1999.
LEVERAGE (%)	≡	The leverage ratio calculated as the ratio of book liabilities including capitalized operating leases to book assets including capitalized operating leases.	-	Smith and Watts, 1992; John and John, 1993.
ΔlnASSETS	≡	The change in the natural logarithm of book assets including capitalized operating leases.	+	Smith and Watts, 1992; Core and Guay, 1999; Baker and Hall, 2004.
ΔlnSEGMENT_ LENGTH	≡	The change in the natural logarithm of average segment length.	+/-	Banker and Johnston, 1993; Caves, Christensen, and Tretheway, 1984. Negatively associated with CASM; potentially associated with compensation.
ΔlnSEAT_DENSITY	≡	The change in the natural logarithm of average seating capacity.	+/-	Banker and Johnston, 1993. Negatively associated with CASM; potentially associated with compensation.

Table 4, cont.

Variable		Definition	Pred. assoc.	Previous literature / reasoning
ΔlnLOAD_FACTOR	≡	The change in the natural logarithm of the load factor (the % of seats on a flight that are sold).	+	Doganis, 2002, p. 105. Positively associated with compensation, and CASM (e.g., influences the type of aircraft flown, size of cabin crew, etc.).
UNIONIZATION (%)	≡	The percentage of an airline's FTEs (Full-time Equivalent Employees) who are members of a labor union organization.	-	Firms with greater union representation are likely to pay lower compensation to the CEO and to have higher CASM.
CEO_VOT_ POWER (%)	≡	The CEO's voting power.	+	Lambert, Larcker, and Weigelt, 1993; Core, 1997; Core, Holthausen and Larcker, 1999.

Table 5
Descriptive Statistics

Panel A: Variable Distributions, Total Sample (N=277)

	MEAN	**SD**	**10th PERCENTILE**	**MEDIAN**	**90th PERCENTILE**
ΔlnCOMP	0.078	1.806	(1.154)	0.078	1.226
ΔlnCASM	0.017	0.176	(0.107)	0.021	0.126
ΔlnSUBS_CASM	0.007	0.073	(0.052)	0.008	0.074
ΔlnCOMPL_CASM	(0.020)	0.103	(0.165)	0.016	0.063
ΔlnPEER_CASM	0.003	0.125	(0.146)	0.005	0.153
ΔROA	-0.016%	9.256%	-5.217%	0.080%	4.983%
ΔSUBS_ROA	-0.054%	8.347%	-8.521%	-0.001%	5.427%
ΔCOMPL_ROA	-0.047%	6.101%	-5.621%	-0.032%	3.337%
ΔPEER_ROA	0.101%	7.992%	-7.203%	0.260%	6.423%
lnCEO_TENURE	1.356	1.105	(0.132)	1.504	2.731
TRANSIENT (%)	11.857	18.792	0.000	0.000	44.600
lnCEO_AGE	3.983	0.119	3.829	3.989	4.127
CEO_CHAIR (1/0)	0.672	0.470	0.000	1.000	1.000
LOW_COST (1/0)	0.243	0.430	0.000	0.000	1.000
BTM (%)	88.116	16.780	66.117	92.384	101.770
LEVERAGE (%)	88.135	12.954	71.012	89.996	101.151
ΔlnASSETS	0.071	0.191	(0.048)	0.071	0.241
ΔlnSEGMENT_LENGTH	0.026	0.075	(0.033)	0.022	0.071
ΔlnSEAT_DENSITY	0.007	0.066	(0.029)	0.003	0.037
ΔlnLOAD_FACTOR	0.017	0.040	(0.027)	0.016	0.064
UNIONIZATION (%)	54.132%	25.819%	16.484%	56.172%	84.000%
CEO_VOT_POWER (%)	3.324	10.398	0.138	1.021	4.832

Table 5, cont.

Panel B: Variable Distributions, Network Airlines (N=227)

	MEAN	**SD**	**10th PERCEN TILE**	**MEDIAN**	**90th PERCEN TILE**
ΔlnCOMP	0.115	1.931	(13.305)	(0.967)	0.095
ΔlnCASM	0.016	0.089	(0.292)	(0.103)	0.015
ΔlnSUBS_CASM	0.014	0.064	(0.169)	(0.045)	0.008
ΔlnCOMPL_CASM	(0.030)	0.105	(0.394)	(0.165)	(0.002)
ΔROA	0.080%	9.817%	-55.833%	-5.217%	0.216%
ΔSUBS_ROA	-0.050%	9.008%	-20.449%	-10.307%	-0.241%
ΔCOMPL_ROA	-0.066%	2.917%	-8.241%	-3.497%	-0.032%
lnCEO_TENURE	1.164	1.073	(2.499)	(0.403)	1.312
TRANSIENT (%)	12.041	19.869	0.000	0.000	0.000
lnCEO_AGE	3.988	0.125	3.584	3.829	4.007
CEO_CHAIR (1/0)	0.698	0.460	0.000	0.000	1.000
LOW_COST (1/0)	0.293	0.456	0.000	0.000	0.000
BTM (%)	87.026	17.001	0.444	66.117	91.588
LEVERAGE (%)	89.378	12.409	47.578	72.479	90.585
ΔlnASSETS	0.091	0.112	(0.205)	(0.031)	0.077
ΔlnSEGMENT_LENGTH	0.025	0.054	(0.174)	(0.019)	0.023
ΔlnSEAT_DENSITY	0.000	0.032	(0.262)	(0.029)	0.003
ΔlnLOAD_FACTOR	0.017	0.035	(0.063)	(0.022)	0.016
UNIONIZATION (%)	54.703%	26.693%	0.000%	16.222%	56.325%
CEO_VOT_POWER (%)	3.424	11.390	0.000	0.099	0.788

Table 5, cont.

