STRATEGIC BEHAVIOR UNDER CAPITAL MARKET PRESSURE:

EVIDENCE FROM THE U.S. AIRLINE INDUSTRY

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ABSTRACT

This paper studies the impact of capital market pressure on the firm's strategic behavior and the competitive interaction with its rivals in product-market competition. Using data from the US airline industry, we examine whether pressures to meet analysts' earnings forecasts, and existing financial constraints, influence the airlines competitive behavior in terms of capacity expansion and price changes, and how these effects influence competitive response. We find that firms reduce the aggressiveness of their strategic behavior (by reducing capacity investments and increasing pricing) if they confront earnings pressure or face financial constraints. These effects lead to systematic competitive responses. Firms increase their capacity and reduce their price when their rivals' earnings pressure is high. The effect of earnings pressure is partially moderated by the financial constraints binding the firms.

While capital market pressures on the strategy and performance of firms have traditionally been interpreted as efficient monitoring mechanisms by shareholders (Jensen and Meckling, 1976; Jensen, 1986), recent views have been less optimistic about the likely effects of such pressures (Stein, 1989; Porter, 1992). Managers have accused capital markets of being short-term oriented, and distracting them from the long-term commitment to a strategy. In a recent worldwide survey by McKinsey & Company in 2006, 42% percent of respondents (managers and board members of publicly traded firms) strongly agreed that issuing earnings guidance and trying to meet them led the firm to focus more on short-term earnings (McKinsey & Company, 2006). Hence not surprisingly, some large companies are trying to escape capital market pressures by withdrawing guidance on quarterly earnings (Zuckerman, 2005), while others are going private (Deutsch, 2005). This strong contrast between theory and practice highlights the importance of examining the impact of capital market pressure on firm's strategic behavior, and what types of actions firms choose to deal with the pressures. In theory, managers can respond to capital market pressures in multiple ways, such as ignoring the pressures, engaging in "creative accounting", communicating with capital market agents and managing expectations, or modifying strategic decisions to accommodate the pressures. This raises the questions of whether managers will respond to earnings pressures with substantive changes in competitive strategy decisions. And if so, are these changes in competitive strategic behavior beneficial or detrimental for the long-term competitive viability of the organization in the product market?

In this paper we take the first step to examine empirically the effect of earnings pressure on a firm's competitive behavior and its competitive interactions with its product-market rivals. By taking this approach, we highlight the various effects of capital market pressure on strategic behaviors and competitive interactions in an oligopolistic competition environment. Thus we contribute to the ongoing discussion about the impact of capital market pressure (Stein, 1989; Porter, 1992) by linking the traditional short-term vs. long-term tradeoff under capital market pressure to different types of product market competition, highlighting the importance of a careful examination of the question.

THEORY AND HYPOTHESES

The impact of earnings pressure

Despite the important contribution that capital markets make to the growth and success of modern industrial firms (Rajan and Zinagles, 1998), it seems the functioning of the stock market financing is not perfect. In particular, because many investors in publicly traded firms have small investments in these firms, potential investors rely on external equity analysts to analyze the past performance and future earnings potential of the firms, and recommend stocks. In that role, equity analyst use information disclosed by managers about past performance and future objectives for the company, as well as their professional judgment and the social influence from the judgments of their peers. The convergence among analysts on some estimates for future earnings for the company (the "consensus" earnings forecasts) create a powerful force that influence managerial behavior. Failing to meet the expectation, even if by a small margin, usually causes the stock price to drop disproportionally (Kasznik and McNichols, 2002; Bartov, Givoly and Hayn, 2002), which can have a big impact on the managers' compensation (Hall and Liebman, 1998) as well as managers' job positions (Puffer and Weintrop, 1991). Hence it is not surprising that managers have very strong incentives to meet earnings expectation through different means. One common approach is to disclose information and realistic objectives to guide earnings forecast down toward achievable levels. In addition, anecdotal and empirical evidence have shown managers to use "creative" accounting methods to meet earnings expectations (Degeorge, Patel and Zeckhauser, 1999), or use symbolic languages to reduce the negative impact when they report earnings lower than the consensus expectations (Pozner and Zajac, 2005).

A more serious concern about earnings forecast consensus is whether this pressure to meet earnings expectations distorts the firm's strategy and hinders its competitive advantage in the long run or not (Porter, 1992). Certainly managers have scolded this pressure for decades, quoting that it hinders them from taking necessary strategic actions for the success in the future. However, other parities, such as the institutional investors, the stock research analysts, believe the mechanism of earnings expectation and pressure is necessary for the effective monitoring of the managers (Jensen, 1986). However, the current debate is mainly based

on anecdotal stories and interviews or surveys with the managers (e.g., Abegglen and Stalk, 1985; Useem, 1996). Although there are already some theoretical models discussing this effect (e.g., Stein, 1989; Rotemberg and Scharfstein, 1990), there is a lack of direct evidence about the effect of earnings pressure on firm's strategy and performance. More importantly, previous theoretical views tend to focus on the short-term vs. long-term trade-off of strategic behavior in the face of earnings pressure, treating the firm as the only player in the product market. However, the performance of the firm not only depends on the strategic behaviors of the firm itself, but also on the responses from the competitors, or the competitive environment as well (Schelling, 1960; Ghemawat, 2001). Therefore it is important to examine the impact of earnings pressure on the firm's strategy and performance in a competitive context, especially when there is a possibility that the intention to meet earnings expectations by changing strategic behavior can be offset by the competitive responses of the rivals in the product market.

Strategic behavior under capital market pressure

Strategic behavior refers to preempting rivals with commitment necessary for future success (Rumelt, Schendel and Teece, 1994: p. 19), and translates into actions that are aimed at either lowering production costs, increasing product differentiation (Porter, 1980, 1985), or increasing entry barriers or isolating mechanisms (Spence, 1977; Rumelt, 1984). Typically, strategic actions involve short-term vs. long-term trade-offs, whereby firms may sacrifice margins in the short term to increase volumes and gain a stronger market presence in the long run, which is likely to lead to higher financial performance in the future. In oligopolistic competition environment, this trade-off can take the form of competitive actions and responses. Typically, the optimal long-term competitive behavior may differ from the optimal short-term competitive behavior in the sense that they are more "aggressive": in the case of strategic capacity competition, a firm will produce more than the output needed to maximize its short-term profit (Fundenberg and Tirole, 1983); while in the case of strategic price competition, the firm will price lower than the price needed to maximize its short-term profit (Klemperer, 1987, 1995). However, due to the special traits of the strategic assets

accumulation process (Dierickx and Cool, 1989), the consistent and constant actions to build up these assets or positions can be critical for the firm's success in the future competition.

Note that these "strategic investments" are not always considered to be investments in the accounting sense. In fact, they are often considered to be current expenses, even though they may have long-term performance implications. Hence, for public firms, this difference creates a problem when the managers face pressure from the capital market to meet with the earnings expectations. Because pursuing strategic behaviors involves an inter-temporal trade-off between current and future profits, relaxing these investments can generate short-term results. For example, Coca-Cola, which announced in 2002 that it would stop providing earnings guidance, had entered into a dynamic where marketing expenses were used to bridge the gap between actual results and earnings expectations. For other types of strategic investments, such as the "learning by doing" effects, where higher current output reduces future marginal cost (Fundenberg and Tirole, 1983), or investments in acquiring a large customer base which may benefit the firm in the future in the context of customer loyalty and switching costs (Klemperer, 1987, 1995). These investments involve expanding short-term output and sacrificing short-terms margins (either by reducing prices or increasing customer acquisition costs) in ways that reduce short-term profitability. Therefore, firms facing higher earnings expectations may be less likely to engage in these strategic behaviors, and may undertake less aggressive competitive actions in pricing and output in the product market.

Hypothesis 1: *firms facing higher earnings pressure will engage in lower capacity increases in future periods.*

Hypothesis 2: *firms facing higher earnings pressure will engage in higher price increases in future periods.*

The role of financial constraint

Although earnings pressure may push the manager to reduce strategic investment, whether managers are willing and able to sacrifice long-term performance or not may depend on the financial situation of the firm, especially its financial constraints. For example, complaints from managers about "excessive" earnings pressure limiting long-term investments

were more prevalent during the recession years (early 1990s, early 2000s), than during the booming years in the late 1990s. Thus, it is important to examine whether the effects of earnings pressure are moderated by the financial constraints experienced by the firms. Below we present competing hypotheses about this moderating effect.

