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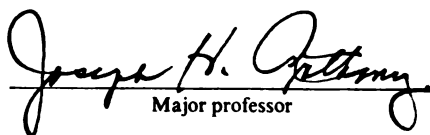
CONFLICTING INCENTIVES FOR EARNINGS MANAGEMENT
IN REGULATED COMPANIES: A STUDY OF THE UNITED
STATES AIRLINE INDUSTRY

presented by

Lydia Whitt Rosencrants

has been accepted towards fulfillment
of the requirements for

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IN REGULATED COMPANIES: A STUDY OF THE
UNITED STATES AIRLINE INDUSTRY

By

Lydia Whitt Rosencrants

A DISSERTATION

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ABSTRACT

CONFLICTING INCENTIVES FOR EARNINGS MANAGEMENT IN REGULATED COMPANIES: A STUDY OF THE UNITED STATES AIRLINE INDUSTRY

By

Lydia Whitt Rosencrants

Previous accounting studies concerning regulation have assumed that all the firms in an industry have the same incentives for managing earnings. This study presents evidence which contradicts this assumption. Using an economic model derived from capture theory, this study attempts to explain why companies within one industry would try to influence regulators differently.

This study uses the airline industry and its regulatory body, the Civil Aeronautics Board (CAB), to investigate the above issues. The industry experienced record losses during the 1970-1971 period. In response, the CAB implemented various anticompetitive policies designed to bolster the sagging profits of the more established airlines. (Brown, 1987) This study predicts that the established airlines, which benefited from regulation, would manage earnings downward in 1970 to further strengthen their argument for anticompetitive regulatory policies. The charters, however, whose growth was hindered by regulation,

would not have the same incentives as the established airlines. They are not predicted to significantly manage earnings in an attempt to influence the CAB.

This study also examines the airlines in a deregulated time period. The period surrounding 1980 was similar to that of 1970 for the airlines financially; however, the airline industry was now effectively deregulated. This similar but different scenario allows for stronger conclusions to be drawn about the earnings management found under regulation.

Tests of the hypotheses are conducted on a sample of the airlines operating in 1970 and 1980 using data collected primarily from CAB publications. Results are basically consistent with the hypotheses. The discretionary accruals of the more established airlines are found to be significantly more negative than the discretionary accruals of the charters in 1970. The discretionary accruals of the established airlines are found to be more negative in 1970 than surrounding time periods. However, contrary to the hypotheses, the discretionary accruals for the charters are more positive in 1970 than in surrounding time periods. During the 1980 time period, neither group of airlines used significantly different discretionary accruals.

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Chapter One

INTRODUCTION AND OVERVIEW

"Manipulation of accounting is a serious concern in . . . regulation . . ." (Laffont and Tirole, 515) Prior accounting studies have found evidence that firms will manage earnings either to avoid regulation (Schipper, 1989), (Cahan, 1992), (Hall, 1993), (Cahan, 1997), (Key, 1997) or encourage it (Jones, 1991). These papers, however, examine instances where all of the firms in an industry have similar motivations concerning wanting or discouraging regulation.¹ This study hypothesizes that the airline industry during the time periods of 1969-1972 and 1979-1982 offers a unique opportunity to see whether managers use accounting to influence their regulatory body in an industry where not every firm has the same regulatory goals. It also provides an opportunity to examine whether accounting impacts a regulatory body and its decisions, extending an issue not well explained by the current literature.

This introductory chapter continues in section 1.1 with a discussion of the hypotheses. Section 1.2 summarizes the research design and results. Section 1.3 gives the organization of the remainder of the paper.

¹ Jones omits two firms which opposed regulatory interference from her sample.

1.1 Overview of Hypotheses

Owen and Braeutigam (1978) hypothesize the administration of regulation

as a strategic game in which regulated entities and other interested parties struggle to achieve economic rewards. The legal rules of regulatory activity and the natural proclivities of regulators combine to create a well-defined environment within which the game is played.

To date, accounting studies of regulation have examined managerial response to certain regulatory actions. No study has attempted to explain the role of accounting in the regulatory "game" or the impact it has on the regulators. Economic studies have focused almost exclusively on explaining regulation and the actions of regulators. Little attention has been given to the actions of regulated firms and their role in the regulatory process.

This study attempts to examine the use of accounting numbers by both managers of regulated firms and the regulators themselves. Capture theory is used to explain why accounting information might have an impact on regulatory decisions and the incentives of managers in a regulatory environment. Because both the regulators' and regulated firms' motivations and actions are presented, this study gives a more balanced

and informative view of the role of accounting in the regulatory setting.