Panel C: Variable Distributions, Regional Airlines (N=50)

	MEAN	SD	10th PERCENTILE	MEDIAN	90th PERCENTILE
ΔlnCOMP	(0.104)	0.986	(2.494)	(1.432)	0.006
ΔlnCASM	0.024	0.383	(1.079)	(0.328)	0.030
ΔlnSUBS_CASM	(0.026)	0.103	(0.432)	(0.162)	(0.008)
ΔlnCOMPL_CASM	0.025	0.081	(0.152)	(0.046)	0.027
ΔROA	-0.48%	5.85%	-15.37%	-4.76%	-0.46%
ΔSUBS_ROA	-0.08%	3.77%	-9.24%	-7.74%	0.39%
ΔCOMPL_ROA	0.05%	13.45%	-18.40%	-18.40%	-3.32%
lnCEO_TENURE	2.294	0.718	0.403	1.504	2.247
TRANSIENT (%)	10.957	12.390	0.000	0.000	8.196
lnCEO_AGE	3.958	0.073	3.807	3.871	3.951
CEO_CHAIR (1/0)	0.548	0.504	0.000	0.000	1.000
LOW_COST (1/0)	0.000	0.000	0.000	0.000	0.000
BTM (%)	93.433	14.712	55.516	69.922	97.344
LEVERAGE (%)	82.070	13.972	41.496	60.205	83.404
ΔlnASSETS	(0.025)	0.379	(1.517)	(0.272)	0.048
ΔlnSEGMENT_LENGTH	0.028	0.137	(0.231)	(0.065)	0.019
ΔlnSEAT_DENSITY	0.042	0.139	(0.161)	(0.021)	0.017
ΔlnLOAD_FACTOR	0.021	0.058	(0.160)	(0.027)	0.016
UNIONIZATION (%)	51.347%	21.092%	0.000%	18.206%	53.745%
CEO_VOT_POWER (%)	2.836	1.728	0.233	0.799	2.678

Table 6
Correlations

Panel A: Correlations - Strategic Interaction Hypotheses Variables

	1	2	3	4	5	6	7	8
1. ΔlnCOMP	1.000							
2. ΔlnCASM	(0.035)	1.000						
3. ΔlnSUBS_CASM	0.072	**0.270**	1.000					
4. ΔlnCOMPL_CASM	0.003	**0.157**	**0.279**	1.000				
5. ΔlnROA	**0.183**	**(0.197)**	**(0.266)**	(0.078)	1.000			
6. ΔlnSUBS_ROA	(0.038)	(0.110)	**(0.425)**	0.039	**0.207**	1.000		
7. ΔlnCOMPL_ROA	**0.184**	**0.209**	0.023	**(0.239)**	0.081	0.061	1.000	
8. lnCEO_TENURE	0.013	(0.018)	(0.084)	0.108	0.002	0.090	0.054	1.000
9. TRANSIENT	0.060	0.018	0.019	0.033	0.004	(0.004)	(0.044)	**(0.201)**
10. lnCEO_AGE	(0.053)	(0.043)	(0.011)	(0.041)	(0.034)	0.018	(0.007)	**0.280**
11. CEO_CHAIR	(0.051)	(0.004)	0.015	(0.071)	(0.053)	0.005	0.001	**0.327**
12. LOW_COST	0.009	0.022	0.069	(0.043)	0.002	(0.016)	(0.018)	**(0.137)**
13. BTM	(0.057)	(0.032)	(0.104)	(0.105)	(0.018)	(0.004)	(0.005)	(0.069)
14. LEVERAGE	**(0.136)**	(0.062)	0.029	(0.101)	(0.068)	(0.024)	(0.124)	**(0.324)**
15. ΔlnASSETS	0.109	0.040	0.053	0.033	0.059	0.043	(0.111)	(0.008)
16. ΔlnSEGMENT_LENGTH	(0.001)	**(0.316)**	(0.051)	0.034	**0.131**	(0.083)	**(0.194)**	(0.032)
17. ΔlnSEAT_DENSITY	0.042	**(0.383)**	(0.109)	0.093	0.025	(0.046)	**(0.194)**	**0.147**
18. ΔlnLOAD_FACTOR	**0.154**	(0.044)	(0.019)	(0.017)	**0.208**	0.019	**0.165**	(0.018)
19. UNIONIZATION	(0.087)	(0.013)	0.022	0.033	(0.046)	0.002	0.005	(0.114)
20. CEO_VOT_POWER	(0.041)	0.003	(0.051)	0.014	(0.062)	(0.007)	(0.028)	0.027

Bold font indicates statistical significance at $p<.05$.

Table 6, cont.