Financial constraints refer to conditions where firms are unable to obtain enough funding for business activities and investments from retained earnings or external debt financing. Indicators of financial constraint include low cash flow generation, low cash balances, high leverage, low credit ratings, etc. On the one hand, higher financial constraint of the firm suggests that the firm is more dependent on new equity financing in order to fund growth opportunities (Baker, Stein and Wurgler, 2003). Hence it will be more responsive to external expectations and pressures from the capital markets, as maintaining high stock market valuations (a consequence of fulfilling earnings expectations) is beneficial not only for managerial compensations, but also for raising new equity funding from the stock market and to shield against corporate takeover threats. In fact, previous studies have shown that firms are more likely to manage the accounting of their earnings up when they plan to issue new stock (Teoh, Welch and Wong, 1998). This view suggests that the effects of earnings pressures and financial constraints are complements, since firms would care more about earnings pressure when they are more financially constrained.

The above mechanism would work when the firm has the chance to raise new equity financing. On the other hand, if new equity financing is not possible, financial constraints would be binding and would limit the firm's strategic investment anyway. In that situation, earnings pressure may have little behavioral impact among firms that are financially constrained. Yet, among firms with more financial slacks, earnings pressure would have a stronger effect in regulating whether financial slack results in new strategic investments. Firms with high earnings pressure may be induced to reduce strategic investments and maximize earnings in order to meet the earnings expectations. In that situation, earnings pressures and financial constraints would act as substitute mechanisms in reducing aggressive strategic investments.

These competing views of the interaction between earnings pressure and financial con-

straints result in competing hypotheses. H3a and H4a propose that the mechanisms are complementary, while H3b and H4b propose that they are substitutes. In the case of capacity competition, these would suggest:

Hypothesis 3a *(complements): The more financially constrained a firm is, the higher the negative effect earnings pressure will have on the firm's capacity changes.*

Hypothesis 3b *(substitutes): The more financially constrained a firm is, the lower the negative effect earnings pressure will have on the firm's capacity changes.*

In the case of price competition, these would suggest:

Hypothesis 4a *(complements): The more financially constrained a firm is, the higher the positive effect earnings pressure will have on the firm's future pricing behavior.*

Hypothesis 4b *(substitutes): The more financially constrained a firm is, the lower the positive effect earnings pressure will have on the firm's future pricing behavior.*

Effects on rival firm's behavior

Finally, while earnings pressure will lead the focal firm to be less aggressive in strategic competition, it is not sufficient to determine its impact on the firm's performance until we analyze the competitive responses from the rivals in the product market as well. We argue that the effect of focal firm's earnings pressure on its rivals' competitive behavior will differ according to the different strategic competition contexts. In the typical context of strategic capacity competition, where firms compete to preempt an available business opportunity, a focal firm that reduces its aggressiveness will indirectly encourage its rivals to pursue a more aggressive strategy, since the payoff from that strategy will be higher. Accordingly, we would expect that firms will produce more if they are interacting with rivals that experience strong earnings pressure. In that situation, earnings pressure may be disruptive to the long-term performance of firms, since they make them "soft competitors" while encouraging rivals to be aggressive. On the other hand, in context where barriers to entry are already high, industry capacity is sufficient, and the main form of competition is price competition among incumbents with existing capacity, the competitive interaction may differ. If firms facing earning

pressure increase their prices to increase their short-term profitability, rivals may take advantage of this umbrella pricing by also increasing their own price. In that situation, higher earnings pressure may be good for the firm and for the industry (although the rivals benefit more than proportionally), since it provides a commitment to capture more value from customers. Therefore we propose:

Hypothesis 5: *The higher the earnings pressure that a firm faces, the higher the capacity increases by its product-market rivals.*

Hypothesis 6: *The higher the earnings pressure that a firm faces, the higher the price increases by its product-market rivals.*

DATA AND METHODS

Data and Sample

We chose the U.S. airline industry from 1995 to mid-2001 to test our theory and hypotheses. Airline data from the U.S. Department of Transportation (DOT) have been used widely in previous research on competitive behavior at the firm-market (defined as an airline within certain city-pair market) level due to the richness of the 10% air ticket price sampling used in the Origin and Destination (O&D) survey as well as the completeness of other statistics at market and firm level (Evans and Kessides, 1994; Gimeno and Woo, 1996). For our study, it is also important that the US airline industry has firms that differ greatly in terms of capital structure, earnings pressure from the stock market, and financial constraints. For example, Southwest Airlines is known for its unique product and financial position, as Peter Lynch has put it: "It didn't fly to Paris, it didn't serve fancy meals, it didn't borrow too much money…" (Lynch, 1994: p184). There is some anecdotal evidence that some competitive behaviors in the airline industry may be influenced by the desire to meet analysts' earnings expectations. For instance, New York Times journalist Laurence Zuckerman interpreted the successive price increases by major airlines in 1999 as driven by the pressure from Wall Street to maintain record profitability despite a softening demand (Zuckerman, 1999).

Airline data were obtained from the DOT statistics and were combined from three interrelated data bases: the Airline O&D Survey (DB1B), the Air Carrier Statistics (Form 41 Traf-

fic's T-100 Segment), and the Air Carrier Financial Reports (Form 41 Financial Data). The DB1B database was used to construct price variables for firms within a market. The T-100 Segment database was used to capture market structure measurement at the firm-market level. The Form 41 database was used to create financial status variable at the firm level. Following previous studies about airline industry competition, we defined a market as a city-pair route between any given pair of cities. The time span that we chose for our study is from 1995 to mid-2001. We started our sampling in 1995, since one of the major airlines, Northwest Airlines, went public in 1994. We stopped our sampling in mid-2001 in order to exclude the dramatic effect of September 11. The DOT databases have quarterly frequency.

We selected a sample of relevant markets that met the following conditions: (a) the origin and destination cities were at least small hubs according to FAA definition (i.e., carrying at least 0.05 percent of the total US traffic), (b) the origin and destination cities were at least 100 miles apart (to eliminate substitution from ground transportation), (c) the market had average daily traffic of at least 10 passengers per day. In those markets, we identified as incumbents those airlines that had at least 5% market share or carried at least 10 passengers per day in the market. We identified as potential entrants those companies that were active at both end cities of the city-pair market but did not qualify as incumbents. Because we are interested in competitive interactions, we eliminated cases of monopoly markets (i.e., markets with only one incumbent).

Earnings forecast and historical company earnings were obtained from the Institutional Broker Estimates System (I/B/E/S) database offered by Thomson Financial / First Call. The I/B/E/S database has been used extensively in finance and accounting for research on the applications and effects of earnings expectations data. The I/B/E/S earnings data and DOT airline data were combined by matching the airline names and their I/B/E/S tickers and cross-checked by looking at industry and company histories. The DOT airline data is reported at the level of the "entity" (an operational unit flying under a single code). In some cases, publicly-traded corporations owned multiple entities. In those cases, analysis was done at the entity level (i.e., operational information was not aggregated across entities), but corporate-level earnings information was used. Although all entities were used to calculate market structure

variables, the final sample only included observations of entities that belonged to publicly-traded corporations, since only these companies had public information about earnings forecasts by analysts.

Dependent Variables

Capacity. Airlines allocate capacity to markets by assigning planes to fly different segments[1]. We use the variable *Daily Frequencies* to proxy the allocation of capacity to serve a particular market. This measure was constructed from the DOT T-100 dataset, which is a census of all flights performed by airlines each quarter. We calculated daily frequency in a segment by dividing the number of directional departures in a route by 90 days, and then averaging each direction. For markets served by non-stop service, the frequency in the market was the frequency in the segment. When a market was served by one-stop service through a hub, we used the minimum frequency of the two relevant segments, since the minimum frequency per segment determined the possible daily schedules. The average daily frequency is 3.87 directional departures per day.

Price. The price level in a market was proxied by the natural logarithm of the yield. Yield is defined as the average ticket price that an airline charges in a city-pair route, divided by the distance of the route in miles. Yield is a commonly used measure of price or revenue generation in the airline industry. The measure reflects the revenue in the market divided by the number of passenger-miles flown in the market. Since the variable was skewed, we applied a log transformation to generate a more symmetric distribution.

