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ABSTRACT

Most of the accounting research examining the information content of earnings assumes a competitive market framework. Little research has been devoted to the value relevance of earnings announcements in regulated markets. This paper examines the information content of earnings releases under two economic conditions facing the airline industry: regulation and deregulation (i.e., competition). We hypothesize that in a deregulated (competitive) environment, there is greater competition, causing more risk and uncertainty for the investor in setting security prices. Therefore, earnings' releases provide more useful information in resolving uncertainties and in formulating and revising the investor's beliefs regarding future earnings and prices in deregulated than for regulated markets.

Three critical event periods are examined: the regulation period (1973 - 1975), the transition period (1976 - 1978), and the deregulation period (1979 - 1981). A revaluation index (RI) and a standardized revaluation index (SRI) are used to examine the extent of airline stock price revaluation in response to quarterly accounting earnings releases during the three critical event periods. The results indicate that earnings announcements have value relevance in setting security prices in both regulated and deregulated market conditions. However, the level of the market revaluation to earnings releases is dependent on market structure. The market revaluation to earnings releases is greater in a deregulated (competitive) period than in a regulated one. This result confirms the hypothesis that earnings have more value relevance in competitive markets than in regulated ones. The findings of this research have direct implications for the level of accounting disclosure and the extent of financial reporting in a given market structure. Since financial reporting is a costly process, it becomes important to identify the circumstances under which the level of financial disclosure should be expanded or reduced.

INTRODUCTION

Nature of the Problem

Investors in equity and debt securities use all publicly available information, including accounting reports and disclosures, in building expectations about the risk and earnings of target firms. In open and competitive markets, firms operate under higher levels of uncertainty than those in less competitive environments. Thus, investors employ probability models to estimate future corporate earnings. Announcements of actual earnings resolve the uncertainties associated with formulated expectations. Therefore, earnings announcements not only provide uncertainty resolution of a firm's earnings for the current period, but also serve as a benchmark for expected earnings of the next period.

Changes in security prices associated with earnings announcements have been considered evidence that the announcement of earnings provide new information, causing market participants to alter security prices. This hypothesis has been confirmed by both earlier and current empirical tests (e.g., Ball and Brown 1968; Atiase 1985; and El-Gazzar 1998). However, prior research that examined the information content of accounting earnings assumed competitive markets, but may have employed samples that contained firms from both regulated and deregulated markets. These characteristics may limit the generalizability of the conclusions on the content of earnings releases.

This paper examines the hypothesis that in regulated markets, firms enjoy some form of certainty through guaranteed markets and normal rates of return (i.e., regulation provides a buffer that can insulate a firm from unexpected changes in its operating environment). These features reduce a firm's operating risk in comparison with competitive, deregulated markets. Therefore, investors' expectations of the earnings of firms in regulated markets can be more stable and easier to forecast. One would also expect higher accuracy of financial analysts' earnings forecasts (i.e., lower forecast errors), for firms in regulated markets in comparison with firms in non-regulated markets. For example, Teets (1992) provides evidence that earnings predictability is enhanced for electric utility firms during regulated periods. Accordingly, one anticipates that the announcement of actual earnings of firms in regulated markets may not convey a significant earnings surprise (i.e., the announcement has less information content).

Deregulation of the Airline Industry

The airline industry is a unique case for testing the above hypothesis. This airline industry was regulated through guaranteed routes and fares for nearly a forty-year period, ending in 1978. Deregulation consisted of a gradual transition phase during the 1976-1978 period when the Civil Aeronautics Board, (CAB), began to voluntary relax its regulatory controls over the industry. The Airline Deregulation Act was passed on October 24, 1978, thus eliminating the regulation of the airline industry.[1]

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[1] According to Caves, et al (1983), 1976 is generally regarded as the beginning of the transition from full regulation to deregulation. Specifically, the CAB began allowing airlines considerable freedom to compete on the basis of price. As a result of the voluntary relaxation of CAB regulatory controls, the industry reported record profits of $1.2 billion and a record 62% load factor in 1978.