Panel A: Correlations - Strategic Interaction Hypotheses Variables

	9	10	11	12	13	14	15	16
1. ΔlnCOMP								
2. ΔlnCASM								
3. ΔlnSUBS_CASM								
4. ΔlnCOMPL_CASM								
5. ΔlnROA								
6. ΔlnSUBS_ROA								
7. ΔlnCOMPL_ROA								
8. lnCEO_TENURE								
9. TRANSIENT	1.000							
10. lnCEO_AGE	(0.118)	1.000						
11. CEO_CHAIR	**(0.244)**	**0.313**	1.000					
12. LOW_COST	**(0.169)**	0.025	(0.114)	1.000				
13. BTM	**0.119**	(0.077)	(0.068)	**(0.478)**	1.000			
14. LEVERAGE	**0.147**	**(0.205)**	(0.098)	**(0.274)**	**0.332**	1.000		
15. ΔlnASSETS	**(0.122)**	(0.039)	0.106	**0.292**	**(0.222)**	0.033	1.000	
16. ΔlnSEGMENT_LENGTH	0.115	(0.021)	0.113	(0.074)	0.092	0.113	**0.243**	1.000
17. ΔlnSEAT_DENSITY	(0.081)	(0.077)	0.074	**(0.129)**	**0.185**	0.050	**0.182**	**0.623**
18. ΔlnLOAD_FACTOR	(0.038)	(0.086)	0.059	(0.017)	(0.061)	0.044	0.080	**0.389**
19. UNIONIZATION	0.109	(0.010)	**(0.130)**	**(0.273)**	0.062	**0.192**	**(0.197)**	0.033
20. CEO_VOT_POWER	(0.068)	**0.226**	**0.165**	**0.148**	(0.021)	(0.012)	0.112	(0.096)

Bold font indicates statistical significance at $p<.05$.

Table 6, cont.

Panel A: Correlations - Strategic Interaction Hypotheses Variables

	17	18	19	20
1. ΔlnCOMP				
2. ΔlnCASM				
3. ΔlnSUBS_CASM				
4. ΔlnCOMPL_CASM				
5. ΔlnROA				
6. ΔlnSUBS_ROA				
7. ΔlnCOMPL_ROA				
8. lnCEO_TENURE				
9. TRANSIENT				
10. lnCEO_AGE				
11. CEO_CHAIR				
12. LOW_COST				
13. BTM				
14. LEVERAGE				
15. ΔlnASSETS				
16. ΔlnSEGMENT_LENGTH				
17. ΔlnSEAT_DENSITY	1.000			
18. ΔlnLOAD_FACTOR	**0.235**	1.000		
19. UNIONIZATION	0.020	(0.016)	1.000	
20. CEO_VOT_POWER	(0.091)	(0.024)	**-0.162**	1.000

Bold font indicates statistical significance at p<.05.

Table 6, cont.

Panel B: Correlations - RPE Hypotheses Variables

	1	2	3	4	5	6	7	8
1. ΔlnCOMP	1.000							
2. ΔlnCASM	(0.035)	1.000						
3. ΔlnPEER_CASM	0.005	0.018	1.000					
4. ΔlnROA	**0.183**	**(0.197)**	**(0.277)**	1.000				
5. ΔlnPEER_ROA	0.124	0.051	**(0.286)**	**0.198**	1.000			
6. lnCEO_TENURE	0.013	(0.018)	0.002	0.002	0.074	1.000		
7. TRANSIENT	0.060	0.018	(0.044)	0.004	(0.006)	**(0.201)**	1.000	
8. lnCEO_AGE	(0.053)	(0.043)	0.013	(0.034)	0.008	**0.280**	(0.118)	1.000
9. CEO_CHAIR	(0.051)	(0.004)	0.028	(0.053)	0.003	**0.327**	**(0.244)**	**0.313**
10. LOW_COST	0.009	0.022	(0.055)	0.002	(0.012)	**(0.137)**	**(0.169)**	0.025
11. BTM	(0.057)	(0.032)	0.026	(0.018)	(0.037)	(0.069)	**0.119**	(0.077)
12. LEVERAGE	**(0.136)**	(0.062)	0.017	(0.068)	(0.084)	**(0.324)**	**0.147**	**(0.205)**
13. ΔlnASSETS	0.109	0.040	(0.065)	0.059	0.033	(0.008)	**(0.122)**	(0.039)
14. ΔlnSEGMENT_LENGTH	(0.001)	**(0.316)**	(0.021)	**0.131**	(0.086)	(0.032)	0.115	(0.021)
15. ΔlnSEAT_DENSITY	0.042	**(0.383)**	0.035	0.025	(0.028)	**0.147**	(0.081)	(0.077)
16. ΔlnLOAD_FACTOR	**0.154**	(0.044)	0.002	**0.208**	0.114	(0.018)	(0.038)	(0.086)
17. UNIONIZATION	(0.087)	(0.013)	0.091	(0.046)	0.006	(0.114)	0.109	(0.010)
18. CEO_VOT_POWER	(0.041)	0.003	(0.039)	(0.062)	(0.001)	0.027	(0.068)	**0.225**

Bold font indicates statistical significance at p<.05.

Table 6, cont.