Independent Variables

Earnings Pressure. Earnings pressure exists when there is a gap between the earnings expectations from equity analysts and the earnings that the company would achieve if managed under steady state conditions. Of course, analysts differ in their forecasts of future earnings. We use the concept of "consensus estimates" (measured by the average of earnings per

[1] Airlines distinguish between a segment, which is a non-stop flight between two points, and a market, which is determined by the origin and destination of passengers. Therefore, non-stop markets are served with one segment, while one-stop markets are served with two segments.

share forecasts by different analysts) to estimate the expectation for capital markets. Since earnings estimates are provided for different quarters, we aggregate earnings for the four quarters ahead to calculate a measure of earnings estimates for the year ahead. Financial sources such as I/B/E/S typically report performance and estimates of earnings per share, yet because shares have different underlying values the scaling of these variables is problematic. A gap between performance and estimates of 10 cents per share may be large or small depending on the underlying value of the stock. One possibility would be to normalize earnings per share by the market value of the share. Yet, because share prices are influenced by EPS estimates, this would create a complex endogeneity problem. Instead, we normalize earnings estimates (and earnings performance) by the value of the assets per share, making these measures more comparable between firms and across periods.

Whether earnings estimates influence the behavior of firms depends on their level relative to what the company would normally be able to achieve. We use historical performance (measured by the earnings over the four last completed quarters) to assess the ongoing earnings performance of the firm. The measure is also normalized by the assets per share. For a particular quarter, our measure of earning pressure is based on the gap between the consensus earnings estimates for the following four quarters and the earnings performance in the previous four quarters. Since both dimensions are based on performance over four consecutive quarters, the measure provides a smoothing of seasonality in performance. Thus, *Earnings Pressure* is measured as follows:

$$\text{Earnings Pressure}_t = \frac{\frac{1}{4}\left(\sum_{k=t}^{t+3} \text{Forecasted EPS}_k\right)}{\text{Assets per share}_{t-1}} - \frac{\frac{1}{4}\left(\sum_{k=t-4}^{t-1} \text{Actual EPS}_k\right)}{\text{Assets per share}_{t-1}}$$

In order to effectively identify the behavioral effects of earnings pressure, we try to avoid two sources of possible spurious correlation. First, earnings pressure may simply indicate that a firm has low objective earnings performance, and results could be contaminated by the performance effect. To avoid this, we control for *Earnings Performance*, defined as the average earnings per share over the last four completed quarters, divided by the assets per share. This measure represents the second term of the Earnings Pressure measure above.

Second, earnings pressure may reflect new information available to the equity analysts about future industry conditions and shocks that have not yet been reflected in historical performance. Because these changes in the business environment may have their own effect on competitive behavior, independently from the behavioral aspects of earnings pressure, there is a risk of spurious correlation between earnings pressure and competitive behaviors. We try to control for those spurious effects by including dummies for each time period (year and quarter combination), which capture the new economic conditions in the industry that affect analyst estimates.

Financial Constraint. We measured firms' financial constraints by using the *KZ index* (Kaplan and Zingales, 1997), which has been used to measure firm's financial constraints and equity dependence in the finance literature. Kaplan and Zingales (1997) studied the financial constraints faced by a sample of 49 low-dividend manufacturing firms. They ranked firms on an ordinal scale from the least to most constrained and then estimated an ordered logit model which relates their rankings to five financial variables. A high index level of the index indicates that a firm has low cash balances and weak cash flows, provides small cash dividends and is burdened by high leverage. Firms with those financial constraints would have great difficulty to finance additional investment opportunities internally, from cash balances, retaining cash flows or further increasing debt. Future research used this measure of financial constraint to measure "equity dependence", that is, whether a firm depends on new equity offerings to raise cash for investments (Baker et al., 2003; Lamont, Polk and Saa-Requejo, 2001). In particular, the KZ-index of financial constraint is calculated as:

$$KZ_{it} = -1.002\frac{CF_{it}}{A_{it-1}} - 39.368\frac{DIV_{it}}{A_{it-1}} - 1.315\frac{C_{it}}{A_{it-1}} + 3.139LEV_{it}$$

where CF_{it} / A_{it-1} is cash flow over lagged assets, DIV_{it} / A_{it-1} is cash dividends over lagged assets, C_{it} / A_{it-1} is cash balances over assets, and LEV_{it} is leverage.

Rivals' Earnings Pressure and Financial Constraints. The theoretical model suggests that earnings pressure and financial constraint have an effect not only on the investment behavior of a focal firm but, because of the oligopolistic context in airline markets, also in the competitive behavior of competitors. The examine the cross- rival effects, we created meas-

ures for Rivals' Earnings Pressure and Rivals' Financial Constraints. These measures are calculated for each firm in each market, and vary with the identity and characteristics of the rivals that the firm faces in each market. The measure is constructed as the market share-weighted average of the Earnings Pressure and Financial Constraint measures of the various rivals present in the focal market, excluding private firms. Since rivals differ across markets, the measure varies across markets and has weak correlations to the focal firm's own measures of earnings pressure and financial constraint.

Control Variables

Capacity analysis. Capacity changes by a firm in a market may be influenced by differences in the attractiveness of markets, changes in the attractiveness of the markets, and changes in market structure. In order to make comparisons possible across city-pair markets, we include market-level fixed effects to account for unobserved heterogeneity that affect capacity expansion across markets. In addition, we control for drivers of market attractiveness. Markets with high prices relative to costs may attract capacity expansion. The variable *ln(market yield/SIFL)* measures the log of the ratio of the average market yield relative to the market's Standard Industry Fare Level (SIFL), a measure calculated by the DOT to approximate the costs of serving the market. The SIFL reflects changes in landing fees, fuels costs, changes in average cost structures in the industry, and depends on the market distance. Market size may also affect capacity changes. The variable *ln(Market Density)* captures the log of the total number of passengers in the market. Capacity changes may also be influenced by the oligopolistic nature of the market. We thus control for concentration in the market with the variable *Market Herfindahl* (sum of square shares of firms in the market) and average concentration at the origin and destination hubs with the variable *Airport Herfindahl*. We also control for the number of *Potential Entrants* to the market (defined as airlines that offer services in both the origin and destination airports, but that do not provide services between them). In addition, as mentioned earlier, we control for *Earnings Performance* and time fixed effects (for each year and quarter) to control for spurious effects that may bias the estimates of earnings pressure.

Price analysis. Similarly to the capacity analysis, we control for relevant market-specific effects. We include market-level fixed effects to capture unobserved differences among markets. Cost structures are captured by the variable *ln(SIFL)*, which control for the log of the Standard Industry Fare Level), an index created by the DOT to reflect the changing cost of inputs to air travel, including changes in airport fees, fuel, etc. The index depends on the distance traveled, as average costs per mile tend to decline with distance traveled (take-off and landing costs are spread over more mileage). We also control for market size (*ln(Market Density)*), market and airport concentration (*Market Herfindahl* and *Airport Herfindahl*), and presence of potential entrants (*Potential Entrants*). Previous research has suggested that hub dominance is an important source of firm-specific market power, and we control for *Airport Share*, or the share that a firm has on the total passengers enplaned in the origin and destination cities (in all rountes). Besides, the analysis of pricing must take into account the dimensions of differentiation of the service offerings of the focal airline in the focal market. We control for the % of firm's tickets that are sold as round trips (*% Round Trip Tickets*), the percentage of tickets in non-economy classes (*% High Class*), the percentage of tickets offering non-stop travel (*% Direct Flights*), and the schedule frequencies in the route (*Daily Frequencies*). These variables capture differences in pricing due to product characteristics. Finally, similarly to the capacity analysis, we control for Earnings Performance and time fixed effects to avoid spurious bias on earnings pressure.

Extended definitions of the control variables are provided in Table 1.

----------Insert Table 1 about here----------

Methodology

We exploit the panel data structure of our sample by focusing on longitudinal changes in the variables of interest. Thus, the dependent variables reflect the changes in capacity and price of a future time period relative to the current period where all independent variables are measured. This approach eliminates the risk of reverse causality. Because the data is based on a quarterly frequency, we examine two spans of change: one quarter changes, and four quarter (one year) changes. One quarter changes provide information about more immediate

effects, although in a seasonal industry like the airline industry, adjacent quarters may not be strictly comparable. The time period fixed effects may control for some of the seasonal trends that are general to the industry. Changes over four quarters are based on comparison with the same quarter in the following year, and are free from seasonal effects. Yet, they represent more medium-term changes that may be influenced by events that happened during the year and are not captured in our independent variables.