Given the gradual phase out of airline industry regulation, the test period in this study is divided into three sub-periods; each reflects the industry's market structure. The regulation period consists of the three fiscal years immediately preceding the beginning of the phase out in 1976; the transition period consists of the three years 1976 to 1978; and the deregulation period consists of the three fiscal years of 1979 to 1981.

The remainder of this study is organized as follows. In section 2, we discuss the role of financial information in stock price valuation in a regulated and deregulated environment. Section 3 presents the research questions and hypothesis for the study. Section 4 addresses the research design, data, and the sample. Empirical testing and research results are described in Section 5. The summary and conclusions of the study are presented in the last section of this paper.

ANALYSIS AND HYPOTHESES

The Role of Financial Information in Stock Price Valuation

In general, the role of financial information is to assist investors in formulating their beliefs about a firm's future earnings. Given a market model setting, belief revision is concerned with the expected return and variance for each investor's portfolio (e.g., Beaver 1981). The terminal value of the investor's portfolio is the expected value at some time in the future when the investor expects to liquidate his or her portfolio. The expected value is not only a function of the state (e.g., high or low cash flows) but also the probability of the state's occurrence. The state's probabilities about future cash flows are affected by the financial information available to the investor. Based on the financial information available, the investor will allocate his or her resources to the portfolio of securities that will maximize expected value. However, the value of financial information depends on the level of certainty or uncertainty facing the investor.

The Role of Financial Information in a Regulated Industry

Guaranteed markets and rates created an environment of increased certainty for the investor when the airline industry was regulated. Fluctuations in estimates of present and future earning power were minimal. With stability in financial measures such as return on equity, projections could be made with greater accuracy. Regulation allowed the investor to determine expected returns and variances due to stability of states and state probabilities.

Theoretically, if rates are constantly revised by the regulatory commission, revenues will equal operating and capital costs (Teets 1992). This continuous rate revision process ensures that the standard or "normal" industry rate of return is achieved. Thus, expected and actual results should be equal under regulation, and book values

should gain higher alignment with market values (Nwaeze 1998). Based on this theory, it seems that accounting earnings and other financial information provide insignificant insight and play a limited role in resource allocation in a regulated industry. According to Beaver (1981), with certainty, knowledge of financial information is not required. Once security value is determined, an earnings concept is redundant and the accrual process is unnecessary, since observing prices is sufficient. In theory, the same decision would be made by the investor regardless of the information signaled in the financial statements. This notion may find some support in an early study of the airline industry. Summers (1968) examined twenty-three airlines and tested whether alternative accounting measures had a significant impact on security prices. Summers concluded that investors were indifferent to the accounting measures used. Although financial statements provided some information to the market, unbiased airline security pricing resulted under any alternative accounting measurement. That is, many different measures of accounting earnings signaled the same information to market participants.

Recent research (Blacconiere et al. 2000 and Nwaeze 1998) indicates that the assumed continuous rate revision process may not exist in practice, and the regulatory commission may only revise rates periodically. Rate revision is required when changes in a firm's operating environment cause rates of return to deviate from the standard ("normal") levels set by the commission (i.e., there are unexpected earnings announced). The delay in rate revision is called a regulatory lag.

When there is a regulatory lag, the cash flows associated with unexpected earnings may persist for a longer period of time. Thus, the unexpected earnings announcement can be associated with a material stock price reaction. In addition, a stock price reaction to unexpected earnings could also result when the manager of a regulated firm is given an incentive to operate efficiently within the regulatory structure. Here, the cash flows associated with the unexpected earnings are also made more permanent and could elicit a stock price reaction to earnings announcements.