Panel B: Correlations - RPE Hypotheses Variables

	9	10	11	12	13	14	15	16
1. ΔlnCOMP								
2. ΔlnCASM								
3. ΔlnPEER_CASM								
4. ΔlnROA								
5. ΔlnPEER_ROA								
6. lnCEO_TENURE								
7. TRANSIENT								
8. lnCEO_AGE								
9. CEO_CHAIR	1.000							
10. LOW_COST	(0.114)	1.000						
11. BTM	(0.068)	**(0.478)**	1.000					
12. LEVERAGE	(0.098)	**(0.274)**	**0.332**	1.000				
13. ΔlnASSETS	0.106	**0.292**	**(0.222)**	0.033	1.000			
14. ΔlnSEGMENT_LENGTH	0.113	(0.074)	0.092	0.113	**0.243**	1.000		
15. ΔlnSEAT_DENSITY	0.074	**(0.129)**	**0.185**	0.050	**0.182**	**0.623**	1.000	
16. ΔlnLOAD_FACTOR	0.059	(0.017)	(0.061)	0.044	0.080	**0.389**	**0.235**	1.000
17. UNIONIZATION	**(0.130)**	**(0.273)**	0.062	**0.192**	**(0.197)**	0.033	0.020	(0.016)
18. CEO_VOT_POWER	**0.165**	**0.148**	(0.021)	(0.012)	0.112	(0.096)	(0.091)	(0.024)

Bold font indicates statistical significance at p<.05.

Table 6, cont.

Panel B: Correlations - RPE Hypotheses Variables

	17	18
1. ΔlnCOMP		
2. ΔlnCASM		
3. ΔlnPEER_CASM		
4. ΔlnROA		
5. ΔlnPEER_ROA		
6. lnCEO_TENURE		
7. TRANSIENT		
8. lnCEO_AGE		
9. CEO_CHAIR		
10. LOW_COST		
11. BTM		
12. LEVERAGE		
13. ΔlnASSETS		
14. ΔlnSEGMENT_LENGTH		
15. ΔlnSEAT_DENSITY		
16. ΔlnLOAD_FACTOR		
17. UNIONIZATION	1.000	
18. CEO_VOT_POWER	**(0.162)**	1.000

Bold font indicates statistical significance at p<.05.

Table 7
Empirical Results: Hypothesis H1

		Dependent Variable: ΔlnCOMP	
		Model 1	Model 2
ΔlnCASM	H1(-)	-0.810***	
ΔlnPEER_CASM	H1(+)	0.606	
ΔROA	H1(+)		2.253**
ΔPEER_ROA	H1(-)		1.694
lnCEO_TENURE	+	-0.130	-0.123
TRANSIENT	+	0.012**	0.011**
lnCEO_AGE	+	0.0610	0.108
CEO_CHAIR	+	-0.206	-0.177
LOW_COST	-	-0.377**	-0.328*
BTM	+	-0.004	-0.004
LEVERAGE	-	-0.024**	-0.021**
ΔlnASSETS	+	1.737**	1.442**
ΔlnSEGMENT_LENGTH		-3.406	-3.510
ΔlnSEAT_DENSITY		2.270	3.118*
ΔlnLOAD_FACTOR	+	7.463**	6.507*
UNIONIZATION	-	-0.636**	-0.572**
CEO_VOT_POWER	+	-0.005	0.023
CONSTANT		3.144	2.615
Observations (clusters)		247 (30)	247 (30)
Adjusted R-squared		8.0%	8.7%

p-values: * p<0.10, ** p<0.05, *** p<0.01, (one-tailed for predicted coefficients, two-tailed otherwise). OLS estimation with Froot (1989) robust standard errors clustered by firm. Year indicators are included, but are suppressed in the results tables.

Table 8
Empirical Results: Hypothesis H2

		Dependent Variable: ΔlnCOMP		
		Model 1	Model 2	Model 3
ΔUNSYS_CASM	H2(-)	-0.810***		
ΔSYS_CASM	H2(0)	0.949		
ΔUNSYS_ROA	H2(+)		2.253**	
ΔSYS_ROA	H2(0)		11.52	
ΔlnEXFUEL_CASM	H2(-)			-1.481**
ΔlnFUEL_CASM	H2(0)			0.413
lnCEO_TENURE	+	-0.130	-0.123	-0.113
TRANSIENT	+	0.012**	0.011**	0.013**
lnCEO_AGE	+	0.0610	0.108	0.055
CEO_CHAIR	+	-0.206	-0.177	-0.210
LOW_COST	-	-0.377**	-0.328*	-0.358*
BTM	+	-0.004	-0.004	-0.003
LEVERAGE	-	-0.024**	-0.021**	-0.025**
ΔlnASSETS	+	1.737**	1.442**	1.623**
ΔlnSEGMENT_LENGTH		-3.406	-3.510	-4.165*
ΔlnSEAT_DENSITY		2.270	3.118*	2.415
ΔlnLOAD_FACTOR	+	7.463**	6.507*	7.420**
UNIONIZATION	-	-0.636**	-0.572**	-0.578**
CEO_VOT_POWER	+	-0.005	0.023	-0.018
CONSTANT		3.144	2.615	3.120
Observations (clusters)		247 (30)	247 (30)	247
Adjusted R-squared		8.0%	8.7%	8.5%

p-values: * p<0.10, ** p<0.05, *** p<0.01, (one-tail for predicted coefficients, two-tailed otherwise). OLS estimation with Froot (1989) robust standard errors clustered by firm. Year indicators are included, but are suppressed in the results tables.