The longitudinal modeling provides a control for unobserved heterogeneity, since stable unobserved effects would influence the current and future realizations of the dependent variable, but would not affect the first differences. However, an important concern in longitudinal modeling is the presence of "regression to the mean" or negative feedback effects. That effect implies that future changes are negatively correlated to current levels of the dependent variable. The magnitude of the effect (coefficient between 0 and 1) reflect the level of inertia and stickiness of the variable. A coefficient of high negative magnitude suggests that high values of the variable quickly return towards the average, since high levels imply large negative changes in the future. A low magnitude represents higher inertia in the dependent variable.

Formally, the models can be stated as follows. Let $X_{im,t}$ represent the level of the independent variables for firm i in market m at time period t, and $Y_{im,t+k}$ represent the level of the dependent variable for the same firm and market, k periods later. Let μ and τ represent fixed effects for market and time period respectively. Then, our model structure follows the equation:

$$\Delta Y_{im,t+k} = (Y_{im,t+k} - Yi_{m,t}) = \alpha + \gamma\, Yi_{m,t} + \beta\, X_{im,t} + \mu_m + \tau_t + \varepsilon_{imt} \qquad (1)$$

The parameter estimates for γ reflect the process of autoregression in the dependent variable, which influences the dynamics of the variable. We expect a negative estimate, reflecting a negative feedback process where high values in one period generate opposite changes in the future. The coefficient should be in the range between -1 and 0. A coefficient closer to 0 indicates that a random shock in the dependent variable persists for a long time, while a coefficient closer to -1 indicates a fast adjustment process.

The coefficients of equation can also be interpreted as reflecting a partial adjustment towards equilibrium. If the levels of the independent variables were frozen at current levels,

the dependent variable would converge toward equilibrium at a speed determined by the parameter γ. The dependent variable would be at equilibrium, for a given set of parameter estimates and independent variables, when equation (1) would not lead to additional changes in the dependent variable (when $\Delta Y=0$), which implies:

$$Y^* = 1/|\gamma| *(\alpha + \beta X_{im,t} + \mu_m + \tau_t) \quad (2)$$

Since some hypotheses involve the evaluation of interaction effects, we centered the components of these interactions around their sample mean prior to calculating the interactions. These changes allow the interpretation of main effects as the effects of a variable at the mean level of the moderator variable. The model was estimated using Stata 9.0.

RESULTS

The final sample included over 200,000 observations representing 23 airline entities, active in 4,255 city-pair markets for a maximum of 26 period (6 ½ years, from 1995Q1 to 2001Q2). Although there was some attrition among the airlines in the sample, the minimum span of coverage in the sample was 7 consecutive quarters per airline. Over 98 percent of the airline-market-period observations came from airlines that were active in the sample for 25 or 26 periods. Firms active in a market were present for an average of 18.2 consecutive quarters. Since the sample eliminates monopoly markets, the incumbents per market ranged from 2 to 12, with a median of 4.

We start the analysis by looking at the descriptive statistics and correlations of the variables presented in Table 2. . First, considering the dependent variables, we found that daily frequencies averaged 3.87 departures per day, and the yield during the period averaged 12.5 cents per mile. (exp(-2.08)). Frequencies and yields are positively correlated. Although one might expect that capacity and prices should be negatively correlated, and indeed changes in capacity are negatively correlated to changes in price, the relationship between frequency and price is complex. Clearly, excess capacity in a market should reduce price levels. However, because passengers prefer companies with more frequencies per day, the effect of frequency competition tends to damage rivals more than the focal firm.

Considering the independent variables, the average level of earnings pressure was close to zero, yet about 70% of the observations had positive earnings pressure (i.e., analyst earnings expectations were above historical earnings performance). This result suggest that while although we found that earnings pressure and financial constraints were positively correlated, both for the focal firm (r=.27) and for its rivals (r=.22). However, earnings pressures and financial constraints of a focal firm were only weakly correlated to those of its rivals. This should facilitate the independent identification of effects for both. Earnings performance by the focal firm had a strong negative correlation to earnings pressure (r=-.59) and financial constraints (r=-.51), suggesting the need to control for earning performance before assessing the effects of earnings pressure and financial constraints.

Looking at the correlations between independent and dependent variables, we found that a firm's earnings pressure was weakly negatively correlated to its current level of daily frequencies, and positively correlated to the level of current frequencies by rivals. Similarly, rivals' earnings pressure had a negative correlation to rivals' frequencies, and a positive correlation to frequencies by the focal firm. Earnings pressures by the focal firm and its rivals were positively correlated to price levels by the focal firm and its rivals. Financial constraints by a focal firm had weak negative correlations to frequencies by focal firm and rivals, and financial constraints by rivals were negatively correlated to focal firm and rivals' frequencies. Financial constraints by both the focal firm and its rivals were positively correlated to both focal firm's and rivals' pricing. However, the magnitude of these correlations is low, and there may be spurious effects affecting these correlations.

----------Insert Table 2 about here----------

Tables 3 and 4 present the analysis of frequency changes after one quarter and four quarters (one year), respectively. Tables 5 and 6 present the analysis of price changes for the following quarter and for the following year, respectively.

----------Insert Tables 3, 4, 5 and 6 about here----------

Hypothesis 1 proposed that earnings pressure by a focal firm would have a negative impact on capacity increases by the company. Tables 3 and 4 provide strong evidence in support for this hypothesis. Models 3.2 to 3.8 show that earnings pressure had a negative and signifi-

cant effect on capacity changes for the next quarter, while models 4.2 to 4.8 showed a negative and significant effect on capacity changes for the same quarter of the following year.

Hypothesis 2 suggested that earnings pressure would have a positive impact on firm's pricing behavior. Tables 5 and 6 examine the impact on next quarter and next year pricing. Results in models 5.2 to 5.8 systematically reject the hypothesis for the next quarter analysis. None of the coefficients of earnings pressure are significant at the 5% level. However, results for pricing in the following year (models 6.2 to 6.8) find strong and positive effects of earnings pressure on prices in the same quarter next year. These are significant at the 0.1% level. The results indicate the effect of earnings pressure on pricing are not immediate, but are delayed. Given that pricing is a variable that can be adjusted more easily than scheduled frequencies in the short term, the results are intriguing. One possible interpretation is that the increase in pricing may be the medium-term result of the reduction on scheduled frequencies found in hypothesis 1.

Hypotheses 3 and 4 examined the moderator effect of financial constraints on the effect of earnings pressure. However, we first examined the direct effect of financial constraints. We found that financial constraints by the focal firm had negative and significant effects on capacity increases (both for the following quarter and the following year), and positive and significant effects on price changes (both for the following quarter and the following year). Therefore, the Kaplan-Zingales measure seems to reflect financial constraints that make the firms reduce capacity investment and focus in short-term revenue generation.

Hypothesis 3 provided competing hypotheses about the interaction between earnings pressure and financial constraints. One alternative was that earnings pressures had the greatest effect on reducing investment when companies are more financially constrained, since at that time they are more dependent on new equity financing, and meeting earnings expectations would be critical for their ability to obtain equity financing. In this case, earnings pressures and financial constraints would be complementary, since they would reinforce each other. This would imply a negative coefficient in the capacity analysis, since greater financial constraint would make the effect of earnings pressure more negative. Alternatively, the effects of earnings pressure and financial constraints might be substitutes. If external equity fi-

nancing is improbable, then companies that are financially constrained would be unable to invest, no matter what the earnings pressure might be. The results in the capacity analysis in Tables 3 and 4 suggest that earnings pressure and financial constraints act as substitutes in their influence on capacity investment. The effect of earnings pressure is greatest among companies with financial slack (i.e., those that experience earnings pressure invest less than those that do not), but has limited effect among companies with financial constraints. These results are supported by the positive and significant interactions effects in models 3.3, 3.4, 3.7 and 3.8 (for the following quarter), and models 4.3, 4.4, 4.7 and 4.8 (for the same quarter of the following year). One possible interpretation of these results is that airlines, because of their typical low long-term profitability, are generally cut off from new equity financing. If so, financial constraints becoming binding on the investment for the company, and the effect of earnings pressure will only be observed among firms with financial slack. That is, earnings pressure and financial constraints act as substitute mechanisms to constrain investments.

Hypothesis 4 examined the interaction effect of earnings pressure and financial constraint on pricing behavior. Yet, the results in tables 5 and 6 show that none of the interaction effects are significant at the 5% level. Therefore, we cannot find evidence of interdependence between the effects of earnings pressure and financial constraints on pricing behavior. Either earnings pressure had no effect on pricing (for next quarter pricing), or its positive effect seemed to be independent of the level financial constraint. One possible post-hoc interpretation of this result may be that, in contrast to capacity investments, which required financial investments in new equipment and sunk costs in increasing penetration, price changes do not necessarily involve a financial investment.