Conversely, Teets (1992) notes rates may be revised more quickly (i.e., the regulatory lag is not too long) and incentive regulation may not be a significant factor. In this case, uncertainty is reduced and the future cash flows associated with the unexpected earnings announcement would not persist. As a result, the stock price reaction to the earnings announcement would be less significant for a regulated firm relative to the deregulated firm.

The Role of Financial Information in a Deregulated Industry

Guaranteed markets and standardized or "normal" fare levels (i.e., monopoly rents) were lost with the introduction of airline industry deregulation in 1979. The industry became subject to intense competition and uncertainty. Competitive and cost factors changed drastically with the modification of regulatory practices. Within a competitive market structure, reliable estimates of present and future earning power are

impossible without significant, additional financial information and analyses (Cottle, Murray, and Block, 1988).

A conceptual relationship between accounting earnings and the price of a security is created when uncertainty is introduced into the model: (1) a link between security price and future dividends; (2) a link between future dividends and future earnings, and (3) a link between future earnings and current earnings (Beaver 1981). Here, accounting earnings are viewed, from an information perspective, as a source of information used by investors in the process of assessing the value of a security. In fact Balacconiere et al. (2000) claims that earnings have had greater valuation relevance during the deregulated periods of the electric utility industry.

In a deregulated and competitive market, the role of financial information as a resource allocator is expanded. After the deregulation of the airline industry, investors increased risk regarding their projections of expected returns and variances.[2] Basically, the existence of deregulation alone represents an information signal that will alter the probability that a state will occur. Under a competitive market structure, accounting information may have considerably more value to an investor for resolving uncertainty in decision making than under regulation.

However, Teets (1992) notes that under deregulation, the operating environment becomes more competitive. With increased competition, higher unexpected earnings (rates of return) may only be temporary as competitors duplicate a firm's success. Thus, unexpected earnings in a competitive environment will have implications for future cash flows that may not be permanent. Therefore, if competitive forces cause rates of return to revert to normal or expected levels quickly, then stock price reactions to an unexpected earnings release of a firm operating in a competitive market could be lower than in a similar firm operating in a regulated market.

Research Questions and Hypotheses

Based on the theoretical analysis developed in the previous section of this paper, the information content of published financial reports may be different in the deregulated airline industry.

Theoretically, one would expect that when the industry was regulated and markets and rates were guaranteed, there would be less uncertainty and risk for the investor. Regulated rates would always return to normal or standard industry levels and any unexpected earnings would only be short-lived. Here, there would be little change in

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[2] Prior literature provides mixed results regarding changes in risk with deregulation of the airline industry. For example, Davidson et al (1984) could not conclusively identify a significant beta shift in the deregulated period. Similarly, Vetsuypens and Helmuth (1988) found that there is little or no evidence that airline company betas shifted upward after deregulation. Conversely, Cavarra et al (1981) reported an upward shift in beta during the period of the debate over deregulation. Finally, Teets (1992) noted that the average betas for nonregulated firms were almost twice as large as the average betas for regulated utilities.

future cash flow expectations by investors. Therefore, future earnings would be predicted with greater accuracy and earnings announcements would provide an insignificant amount of new information for the investor.

Conversely, any unexpected earnings announced could result in more persistent cash flow changes if the regulatory commission does not continuously adjust rates to normal levels (i.e., there is significant regulatory lag), or if there are regulatory incentives for managers to operate more efficiently. In this case, earnings releases in a regulated setting could have relatively high value (information content) for the investor.

Risk and uncertainty increased with airline industry deregulation. Intense competition and changes in cost structure resulted in increased earnings volatility, which had the potential of making earnings forecasts less accurate. In addition, in a competitive environment significant unexpected earnings could result in more persistent future cash flows and elicit a significant stock price reaction.

On the other hand, with increased competition, any unexpected earnings may not result in persistent cash flow changes if competitors quickly adjust their operations to reduce or eliminate an operating advantage. Therefore, it is plausible that earnings releases in a deregulated setting could convey less valuable information to the investor in a competitive market than for the investor in a regulated market.