Table 9
Empirical Results: Hypotheses H3a/H3b

		Dependent Variable: ΔlnCOMP			
		Model 1	Model 2	Model 3	Model 4
ΔlnCASM	-	-0.711**	-1.016***		
ΔlnSUBS_CASM	H3a(+)	5.728***			
ΔlnCOMPL_CASM	H3b(-)		-6.799***		
ΔROA	+			1.902*	2.804**
ΔSUBS_ROA	H3a(-)			-4.943*	
ΔCOMPL_ROA	H3b(+)				6.230**
lnCEO_TENURE	+	-0.098	-0.104	-0.128	-0.112
TRANSIENT	+	0.013**	0.013**	0.012**	0.013**
lnCEO_AGE	+	0.005	-0.014	0.231	0.187
CEO_CHAIR	+	-0.263	-0.269	-0.202	-0.165
LOW_COST	-	-0.422**	-0.432**	-0.344*	-0.308*
BTM	+	-0.003	-0.003	-0.005	-0.005
LEVERAGE	-	-0.025**	-0.026**	-0.020**	-0.018**
ΔlnASSETS	+	1.719**	1.718**	1.670**	1.601**
ΔlnSEGMENT_LENGTH	-	-3.462	-3.706	-3.356	-3.374
ΔlnSEAT_DENSITY		3.296*	3.123*	3.658**	3.847**
ΔlnLOAD_FACTOR	+	7.232**	6.435*	5.112	4.947
UNIONIZATION	-	-0.604**	-0.659**	-0.621**	-0.558**
CEO_VOT_POWER	+	0.004	0.029	0.011	0.011
CONSTANT		3.433	3.717	2.212	1.932
Observations (clusters)		247 (30)	247 (30)	247 (30)	247 (30)
Adjusted R-squared		9.7%	10.4%	10.4%	11.0%

p-values: * p<0.10, ** p<0.05, *** p<0.01, (one-tail for predicted coefficients, two-tailed otherwise). OLS estimation with Froot (1989) robust standard errors clustered by firm. Year indicators are included, but are suppressed in the results tables.

Table 10
Empirical Results: Hypotheses H4a/H4b

Panel A: CASM and EXFUEL_CASM		Dependent Variable: ΔlnCOMP			
		Model 1	Model 2	Model 3	Model 4
ΔUNSYS_CASM	-	-0.692**	-1.095**		
ΔSUBS_UNSYS_CASM	H4a(+)	4.048**			
ΔCOMPL_UNSYS_CASM	H4b(-)		-4.657**		
ΔEXFUEL_CASM	-			-1.042**	-1.031***
ΔSUBS_EXFUEL_CASM	H4a(+)			3.582*	
ΔCOMPL_EXFUEL_CASM	H4b(-)				-5.944***
lnCEO_TENURE	+	-0.114	-0.116	-0.118	-0.104
TRANSIENT	+	0.013**	0.013**	0.012**	0.013**
lnCEO_AGE	+	0.029	0.029	0.035	-0.083
CEO_CHAIR	+	-0.247	-0.234	-0.231	-0.235
LOW_COST	-	-0.402**	-0.400**	-0.423**	-0.394**
BTM	+	-0.003	-0.003	-0.003	-0.004
LEVERAGE	-	-0.025**	-0.025**	-0.026**	-0.026**
ΔlnASSETS	+	1.786**	1.781**	1.796**	1.703**
ΔlnSEGMENT_LENGTH		-3.324	-3.602	-3.466	-4.261*
ΔlnSEAT_DENSITY		3.071	2.463	2.496	3.196*
ΔlnLOAD_FACTOR	+	7.246**	6.666*	7.654**	6.158*
UNIONIZATION	-	-0.610**	-0.631**	-0.591**	-0.647**
CEO_VOT_POWER	+	0.010	0.020	-0.018	-0.002
CONSTANT		3.289	3.758	3.319	4.032
Observations (clusters)		247 (30)	247 (30)	247 (30)	247 (30)
Adjusted R-squared		9.9%	10.2%	9.0%	10.4%

p-values: * p<0.10, ** p<0.05, *** p<0.01, (one-tail for predicted coefficients, two-tailed otherwise). OLS estimation with Froot (1989) robust standard errors clustered by firm. Year indicators are included, but are suppressed in the results tables.

Table 10, cont.

Panel B: ROA		Dependent Variable: ΔlnCOMP	
		Model 1	Model 2
ΔUNSYS_ROA	-	1.570*	2.496**
ΔSUBS_UNSYS_ROA	H4a(-)	-4.609*	
ΔCOMPL_UNSYS_ROA	H4b(+)		5.647*
lnCEO_TENURE	+	-0.129*	-0.119
TRANSIENT	+	0.012**	0.012**
lnCEO_AGE	+	0.226	0.220
CEO_CHAIR	+	-0.208	-0.178
LOW_COST	-	-0.343*	-0.319*
BTM	+	-0.005	-0.005
LEVERAGE	-	-0.020**	-0.019**
ΔlnASSETS	+	1.679**	1.631**
ΔlnSEGMENT_LENGTH		-3.322	-3.271
ΔlnSEAT_DENSITY		3.693**	3.800**
ΔlnLOAD_FACTOR	+	5.194	5.090
UNIONIZATION	-	-0.621**	-0.566**
CEO_VOT_POWER	+	0.011	0.011
CONSTANT		2.255	1.900
Observations (clusters)		247 (30)	247 (30)
Adjusted R-squared		10.3%	10.7%

p-values: * p<0.10, ** p<0.05, *** p<0.01, (one-tail for predicted coefficients, two-tailed otherwise). OLS estimation with Froot (1989) robust standard errors clustered by firm. Year indicators are included, but are suppressed in the results tables.