Finally, hypotheses 5 and 6 explored the cross-rival effects. That is, we tried to understand whether earnings pressures and financial constraints by rivals had an effect on a focal firm's competitive behavior. We expect that such result would follow from an oligopolistic causal mechanism, where rival characteristics would affect thee rivals' competitive behavior in frequencies and pricing, and would lead to a competitive reaction from the focal firm. Because airline markets are typically oligopolistic (the average number of incumbents per market was 4.09), we expect that these effects may show across rivals. Before doing the testing

for these hypotheses, we tried to understand the nature of competitive interdependence in the industry. Textbook industrial organization would suggest that capacity competition reflects competition in strategic substitutes, whereby an increase of capacity by rivals would decrease the incentives to increase capacity by the focal firm. Price competition, on the other hand, is typically viewed as competition in strategic complements, where an increase of price by rivals would provide a buffer for the focal firm to increase its own prices. We assessed these assumptions by testing whether rivals' frequencies and prices had the expected effects on changes in the focal firm's competitive variables. With frequencies, we found a robust and significant negative effect of rivals' current frequencies on both for the next quarter's (model 3.4) and next year's (model 4.4) capacity increases. This confirms the expectation that these variables are strategic substitutes, and that factors that may reduce investment by a firm may encourage investment by its rivals. The results for price competition are not completely consistent with our initial assumptions, however. A high current price by rivals has a positive effect on focal firm's prices next quarter (model 5.4), but a negative effect on prices next year (model 6.4). There may be several reasons for these mixed results. The assumption of the models of strategic complements is that capacity is not constrained, and that the threats of new entry or rival capacity expansion have been eliminated. Under those conditions, firms are willing to follow their rivals' pricing umbrella in order to maximize revenues. However, in reality, entry may not be blockaded, and rivals may take advantage of a price umbrella to expand their capacities. As a result, it may be that high rival prices may set in motion some competitive dynamics (entry, capacity expansion) that lead to lower prices by the focal firm in the future. This relationship must be considered when analyzing the cross-rival effects, since the sign of the cross-rival effect is influenced by whether the competitive variables are strategic complements or substitutes.

Hypothesis 5 focused on the effect of rivals' earnings pressure and financial constraints on the capacity increases by the focal firm. The results suggest that rivals' earnings pressure had a strong positive effect on a focal firm's capacity expansion in the following quarter (models 3.5 to 3.7), while rivals' financial constraints had a less robust positive effect (significant in models 3.5 and 3.6, but not significant in model 3.7). It therefore appears that in

the short-term firms respond more aggressively to rivals with high earnings pressure than to rivals with financial constraints. These results are reversed when looking at capacity expansion over the following year. There, rivals' earnings pressure did not have a significant effect on capacity expansion over the following year (models 4.5 to 4.7), while rivals' financial constraints had a positive effect on capacity increases. We interpret these results as mixed support for hypothesis 5, yet providing intriguing results. The results confirms the findings of Chevalier (1995a, 1995b) that, at least in the medium term, a firm's financial leverage (one important component of our measure of financial constraints) may end up encouraging aggressive behavior by its rivals (in this case, capacity increases). Although not hypothesized, we also explored whether the effects of rivals' earnings pressures and rivals' financial constraints were complementary or substitutes. We found that the interactions had a significant negative effect on capacity increases both in the following quarter and the following year. Thus, the marginal effect of rivals' earnings pressure on focal firm's pricing is lower if rivals' financial constraints are simultaneously high, and vice versa. The variables appear to act as substitutes. This is consistent with the findings for hypothesis 3.

Finally, hypothesis 6 examined the effect of rivals' earnings pressure and financial constraints on focal firm's pricing behavior. We find that rivals' earnings pressure had a negative and marginally significant effect on next quarter pricing (models 5.5 to 5.7), but a stronger and significantly negative effect on next years' pricing (models 6.5 to 6.7). The marginal and inconclusive results for next quarter pricing are consistent with the results of hypothesis 2, since we did not find a significant effect of focal firm's earnings pressure on its own pricing behavior. In contrast, the finding for next year pricing seems to challenge again the assumption that prices are strategic complements, at least in the medium term. High earnings pressures by firms seem to increase their own prices over the following year (H2), but make their rivals more aggressive in pricing. This may be due to intermediating processes not captured in the model, such as new entry, capacity expansion by rivals, etc. in contrast to the aggressive behavior on rivals with high earnings pressure, there seems to be strong evidence that firms accommodate rivals with high financial constraints. Rivals' financial constraints increased focal firm's prices for both the next quarter (models 5.5 to 5.7) and next year (models

6.5 to 6.7). The interactions effects also suggest a change of effects across time horizons. For next quarter's pricing, rivals' earnings pressure had a stronger negative effect on focal firm's pricing if the rivals where also financially constrained (rivals' earnings pressures and financial constraints acting as complements). In contrast, for next year pricing, the marginal effect of rivals' earnings pressure on focal firm's pricing would be less negative if the rivals where also financially constrained (i.e., rivals' earnings pressure and financial constraints act as substitutes, a result consistent with other findings in the paper).

In conclusion, the empirical analysis found strong supporting evidence of the effect of earnings pressures on the competitive behaviors of firms and their rivals. Firms facing earnings pressure and financial constraints were less likely to engage in capacity increases, and this behavior seemed to encourage capacity investments by the relevant rivals in the city-pair markets. The effects of earnings pressure and financial constraints on capacity increases appeared to be substitutes. The evidence on pricing behavior was more mixed. Earnings pressures seemed to have little effect on next quarter's prices, which were more influenced by financial constraints. When looking at next year's pricing, earnings pressure tended to have a positive effect on own prices, and a negative effect on rivals' prices. Together, these results show the important of understanding how differences in financial conditions, governance contexts and capital market pressures may have both direct effects on firm behavior and indirect effects by the competitive responses of competitors. This is a basic insight from oligopoly theory that requires further development in the strategy and finance literature, which typically have examined these financial and governance pressures without considering their competitive embeddedness.

DISCUSSIONS AND CONCLUSION

Interpretation of Results

{analysis of magnitude of effects, and graphs of interactions effects to be completed for presentation}

Contributions

In this study we examine the impact of capital market pressure on the firm's strategic behavior and its competitive interactions in oligopolistic markets in the US airline industry. Overall, we find that in both capacity and price competition, earnings pressure by a firm makes it less aggressive (lower capacity increases, higher prices), while earnings pressure experienced by rivals make a focal firm more aggressive (higher capacity increases, lower prices). In addition, the effect of earnings pressure is moderated by the degree of financial constraint (as proxied by the Kaplan-Zingales index): earnings pressure had a weaker effect for firms that were financially constrained, but had a stronger effect when firms had financial slack. Similar interaction effects were found among the rivals' earnings pressures and financial constraints. We feel our findings are both interesting and intriguing the following aspects.

First, our results suggest that earnings pressures do result in substantive changes in the competitive strategy of and these firms. Although we agree that capital market pressure may push the firm to increase their efficiency as well, the results of our study do suggest that earnings pressure can have an impact on the firm's strategic behavior in the product market competition, even after we control for the alternative cost and market structure factors. This indicates that the concerns of both the academics and the practitioners are not groundless – firms may not only use accounting or symbolic methods to deal with the pressure imposed by the capital market, but also change their strategic behavior substantively to meet the expectations. Therefore it is important for us to look into the phenomena of capital market pressure in a competitive context, and to understand it better.

Second, our results show that the effect of earnings pressure on strategic behavior and the competitive interaction among the firm are not simplistic. Although preliminary, our results show that earnings pressure will have different effects on the firm's strategic behavior and competitive interactions, depending on the nature of the strategic competition. Although facing capital market pressure, the focal firm always wants to reduce the aggressiveness of its strategic behavior, the impact on its performance finally depends on the rival's reaction. In strategic capacity competition, the rival will respond by more aggressive strategic actions, and the consequence can be bad for the focal firm. However, in strategic price competition

(assuming that prices are strategic complements), the rival would respond by more accommodating behavior instead, and the consequence is good for the focal firm. Therefore, the claim that capital market pressure hampers the competitive edge and the performance of the focal firm does not always hold in theory. However, our results suggest that at least in medium term price competition, earnings pressure may induce aggressive (not accommodating) responses from market rivals. This finding suggest that earnings pressure may not be an optimal mechanism for de-escalating competition in the product market.