This paper attempts to answer the following three questions:

1. Do earnings have a value that is relevant for setting security prices in regulated markets?

2. Is the role of earnings announcements in the revision of security prices dependent on market structure?

3. Are there any differences in the level of information content of earnings announcements in competitive markets compared to regulated markets?

The above questions lead to the following testable hypotheses:

HO: *There is no difference in the information content of accounting earnings announcements in a regulated market and a deregulated (competitive) market structure.*

HA: *There is a significant difference in the information content of accounting earnings announcements in a regulated market and a deregulated (competitive) market structure.*

RESEARCH DESIGN AND DATA

Data and Sample

This is an industry specific study. Therefore, all firms in the U.S. airline industry were included in the sample. Firms were subjected to the following screening criteria: i) data availability of earnings announcements in the *Wall Street Journal Index* from the first quarter of 1973 to the fourth quarter of 1981, ii) data availability on the CRSP tapes of security returns and prices for the same period, and iii) no confounding events such as mergers, restructuring, or management earnings forecast, and other events. As a result of this screening process, the sample size ranged from 19 to 23 firms per quarter, producing a final sample of 687 total firm-quarters. Table 1 presents the sample selection and elimination process.

TABLE 1

Sample Selection and Elimination

	No. of Observations *(Firm- Quarter)*
Base Sample: (36 quarters, fiscal 1973-1981)	*864*
Sample Elimination:	
1.Firm-quarter with no data on earnings announcements in the Wall Street Journal;	96
2.Firm-quarter with no or incomplete data on CRSP daily stock returns;	54
3.Firm-quarter with confounding events such as Management earnings forecast, reorganaization, etc.) in the test period.	27
Final Sample Used in Tests	*687*

Model

This paper uses the realized unexpected security return (U_{jt}), to develop the market revaluation indices to earnings announcements. That is, revaluation indices are used to develop the market model for securities returns. The market model takes the following form:

$$R_{jt} = A_j + B_j R_{mt} + U_{jt} \tag{1}$$

$j = 1....N$, number of firms *and* $t = 1....T$, number of days.

where:

R_{jt}	=	the return on firm j in day t;
R_{mt}	=	the return on the market portfolio in day t;
U_{jt}	=	the stochastic disturbance term for firm j in day t.
A_j and B_j	=	the model parameters for firm j, representing the intercept and the R_{mt} coefficients, respectively.

The estimation period (EP) consists of the 100 (i.e., T) trading days that immediately precede, but do not include, the end of quarter Q. The test period (TP) for the two indices described below consists of two sub-periods. The first is the report period (RP) consisting of the 5=day trading window, ($t^* = -2, 0, +2$). The second is the predisclosure period (PD) and is the period from the end of quarter Q to the report period. PD is assumed to include some predisclosure information. The estimated coefficients are used to compute the unexpected returns, U_{jt}, in the test period (TP):

$$U_{jt} = R_{jt} - (A_j + B_j R_{mt}) \tag{2}$$

The following revaluation index (RI) and standardized revaluation index (SRI) are then calculated (e.g., Patell 1976 and Atiase 1985: El-Gazzar 1998, for details):

$$RI_{jq} = 1/t \sum_{t=-2}^{t=2} \frac{U_{jt}^2}{C_{jt} S_j^2} X \frac{T-4}{T-2} \tag{3}$$

$$SRI_{jq} = RI_{jt} / \left[1/P_j \sum_{t=1}^{P_j} RI_{jt} \right] \times \frac{P_j - 2}{P_j} \tag{4}$$

where:

$$u_{jt}* \quad = \quad R_{jt} - (A_j + B_j R_{mt})$$

C_{jt*} = correction factor of the variance for firm j for predictions outside the estimation period, and is calculated as:

$$C_{jt} = 1 + \frac{1}{T} + \frac{(R_{mt} - \overline{R}_{mt})^2}{\sum\limits_{k=1}^{k=T}(R_{mk} - \overline{R}_m)^2}$$

S_j^2 = the variance of the disturbance term (residuals) of firm j in the estimation period, T.