Table 11
Empirical Results: Sensitivity Analysis

		Dependent Variable: ΔlnCOMP	
		Model 1	Model 2
ΔUNSYS_CASM	-	-0.721**	
ΔSYS_CASM		-1.149	
LUCK_CASM		0.356	
LUCK_CASM × ΔSYS_CASM		1.553	
ΔUNSYS_ROA	+		2.119**
ΔSYS_ROA			3.111
LUCK_ROA			0.554**
LUCK_ROA × ΔSYS_ROA			-13.88
lnCEO_TENURE	+	-0.133	-0.113
TRANSIENT	+	0.012**	0.010**
lnCEO_AGE	+	0.083	-0.106
CEO_CHAIR	+	-0.232	-0.183
LOW_COST	-	-0.411**	-0.302*
BTM	+	-0.005	-0.004
LEVERAGE	-	-0.024**	-0.021**
ΔlnASSETS	+	1.721**	1.355**
ΔlnSEGMENT_LENGTH		-3.280	-3.203
ΔlnSEAT_DENSITY		2.170	2.886
ΔlnLOAD_FACTOR	+	7.312**	6.674*
UNIONIZATION	-	-0.660**	-0.492**
CEO_VOT_POWER	+	-0.009	0.001
CONSTANT		3.169	3.227
Observations (clusters)		247 (30)	247 (30)
Adjusted R-squared		7.5%	9.0%

p-values: * p<0.10, ** p<0.05, *** p<0.01, (one-tail for predicted coefficients, two-tailed otherwise). OLS estimation with Froot (1989) robust standard errors clustered by firm. Year indicators are included, but are suppressed in the results tables.

APPENDICES

APPENDIX A
Network-Regional Airline Arrangements

Affiliations between network and regional airlines include fixed-fee and revenue-sharing arrangements. However, most arrangements between regional airlines and network airlines are either fixed-fee arrangements or they contain a form of fixed payment in addition to revenue sharing. Under a fixed-fee arrangement, a network airline schedules flights in regional markets, sells tickets for a contracted regional airline's flights, and collects and retains all regional flying revenue. The network airline generally pays the regional airline a fixed fee for each departure or for each ASM (Available Seat Mile) produced, guarantees payment for a minimum number of departures or ASMs, and offers additional incentives based on flight completion, on-time performance and baggage handling performance.[29] In addition, network and regional airlines often enter into an arrangement in which the network airline bears the risk of changes in the price of fuel; other input costs may also be passed through to the network airline. Under fixed-fee arrangements, regional airlines are sheltered from most of the elements that cause short-term volatility in airline earnings, including variations in ticket prices, passenger loads and fuel prices.

However, fixed-fee arrangements do not shelter regional airlines from prolonged volatility in input costs, final demand and fares. For instance, network carriers pass on to consumers any additional costs of fuel that are not the result of temporary variations in price. This practice effectively raises ticket prices and causes a decline in final demand. Regional airlines must absorb the effect of this decline in final demand for the network carrier's mainline capacity, as demand for regional capacity declines almost proportionately. In addition, as capacity declines, the regional airline's per unit cost rises, even though its per unit price remains fixed by the contract.

Also, due to its dependence on a small number of network airlines, a regional airline is faced with additional risks should one or more of its network airline partners fail to fulfill their obligations due to financial distress. For example, as several large network carriers filed for bankruptcy protection in the years following the 9/11 terrorist attacks, some of their diversified and financially healthier regional partners contributed distressed financing both in the form of debt and equity (Regional News, Air Transport World, 2005).[30] Other, less diversified, regional airlines filed for bankruptcy.[31] Hence, regional airlines in fixed-fee arrangements are exposed to the same risks as those faced by network airlines.

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[29] One ASM equals one seat on a plane times one mile flown. One ASM represents the unit of production in the airline industry.

[30] For instance, in 2005, Air Wisconsin and Republic Airways each invested more than $100 million in the financially distressed US Airways; Mesa Air Group invested $30 million in financially distressed Delta Airlines and assumed leases on 30 aircraft.

[31] For instance, Mesaba, which has provided the bulk of its regional service to Northwest Airlines since its inception, filed for bankruptcy protection less than a month after Northwest's bankruptcy filing in 2005. Mesaba's March, 2006 annual report explicitly attributes its bankruptcy filing to the bankruptcy of Northwest Airlines, (which both drastically reduced regional flying and caused Northwest to miss $30 million in payments to Mesaba).

The second type of affiliation between a regional and a network airline is a revenue-sharing arrangement. Under a revenue-sharing arrangement, a network airline and a regional airline negotiate a proration formula, in which the regional airline receives a percentage of ticket revenues for passengers who are making one portion of their trip on the regional airline and another portion on the network airline (Skywest 10-K Report, 2009; Republic Airways 10-K Report, 2009). All substantial costs associated with the regional flight are borne by the regional airline.