Third, our results also highlight the factors that may moderate the effect of capital market pressure, such as the degree to which the firm is financially constrained. Interestingly, in contrast to prior research on the strategic effects of debt (Chevalier, 1995a, b; Phillips, 1995), which suggested that high debt constrained firms from pursuing long-term oriented strategies, our paper shows that firms with financial slack may be more constrained by the effect of earnings pressure. Thus, the paper suggests that both sources of external financing (debt and equity) may limit firms' ability to commit to aggressive strategic behaviors in product markets. Pure finance wise, it seems the only way to shield the earnings pressure is to have enough free cash flow so that the firm is not highly dependent on equity financing. But under the current corporate governance structure of the public firms, high stocks of free cash will also bring the problem of high agency cost. Therefore how to solve the problem of earnings pressure still remains as a dilemma for the public firms in general.

Overall, the paper suggests that financial structure and earnings pressure have a significant effect on the type of competitive strategies pursued, and indirectly on the performance achieved by these firms. Firms should consider which ownership form (publicly-traded or private firm) and financial structure effectively complement their intended competitive strategy.

Limitations and future research

The current study, however, does have some important limitations. First, since the data used in this study is limited to a single industry, the generalizability of the results needs to be examined in other contexts. Our theory of earnings pressure's effect on competitive behavior,

however, does not require any industry-specific factors. Therefore, our theoretical predictions could be generalizable to other industries, particularly those in which firms competition is constrained by capacity investments. The predictions of our theory are not just limited to capacity and price competition. They should also be applicable to other competitive behaviors, such as research and development investments, marketing investment, and diversification. However, as suggested in the study, the prediction for other strategic behavior will certainly depend on the nature of the specific competitive interaction.

Second, we mostly use an economics approach when we build our theory and hypotheses. This assumes the managers are rational and can evaluate the tradeoffs between meeting earnings expectation and changing strategic behavior in competition. Another perspective on this issue could be based on a behavioral approach to managerial decision making. Boundedly rational managers and organizations may respond systematically to framing effects and performance targets (Cyert and March, 1963; Kahneman and Tversky, 1979). Although we have not incorporated these more behavioral approaches into our discussions, it will be valuable for future studies to contrast different theory perspectives more so that we can draw a more comprehensive picture of the story.

Finally, to make the study more focused, we only examined the role of competition types and the degree of financial constraints on the effect of earnings pressure. Several other factors apparently can moderate its effect as well. For example, how does a firm choose between meeting earnings pressure via accounting choices vs. strategic choices? Beside financial factors, does corporate governance structure (ownership, institutional investors) affect the impact of earnings pressure? And from the very beginning, whose earnings expectations or forecasts will the managers care the most? All these can be promising avenues for future research on this topic.

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Table 1

Definition of Control Variables

Variable Name	Definition
Frequency	Number of flights per day by the firm serving the city-pair market
Yield	average ticket price / distance of the route
Rivals' Yield	Market-share weighted average of rival's yield
% Round Trip Tickets	Percentage of round trip tickets of all the firm's tickets in the airline-route
% High Class	Percentage of first and business class tickets in the airline-route
% Direct Flights	Percentage of passengers flying direct (without connection) in the airline-route
SIFL	Standard Industry Fare Level divided by market distance
Market Density	Sqare root of total number of passengers traveling the market with any airline
Potential Entrants	Number of potential entrants (firms with presence at both ends-cities that do not serve the city-pair)
Airport Share	Average of firm's share of total enplanements at both end-cities
Market Herfindahl	Herfindahl-Hirshman index of concentration at city-pair
Airport Herfindahl	Average of the Herfindahl-Hirshman index of concentration of total enplanements at both end-cities

Table 2

Descriptive Statistics and Correlations

	Variable	mean	s.d.	min	max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1)	Daily Frequencies (t)	3.87	2.51	.12	81.0																		
(2)	Rivals' Daily Frequencies (t)	3.76	2.73	.02	66.5	.33																	
(3)	ln(Yield) (t)	-2.08	.47	-3.59	.77	.23	.15																
(4)	ln(Rivals' Yield) (t)	-2.07	.45	-3.33	.76	.19	.19	.90															
(5)	Earnings Performance	.006	.008	-.053	.040	-.02	.01	.01	-.01														
(6)	% Round Trip Tickets	.87	.19	.00	1.0	-.03	-.12	-.19	-.13	.04													
(7)	% High Class	.07	.23	.00	1.0	.03	.05	.02	-.01	.04	-.57												
(8)	% Direct Flights	.15	.34	.00	1.0	.16	.26	.18	.18	.04	-.12	.13											
(9)	ln(SIFL)	-1.69	.17	-2.00	-.63	.28	.28	.77	.79	.03	-.20	.14	.33										
(10)	ln(market yield/SIFL)	-.39	.33	-1.48	1.53	.14	.11	.88	.93	-.03	-.09	-.07	.08	.57									
(11)	ln(Market Density)	4.68	.75	3.40	7.25	.38	.49	-.17	-.17	.04	-.10	.10	.47	.08	-.27								
(12)	Potential Entrants	2.50	1.94	.00	15.0	.29	.33	.11	.11	.04	-.15	.12	.42	.31	-.01	.52							
(13)	Market Herfindahl	.40	.16	.02	.99	.11	.08	.35	.36	.00	-.06	.02	.16	.35	.32	-.11	.13						
(14)	Airport Herfindahl	.27	.11	.11	.85	.08	.04	.22	.23	-.01	-.01	-.04	.16	.09	.27	-.05	-.06	.32					
(15)	Airport Share	.18	.12	.00	.91	.18	-.08	.32	.25	.08	-.11	.19	.38	.27	.23	-.11	.02	.34	.27				
(16)	Earnings Pressure	.002	.005	-.026	.065	-.02	.04	.01	.03	-.59	-.06	.00	.01	.00	.04	.02	.02	.01	.01	-.08			
(17)	Financial Constraint	2.09	.51	-2.30	7.01	-.00	-.01	.07	.08	-.51	.28	-.44	-.09	-.05	.13	-.10	-.08	.04	.05	-.05	.27		
(18)	Rivals' Earnings Pressure	.002	.004	-.026	.069	.04	-.03	.07	.06	.03	-.01	-.04	.00	.03	.07	-.03	.01	.04	.03	.07	.01	.03	
(19)	Rivals' Financial Constraint	2.09	.42	-2.30	7.01	-.02	-.09	.10	.11	-.01	.00	-.01	-.08	-.06	.18	-.18	-.13	.03	.07	.09	.01	-.04	.22

Table 3

Analysis of Changes on Daily Frequencies in Following Quarter

Dependent Variable: Daily Frequencies$_{t+1}$ – Daily Frequencies$_t$

(Fixed effects for market and time period included, but not shown)