T = estimation period, 100 trading days that preceded the end of quarter, Q

P_j = predisclosure period of firm-quarter j, the P_j day period following the end of quarter, Q to the report period, t^*.

t^* = the five day trading window, (-2, 0, +2) or the report period.

q = is the quarter of the specific earnings announcement.

The revaluation indices are used here to determine the extent of share price adjustment in response to the information content of accounting earnings announcements. The essence of these revaluation indices is to measure the *ratio* of the new information conveyed by the earnings release to the information that was available during the estimation period in the case of RI, and during the predisclosure period in the case of SRI. Accordingly, a value of RI (SRI) that is greater than 1.0 implies that the earnings report conveyed more than average information during the estimation (predisclosure) period.

The cross sectional analysis of the effect of the market structure on the value relevance of earnings announcements is conducted through regressing the RI and the SRI on a scaled variable representing the market condition, competition versus regulation. The model takes the following form:

RI_{jq} and $SRI_{jq} = A_0 + A_1 (ECON_{jq} + e_{jq}$ (5)

Where:

$ECON_{jq}$ = a scaled variable that takes the value of 3 for the deregulated (Competitive) period, a value of 2 for the transition period, and a value of 1 for the regulated period.

e_{jq} = a disturbance term of the regression for firm j for quarter q.

DISCUSSION OF RESULTS

We conducted three market tests to determine the impact of regulation (i.e., economic condition) on the information content of earnings announcements. All tests covered the three critical event intervals: the regulation period, covering the years 1973 - 1975; the transition period, consisting of the years 1976 – 1978, and the full deregulation period from 1979 - 1981. These tests included an analysis of the revaluation indices (RI

and SRI) over the three test periods; an ANOVA analysis to determine whether RI and SRI were increasing with the level of competition; and a regression of the revaluation indices on the market structure.

The Revaluation Indices

The average RI and SRI measures are presented in Panel A of Table 2.

TABLE 2

Average Revaluation Index (RI) and Standardized Revaluation Index (SRI) During

the 1973 - 1981 Test Period

PANEL A: Average RI and SRI by Year

Regulation Period	RI	SRI
1973	1.22	1.15
1974	1.26	1.19
1975	1.31	1.17
Transition Period		
1976	1.42	1.26
1977	1.61	1.29
1978	1.69	1.32
Deregulation Period		
1979	1.72	1.58
1980	1.68	1.61
1981	1.67	1.52

PANEL B: ANOVA Tests that RI and SRI are Increasing as a Function of the Economy Condition

	RI	SRI
F-value	2.21	2.96
Prob. > F	0.040	0.019

Definitions:

RI and **SRI** = the revaluation index and the standardized revaluation index and calculated as stated in the previous section, during a 5-day test period (-2, 0, +2) where earnings announcement date is day zero;

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Economy Condition = a scaled variable that takes the value of 3 for competition, 2 for transition, and 1 for the regulated periods, respectively.

As noted in Panel A of Table 2, on average and for each year, the revaluation indices were higher than their expected (theoretical) means of 1.0. The amounts over the expected mean of 1.0 are statistically significant. These results indicate that, irrespective of the economic conditions of the airline industry, earnings announcements provided some new information to the market. Hence, accounting earnings announcements had information content under both economic conditions: regulation and competition. However, there is a shift in the magnitude of RI and SRI when comparing the economic conditions facing the airline industry. The average revaluation indices increased as the economy facing the airline industry moved from full regulation, through the transition period to full deregulation. This result indicates that accounting information becomes more valuable in the deregulated economy. Based on this evidence, we find some support to reject the null hypothesis of no difference in information content of accounting earnings announcements in regulated and deregulated markets.