A minority of regional airlines are wholly-owned subsidiaries of network airlines.[32] Regional airlines that are subsidiaries of network carriers provide regional services to both their parent and to other network carriers. Also, network airlines that wholly own regional subsidiaries contract with non-owned regional airlines. For DOT reporting purposes and from an operational standpoint, wholly-owned regional subsidiaries are treated by their parent carriers as separate entities. Network carriers contract with their regional subsidiaries in the same manner they do with non-owned regional airlines: via fixed-fee arrangements at the market rates received by other regional carriers for similar flying (American Airlines, Delta Airlines, Alaska Airlines 10-K Reports, 2009). Finally, a few regional airlines are independent. These small-size commuter airlines are not included in the sample of this study.

[32] E.g., for most or all of the sample period, American Eagle and Executive Airlines are subsidiaries of American Airlines, Comair is a subsidiary of Delta Airlines, Horizon Air is a subsidiary of Alaska Airlines, and Continental Micronesia is a subsidiary of Continental Airlines.

APPENDIX B
Evidence of the Explicit, Subjective,
and Relative Uses of CASM in Airline CEO Compensation Contracts

A. Evidence From Proxy Statements (emphasis mine)

1) US Airways places a *10% weight on CASM, excluding fuel expenses and profit sharing* (targeted at 3 explicit numerical levels: threshold, target, maximum) in its determination of annual cash incentive awards. They place 60% overall weight on financial (aggregate, profit-based) and stock performance, and 40% on operating performance (CASM is considered part of operating performance metrics).

US Airways has also "established four operational performance targets based on *relative* mainline on-time flight performance, year-over-year improvements for baggage handling and customer complaints and *cost management*. The first three elements are key customer service metrics measured and reported by the U.S. Department of Transportation, or DOT, and the fourth, cost management, is an important indicator of financial performance that is subject to the control of our management team". The airline also defines the peer group relative to which its cost management performance is measured. Source: US Airways 2009 Proxy Statement.

2) Hawaiian Airlines places a *20% weight on "Cost per Available Seat Mile—Fuel Adjusted (CASM)" (also provides a target level)* in its corporate financial performance goals for determining executive compensation.

Hawaiian Airlines also states that "we consider in making compensation decisions ..., revenue per available seat mile ("RASM") relative to objectives, *cost per available seat mile ("CASM") relative to objectives, RASM growth minus CASM growth relative to a peer group".* The airline also defines the other airlines that comprise the "peer group". Source: Hawaiian Airlines 2009 Proxy Statement.

3) Jetblue places a *20% weight on "CASM (cost per available seat mile) excluding fuel"* (also provides the targeted vs. actual levels) in its annual incentive and equity compensation awards. Source: Jetblue 2009 Proxy Statement.

4) Airtran Airways places a 20% weight on "non-fuel CASM" (also provides target levels). Source: Airtran Holdings 2009 Proxy Statement.

5) Alaska Airlines places a *10% weight on "CASM ex fuel and special items (cost per available seat mile)"* in its performance-based pay metrics.

Alaska Airlines states: "The CASM, excluding fuel and special items, metric was chosen to promote the Company’s progress on its strategic plan". Alaska Airlines 2009 Proxy Statement.

6) Republic Airways states that "The financial data that we take into account in setting our executive officers' compensation includes our operating revenues, pre-tax profit, pre-tax margin, net income and the *cost per available seat mile excluding fuel"*.

Republic Airways also identifies 10 categories of performance criteria (to be chosen *subjectively*) which provide the basis for its annual performance-based awards. One of the categories is defined precisely as: "Cost measures, (including, but not limited to, cost per available seat mile)". Source: Republic Airways 2009 Proxy Statement.

7) Skywest Airlines provides a long list of performance criteria which form the basis of the annual grants it awards (to be chosen *subjectively*). One of the criteria is "*cost per available seat mile*". Source: Skywest Airlines 2009 Proxy Statement.

8) Expressjet defines a long list of performance metrics for the determination of annual awards (to be chosen *subjectively*) including "reductions in costs". Source: Expressjet 2008 Proxy Statement.

9) Continental Airlines specifies a long list of performance measures to be used *subjectively*, including: "any operational or financial performance measure or metric with respect to the company or any business unit or operational level within the company". Source: Continental Airlines 2009 Proxy Statement.

10) Delta Airlines places 37.5% weight on "operational measures that support strategic focus on efficiency and customer focus". Source: Delta Airlines 2008 Proxy Statement.

11) Southwest Airlines *subjectively* uses five performance criteria in determining incentive bonuses including "The Company's significant outperformance of the industry in areas such as unit revenues, on-time performance, and customer service". Source: Southwest Airlines 2009 Proxy Statement.

* Generally, the largest carriers (e.g., American, United, Continental, Delta, Southwest) do not specifically tie compensation to CASM or they do not say that they do and do so subjectively.

B. Evidence From 10-K Reports (emphasis mine)

1) Alaska Airlines provides a detailed reconciliation between CASM and CASM excluding fuel expenses and special items.