Model	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8
Daily Frequencies	-0.025 ***	-0.026 ***	-0.026 ***	-0.048 ***	-0.026 ***	-0.026 ***	-0.026 ***	-0.049 ***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Rivals' Daily Frequencies				-0.060 ***				-0.060 ***
				(0.001)				(0.001)
Earnings Performance	-0.364 ***	-2.206 ***	-2.280 ***	-2.195 ***	-2.224 ***	-2.221 ***	-2.303 ***	-2.207 ***
	(0.109)	(0.155)	(0.155)	(0.154)	(0.156)	(0.156)	(0.155)	(0.154)
ln(market yield/SIFL)	-0.106 ***	-0.106 ***	-0.104 ***	-0.096 ***	-0.105 ***	-0.105 ***	-0.103 ***	-0.096 ***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
ln(Market Density)	-0.315 ***	-0.313 ***	-0.313 ***	-0.288 ***	-0.313 ***	-0.313 ***	-0.314 ***	-0.288 ***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Potential Entrants	0.003 **	0.004 **	0.004 **	0.006 ***	0.003 **	0.003 **	0.004 **	0.006 ***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Market Herfindahl	0.015	0.013	0.013	0.091 ***	0.012	0.012	0.012	0.091 ***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Airport Herfindahl	0.495 ***	0.518 ***	0.509 ***	0.460 ***	0.521 ***	0.523 ***	0.511 ***	0.463 ***
	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)
Earnings Pressure		-4.195 ***	-5.569 ***	-5.454 ***	-4.011 ***	-4.002 ***	-5.335 ***	-5.281 ***
		(0.237)	(0.247)	(0.245)	(0.239)	(0.239)	(0.249)	(0.247)
Financial Constraint		-0.012 ***	-0.022 ***	-0.012 ***	-0.008 **	-0.007 **	-0.020 ***	-0.010 ***
		(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Earnings Pressure x Financial Constraint			2.376 ***	2.251 ***			2.321 ***	2.193 ***
			(0.123)	(0.122)			(0.125)	(0.124)
Rivals' Earnings Pressure					1.937 ***	2.313 ***	2.194 ***	1.676 ***
					(0.299)	(0.313)	(0.313)	(0.311)
Rivals' Financial Constraint					0.011 **	0.015 ***	0.005	0.007
					(0.003)	(0.004)	(0.004)	(0.004)
Rivals' Earnings Pressure x Rivals' Financial Constraint						-0.953 ***	-0.690 **	-0.949 ***
						(0.231)	(0.231)	(0.229)
Observations	237560	237560	237560	237560	237560	237560	237560	237560
R-squared	0.0549	0.0562	0.0577	0.0719	0.0565	0.0566	0.0580	0.0720
Model dof	4285	4287	4288	4289	4289	4290	4291	4292
log-likelihood	-139856	-139688	-139499	-137702	-139657	-139649	-139472	-137682
LL ratio test		336.0 ***	378.0 ***	3594.0 ***	62.0 ***	16.0 ***	354.0 ***	40.0 ***
relative to model		4.1	4.2	4.3	4.2	4.5	4.6	4.4
test dof		2	1	1	2	1	1	3

Standard errors in parentheses

Significant at 5% (*); significant at 1% (**); significant at 0.1% (***)

Table 4

Analysis of Changes on Daily Frequencies in Following Year

Dependent Variable: Daily Frequencies$_{t+4}$ – Daily Frequencies$_t$

(Fixed effects for market and time period included, but not shown)

Model	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8
Daily Frequencies	-0.056 ***	-0.058 ***	-0.057 ***	-0.107 ***	-0.058 ***	-0.058 ***	-0.058 ***	-0.108 ***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Rivals' Daily Frequencies				-0.130 ***				-0.130 ***
				(0.002)				(0.002)
Earnings Performance	-1.915 ***	-6.275 ***	-6.759 ***	-6.466 ***	-6.167 ***	-6.156 ***	-6.644 ***	-6.336 ***
	(0.184)	(0.272)	(0.272)	(0.268)	(0.272)	(0.272)	(0.272)	(0.268)
ln(market yield/SIFL)	0.030 *	0.031 *	0.035 *	0.053 ***	0.029 *	0.029 *	0.033 *	0.050 ***
	(0.014)	(0.014)	(0.014)	(0.013)	(0.014)	(0.014)	(0.014)	(0.013)
ln(Market Density)	0.026 *	0.028 *	0.029 *	0.083 ***	0.036 **	0.036 **	0.035 **	0.090 ***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Potential Entrants	-0.014 ***	-0.013 ***	-0.013 ***	-0.010 ***	-0.013 ***	-0.013 ***	-0.013 ***	-0.010 ***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Market Herfindahl	0.012	0.010	0.009	0.196 ***	0.007	0.007	0.008	0.194 ***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Airport Herfindahl	-0.336 ***	-0.282 ***	-0.291 ***	-0.348 ***	-0.266 ***	-0.260 ***	-0.275 ***	-0.333 ***
	(0.076)	(0.076)	(0.076)	(0.074)	(0.076)	(0.076)	(0.076)	(0.074)
Earnings Pressure		-8.181 ***	-11.431 ***	-10.973 ***	-8.325 ***	-8.301 ***	-11.345 ***	-11.010 ***
		(0.407)	(0.429)	(0.421)	(0.410)	(0.410)	(0.432)	(0.425)
Financial Constraint		-0.035 ***	-0.056 ***	-0.033 ***	-0.013 **	-0.010 *	-0.037 ***	-0.013 **
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Earnings Pressure x Financial Constraint			4.601 ***	4.329 ***			4.333 ***	4.053 ***
			(0.193)	(0.190)			(0.195)	(0.192)
Rivals' Earnings Pressure					-0.616	0.124	-0.076	-1.079 *
					(0.464)	(0.486)	(0.485)	(0.477)
Rivals' Financial Constraint					0.063 ***	0.070 ***	0.050 ***	0.053 ***
					(0.006)	(0.006)	(0.006)	(0.006)
Rivals' Earnings Pressure x Rivals' Financial Constraint						-1.806 ***	-1.271 ***	-1.705 ***
						(0.348)	(0.348)	(0.342)
Observations	201482	201482	201482	201482	201482	201482	201482	201482
R-squared	0.0347	0.0371	0.0398	0.0715	0.0377	0.0378	0.0402	0.0720
Model dof	4232	4234	4235	4236	4236	4237	4238	4239
log-likelihood	-191639	-191395	-191105	-187721	-191331	-191317	-191066	-187671
LL ratio test		488.0 ***	580.0 ***	6768.0 ***	128.0 ***	28.0 ***	502.0 ***	100.0 ***
relative to model		4.1	4.2	4.3	4.2	4.5	4.6	4.4
test dof		2	1	1	2	1	1	3

Standard errors in parentheses

Significant at 5% (*); significant at 1% (**); significant at 0.1% (***)

Table 5

Analysis of Changes on Price Changes in Following Quarter

Dependent Variable: $\ln(\text{Yield})_{t+1} - \ln(\text{Yield})_t$

(Fixed effects for market and time period included, but not shown)

Model	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8
ln(Yield)	-0.440 ***	-0.442 ***	-0.441 ***	-0.448 ***	-0.442 ***	-0.442 ***	-0.442 ***	-0.448 ***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ln(Rivals' Yield)				0.049 ***				0.048 ***
				(0.003)				(0.003)
Earnings Performance	0.222 ***	0.431 ***	0.428 ***	0.432 ***	0.438 ***	0.437 ***	0.437 ***	0.440 ***
	(0.039)	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)
% Round Trip Tickets	0.047 ***	0.044 ***	0.044 ***	0.040 ***	0.044 ***	0.045 ***	0.045 ***	0.041 ***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
% High Class	0.020 ***	0.024 ***	0.024 ***	0.023 ***	0.023 ***	0.024 ***	0.024 ***	0.022 ***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
% Direct Flights	-0.020 ***	-0.020 ***	-0.020 ***	-0.021 ***	-0.020 ***	-0.020 ***	-0.020 ***	-0.021 ***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Daily Frequencies	0.003 ***	0.003 ***	0.003 ***	0.003 ***	0.003 ***	0.003 ***	0.003 ***	0.003 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln(SIFL)	0.142 **	0.140 **	0.140 **	0.003	0.138 **	0.136 **	0.136 **	-0.001
	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)
ln(Market Density)	-0.032 ***	-0.032 ***	-0.032 ***	-0.015 ***	-0.031 ***	-0.031 ***	-0.031 ***	-0.014 ***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
Potential Entrants	-0.003 ***	-0.003 ***	-0.003 ***	-0.002 ***	-0.003 ***	-0.003 ***	-0.003 ***	-0.002 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market Herfindahl	0.045 ***	0.045 ***	0.045 ***	0.041 ***	0.045 ***	0.045 ***	0.045 ***	0.040 ***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Airport Herfindahl	-0.055 ***	-0.056 ***	-0.056 ***	-0.059 ***	-0.055 ***	-0.054 ***	-0.054 ***	-0.057 ***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Airport Share	0.142 ***	0.142 ***	0.142 ***	0.150 ***	0.142 ***	0.142 ***	0.142 ***	0.151 ***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Earnings Pressure		0.040	0.020	0.024	-0.012	-0.008	-0.007	0.001
		(0.083)	(0.087)	(0.087)	(0.084)	(0.084)	(0.088)	(0.088)
Financial Constraint		0.007 ***	0.007 ***	0.007 ***	0.008 ***	0.009 ***	0.009 ***	0.009 ***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Earnings Pressure x Financial Constraint			0.034	0.033			-0.001	-0.002
			(0.044)	(0.043)			(0.044)	(0.044)
Rivals' Earnings Pressure					-0.425 ***	-0.240 *	-0.240 *	-0.199
					(0.105)	(0.110)	(0.110)	(0.110)
Rivals' Financial Constraint					0.006 ***	0.007 ***	0.007 ***	0.007 ***
					(0.001)	(0.001)	(0.001)	(0.001)
Rivals' Earnings Pressure x Rivals' Financial Constraint						-0.470 ***	-0.470 ***	-0.473 ***
						(0.081)	(0.081)	(0.081)
Observations	237560	237560	237560	237560	237560	237560	237560	237560
R-squared	0.2518	0.2520	0.2520	0.2531	0.2521	0.2522	0.2522	0.2533
Model dof	4290	4292	4293	4294	4294	4295	4296	4297
log-likelihood	109605	109633	109634	109806	109650	109668	109668	109838
LL ratio test		56.0 ***	2.0	344.0 ***	34.0 ***	36.0 ***	0.0	64.0 ***
relative to model		4.1	4.2	4.3	4.2	4.5	4.6	4.4
test dof		2	1	1	2	1	1	3