The results of the ANOVA tests, in Panel B of Table 2, indicate that both revaluation indices were higher in the deregulated environment than during both the transition period and the regulation period. The F-values for both indices are statistically significant. These results provide additional evidence in support of rejecting the null hypothesis of no difference in the information content of accounting earnings releases in a regulated and deregulated economy.

Regression Results
Finally, the results of the regression model are presented in Table 3.

TABLE 3

Parameter Estimates of Regressing RI and SRI on Economic Conditions

(level of significance in parentheses)

$$RI_{go} \text{ or } SRI_{go} = A_0 + A_{1jt} (ECON_{go}) + e_{go}$$

Parameter Estimate	RI	SRI
A_0	-1.39	-1.45
	(0.00)[a]	(0.00)[a]
A_1	0.171	0.190
	(0.049)[a]	(0.041)[a]

A = p values shown in parentheses.

Adjusted R-squared	0.01	0.01

Definitions:

RI_{jq} and SRI_{jq} = are the revaluation index and the standardized revaluation index and are calculated as described before.

$ECON_{jq}$ = the market condition regulation/ deregulation, and is measured by a scaled variable that takes the value of 1 for the regulated period (1973 – 1975), a value of 2 for the transition period (1976 - 1978) and a value of 3 for the deregulation period (1979 - 1981).

The results presented in Table 3 indicate that the coefficients for the scaled variable representing the economic condition are positive and statistically significant. With the scaled variable taking on the value of 1 for regulation, 2 for transition, and 3 for deregulation, the positive coefficient indicates that information content of accounting earnings announcements in the deregulated/competitive economy is significantly higher than in the regulated economy. Therefore, the regression results provide additional evidence in support of rejecting the null hypothesis of no difference in information content in the regulated and deregulated environment.

SUMMARY AND CONCLUSIONS

This paper examined the information content of accounting earnings releases under the two economic conditions faced by the airline industry: regulation and deregulation (i.e., competition). Three critical event periods were examined: the regulation period (1973- 1975); the transition period (1976 - 1978), and the deregulation period (1979 - 1981). A revaluation index (RI) and a standardized revaluation index (SRI) were used to examine the extent of airline stock price revaluation in response to quarterly accounting earnings releases during the three critical event periods.

Three market tests were conducted to determine information content of accounting earnings announcements during each of the three periods (i.e., economic conditions). The first test was designed to determine if the revaluation indices reflected information content in each economic environment. The ANOVA tests and the OLS regression were used to determine if the relevance of accounting information changed the economic conditions facing the airline industry as it moved from regulation, through a transition period, to full deregulation.

The empirical results reported in this paper indicate that accounting earnings announcements have value in setting security prices in both regulated and deregulated market conditions. However, the significance of the role of earnings announcements in the revision of security prices is dependent on market structure. Our results show that the level of information content of earnings announcements is greater in a deregulated (competitive) market structure than in a regulated economy. That is, in a deregulated environment, there is greater competition, causing more risk and uncertainty for the investor in setting security prices. As a result, accounting information is more useful in the formulation and revision of investor beliefs and in setting security prices in a deregulated economy.

The findings of this research have direct implications for the level of accounting disclosure and the extent of financial reporting in a given market structure. Since financial reporting is costly, it becomes important to identify the circumstances under which the level of financial disclosure should be expanded or reduced. The study of the role of earnings and earnings announcements in regulated markets may give interested parties some insights into the appropriate level of financial reporting and disclosure in these markets.

Future research in this area could include the examination of analysts' forecast errors for airline firms in the regulated economy as compared to the deregulated market. Based on the results of this study, it is plausible to expect higher accuracy of analysts' earnings forecasts (i.e., lower forecast errors), for airline firms during a period of regulation than in a deregulated (competitive) period. Therefore, financial analysts' forecasts errors may be dependent on industry structure.

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