"We have listed separately our fuel costs, new pilot contract transition costs, fleet transition charges and restructuring charges per ASM and our unit cost excluding these items. These amounts are included in CASM, but *for internal purposes we consistently use unit cost metrics that exclude fuel and certain special items* to measure our cost-reduction progress. We believe that such analysis may be important to investors and other readers of these financial statements for the following reasons:

- By eliminating fuel expense and certain special items from our unit cost metrics, we believe that we have better visibility into the results of our non-fuel cost-reduction initiatives. *Our industry is highly competitive and is characterized by high fixed costs, so even a small reduction in non-fuel operating costs can result in a significant improvement in operating results.* *In addition, we believe that all domestic carriers are similarly impacted by changes in jet fuel costs over the long run, so it is important for management (and thus investors) to understand the impact of (and trends in) company-specific cost drivers such as labor rates and productivity, airport costs, maintenance costs, etc., which are more controllable by management.*

- *Cost per ASM excluding fuel and certain special items is one of the most important measures used by managements of both Alaska and Horizon and by our Board of Directors in assessing quarterly and annual cost performance.* For Alaska Airlines, these decision-makers evaluate operating results of the "mainline" operation, which includes the operation of the B737 fleet branded in Alaska Airlines livery. The revenue and expenses associated with purchased capacity are evaluated separately.

- *Cost per ASM excluding fuel (and other items as specified in our plan documents) is an important metric for the PBP incentive plan that covers the majority of our employees.*

- *Cost per ASM excluding fuel and certain special items is a measure commonly used by industry analysts, and we believe it is the basis by which they compare our airlines to others in the industry. The measure is also the subject of frequent questions from investors.*

- Disclosure of the individual impact of certain noted items provides investors the ability to measure and monitor performance both with and without these special items. We believe that disclosing the impact of certain items such as fleet transition costs, new pilot contract transition costs, and restructuring charges is important because it provides information on significant items that are not necessarily indicative of future performance. Industry analysts and investors consistently measure our performance without these items for better comparability between periods and among other airlines.

- *Although we disclose our "mainline" passenger unit revenue for Alaska, we do not (nor are we able to) evaluate mainline unit revenue excluding the impact that changes in fuel costs have had on ticket prices. Fuel expense represents a large percentage of our total mainline operating expenses. Fluctuations in fuel prices often drive changes in unit revenue in the mid-to-long term.* Although we believe it is useful to evaluate non-fuel unit costs for the reasons noted above, we would caution readers of these financial statements not to place undue reliance on unit costs excluding fuel as a measure or predictor of future profitability because of the significant impact of fuel costs on our business".

Source: Alaska Airlines 2009 10-K Report.

2) Continental Airlines provides a detailed reconciliation between GAAP CASM and non-GAAP CASM excluding special charges, fuel expenses and related taxes for the last 5 years separately at the mainline carrier level and at the consolidated level. Source: Continental Airlines 2009 10-K Report.

3) Delta Airlines provides a detailed reconciliation between GAAP CASM and non-GAAP CASM (excluding special items, fuel expenses, and related taxes). Source: Delta Airlines 2009 10-K Report.

4) Southwest Airlines provides a detailed breakdown of CASM into its individual components. Source: Southwest Airlines 2009 10-K Report.

5) Republic Airways reports CASM in its annual report and explains: "Cost per available seat mile utilizing this measurement is included as it is a measurement recognized by the investing public relative to the airline industry". Source: Republic Airways 2009 10-K Report.

In general, all airlines report CASM on a total operating cost basis, as well as on an individual cost component basis.

C. Evidence From Wall Street Analyst Reports (emphasis mine)

Numerous reports from various investment banking firms have comparisons of CASM among airlines.

W. Greene, Morgan Stanley analyst (ranked as the top airline analyst by Forbes in 2009 and with an uninterrupted record of following several airlines) states: **"As we have written numerous times in the past, we view low costs as one of the most important competitive advantages an airline can have"**, (Greene, Morgan Stanley Equity Research, May 17, 2007). This comment is placed in the context of a chart showing the stage-length-adjusted CASM excluding fuel expenses of all major airlines on a relative basis.[33] This analyst provides regular updates of an airline's CASM relative to the CASM of its competitors.

D. McKenzie of Credit Suisse provides updates of **"Stage-Length Adjusted CASM Relative to an Industry Average"**. He defines industry as the airline's direct competitors (e.g., a network airline's competitive set consists of other network airlines). He measures and provides charts of the following: (a) the percentage difference of a carrier's CASM from competitors' CASMs and (b) the percentage year-over-year change in the previous measure. He also ranks airlines based on an average score for investment evaluation purposes, which is based on 6 factors, one of which is "debt-adjusted CASM excluding fuel" (McKenzie, Credit Suisse Equity Research United States, July 19, 2006).

[33] Stage-length-adjustment is a regression technique that is used to adjust airlines' average production unit cost for differences in flight segment length among carriers in order to provide a fair comparison of cost structures among airlines of different operational characteristics.

Other analysts who provide CASM relative to competition include:
J. Baker of JP Morgan (J.P. Morgan North America Corporate Research, November 3, 2010),
A. Light of Citigroup (Citigroup Small/Mid-Cap Research, November 8, 2005),
and F. Boroch of Bear Sterns (Bear Sterns Equity Research, May 29, 2007).

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