Standard errors in parentheses

Significant at 5% (*); significant at 1% (**); significant at 0.1% (***)

Table 6

Analysis of Changes on Price Changes in Following Year

Dependent Variable: $\ln(\text{Yield})_{t+4} - \ln(\text{Yield})_t$

(Fixed effects for market and time period included, but not shown)

Model	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8
ln(Yield)	-0.671 ***	-0.672 ***	-0.673 ***	-0.669 ***	-0.673 ***	-0.673 ***	-0.673 ***	-0.669 ***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ln(Rivals' Yield)				-0.029 ***				-0.030 ***
				(0.003)				(0.003)
Earnings Performance	-0.046	0.375 ***	0.383 ***	0.385 ***	0.383 ***	0.384 ***	0.395 ***	0.397 ***
	(0.050)	(0.077)	(0.077)	(0.077)	(0.077)	(0.077)	(0.077)	(0.077)
% Round Trip Tickets	0.035 ***	0.031 ***	0.031 ***	0.033 ***	0.031 ***	0.031 ***	0.031 ***	0.033 ***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
% High Class	0.034 ***	0.039 ***	0.040 ***	0.040 ***	0.038 ***	0.038 ***	0.039 ***	0.039 ***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
% Direct Flights	-0.030 ***	-0.030 ***	-0.030 ***	-0.029 ***	-0.030 ***	-0.030 ***	-0.030 ***	-0.029 ***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Daily Frequencies	0.004 ***	0.004 ***	0.004 ***	0.004 ***	0.004 ***	0.004 ***	0.004 ***	0.004 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln(SIFL)	-0.180 **	-0.181 **	-0.181 **	-0.100	-0.184 **	-0.182 **	-0.183 **	-0.100
	(0.064)	(0.064)	(0.064)	(0.065)	(0.064)	(0.064)	(0.064)	(0.065)
ln(Market Density)	0.015 ***	0.015 ***	0.015 ***	0.004	0.016 ***	0.016 ***	0.016 ***	0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Potential Entrants	0.002 ***	0.002 ***	0.002 ***	0.002 ***	0.002 ***	0.002 ***	0.002 ***	0.002 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market Herfindahl	0.065 ***	0.066 ***	0.066 ***	0.069 ***	0.065 ***	0.065 ***	0.065 ***	0.068 ***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Airport Herfindahl	0.108 ***	0.104 ***	0.104 ***	0.102 ***	0.104 ***	0.103 ***	0.103 ***	0.101 ***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Airport Share	0.193 ***	0.193 ***	0.193 ***	0.188 ***	0.194 ***	0.194 ***	0.194 ***	0.189 ***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Earnings Pressure		0.520 ***	0.555 ***	0.559 ***	0.426 ***	0.423 ***	0.471 ***	0.473 ***
		(0.111)	(0.118)	(0.118)	(0.112)	(0.112)	(0.119)	(0.119)
Financial Constraint		0.007 ***	0.007 ***	0.007 ***	0.010 ***	0.009 ***	0.010 ***	0.010 ***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Earnings Pressure x Financial Constraint			-0.048	-0.046			-0.066	-0.064
			(0.053)	(0.053)			(0.054)	(0.054)
Rivals' Earnings Pressure					-0.725 ***	-0.843 ***	-0.839 ***	-0.862 ***
					(0.126)	(0.132)	(0.132)	(0.132)
Rivals' Financial Constraint					0.008 ***	0.006 ***	0.007 ***	0.007 ***
					(0.002)	(0.002)	(0.002)	(0.002)
Rivals' Earnings Pressure x Rivals' Financial Constraint						0.288 **	0.281 **	0.281 **
						(0.094)	(0.095)	(0.095)
Observations	201482	201482	201482	201482	201482	201482	201482	201482
R-squared	0.3632	0.3634	0.3634	0.3636	0.3635	0.3635	0.3635	0.3638
Model dof	4237	4239	4240	4241	4241	4242	4243	4244
log-likelihood	71265	71295	71296	71336	71320	71325	71326	71367
LL ratio test		61.2 ***	0.8	79.6 ***	49.6 ***	9.4 **	1.6	63.0 ***
relative to model		4.1	4.2	4.3	4.2	4.5	4.6	4.4
test dof		2	1	1	2	1	1	3

Standard errors in parentheses

Significant at 5% (*); significant at 1% (**); significant at 0.1% (***)

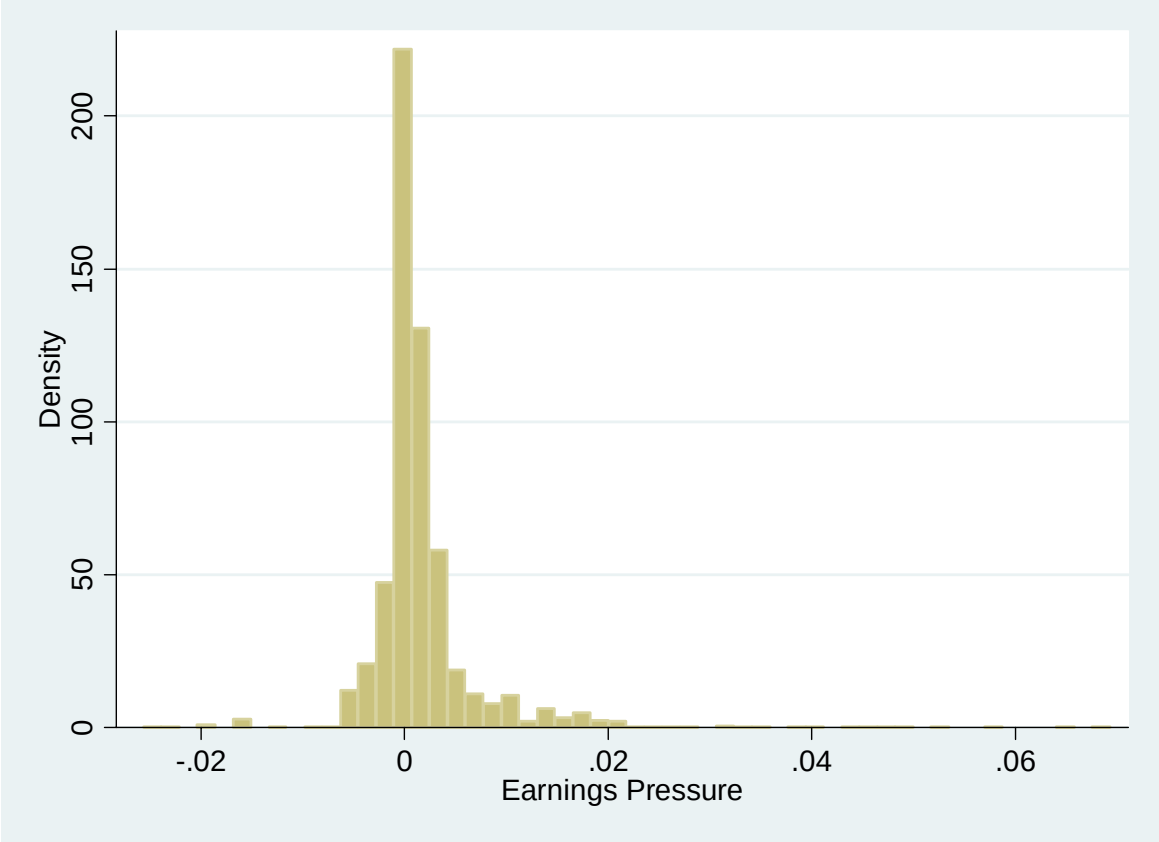

Figure 1.

Histogram of Earnings Pressure variable.