This study uses the airline industry and its regulatory body, the Civil Aeronautics Board (CAB), to investigate the above issues. During the decade 1960-1969, the airline industry enjoyed growth and prosperity. Beginning in 1969, however, fuel shortages and record inflation affected all of the airlines, from the largest international carrier to the smallest charter. The industry experienced record losses during the 1970-1971 period. In response, the Civil Aeronautics Board implemented various anticompetitive policies designed to bolster the sagging profits of the more established airlines. (Brown, 1987) These policies included restricting route expansion, thus protecting the airlines already serving a city. The CAB also began a more stringent regulation of charter airlines. Using positive accounting theory and an economic game modeled from capture theory, this study predicts that the more established airlines, which benefited from regulation, would manage earnings downward in 1970 to further strengthen their argument for anticompetitive regulatory policies. The charters, however, whose growth was hindered by regulation, would not have the same incentives as the established airlines. These

airlines are not predicted to significantly manage earnings in an attempt to influence the CAB.

No other accounting study of earnings management by regulated firms has examined how the actions of those firms change when they are no longer regulated. The airline industry provides a unique opportunity to examine accounting choice by firms facing similar economic conditions while regulated and then when deregulated. The period surrounding 1980 was very similar to that of 1970 for the airlines financially. Record inflation had once again set in, and fuel prices were on the rise. This time, however, the airline industry was effectively deregulated. This similar but different scenario allows for stronger conclusions to be drawn about the earnings management found under regulation.

1.2 Overview of Research Design and Results

Tests of the hypotheses are conducted on a sample of the airlines operating in 1970 and 1980 using data collected primarily from CAB publications. A model of accruals specific to the airline industry is presented, that allows for more powerful tests of the hypotheses. The hypotheses are tested using both linear regression and nonparametric tests. Results are basically consistent with the hypotheses. Specifically, the

discretionary accruals of the more established airlines are found to be significantly more negative than the discretionary accruals of the charters in 1970. The discretionary accruals of the more established airlines are found to be significantly more negative in 1970 than surrounding time periods. However, contrary to the hypotheses, the discretionary accruals for the charters are more positive in 1970 than in surrounding time periods. During the 1980 time period, as hypothesized, neither group of airlines used significantly different discretionary accruals.

1.3 Organization of Remaining Chapters

The organization of the remaining chapters is as follows: Chapter Two talks about the Civil Aeronautics Board and its use of accounting information; Chapter Three presents the hypothesis development; Chapter Four gives the research design; Chapter Five discusses the models, empirical tests, and results for the 1970 time period. Chapter Six discusses the hypotheses, tests, and results for the 1980 time period; and Chapter Seven gives conclusions and suggestions for further research.

Chapter Two

The Civil Aeronautics Board

Until 1978, the airline industry was fully regulated by the federal government. Almost all aspects of the airline business were overseen by a regulatory body known as the Civil Aeronautics Board (CAB). This group used several mechanisms to control the airlines, including requiring the submission of audited annual and unaudited quarterly financial statements.

This chapter begins with a brief history of the Civil Aeronautics Board in section 2.1. Section 2.2 talks about the classification system used by the CAB. The use of accounting by the Board and the unique accounting system of airlines are discussed in sections 2.3 and 2.4. Section 2.5 summarizes the chapter.

2.1 History

The CAB possessed five major instruments with which to regulate the airline industry: licensing, ratemaking, investigation and enforcement, granting of regulatory exemption, and certification of airline agreements. The three tools of primary interest in this study are licensing, ratemaking, and investigation and enforcement.

All airlines had to be certified by the CAB before they could provide transportation service in the United

States. This licensing requirement allowed the Board to exercise almost complete control over the airline industry. The Board could determine the total number of firms in the industry by limiting certification of new airlines. The CAB also exercised control over which airlines were allowed to serve a route between two markets. This allowed the CAB to determine the number of carriers operating on a particular route.

The Board exercised substantial control of airline revenues. It had the power to set the maximum and minimum fares charged by the airlines. The Board could revoke a rate, which would force carriers to modify fares or apply to the CAB for a rate revision. The CAB's primary motive in fare regulation was not matching cost and price, but ensuring overall industry profitability (Joskow, 1988). If times were good economically for the industry, the Board relaxed its regulations somewhat and allowed a small amount of route competition or discount fares. For example, the 1960's brought about record profits for the airline industry. During this decade, the CAB encouraged the development of "discount fares," lower prices for certain routes and customers. (Douglas and Miller, 1974) If the airlines' profits began declining, the CAB would begin instituting anticompetitive policies

designed to buffer airlines from economic realities.
(Brown, 1987)

The Civil Aeronautics Board was established through the Civil Aeronautics Act of 1938. This Act endows the Board with several pursuits. The two primary responsibilities given to the CAB were encouragement of air transport and regulation of air transport. The dual nature of the CAB's policy mandate creates potential conflicts. Basically these guidelines "identify a number of desirable goals and leave it up to the Board to choose which ones it will pursue." (*Congressional Weekly Quarterly Reports*, 1975) The relationship between the CAB and the airline industry, which resulted from the dual mandates of promotion and regulation, led to what has been characterized as a parent-child relationship. "The government has provided the industry with parental support and protection, while exercising in turn, a strong measure of parental control." (Kohlmeier, 1975)

This relationship was further complicated by the responsibility of the Board in encouraging competition within the industry. The Civil Aeronautics Act mandated that the Board "consider competition to the extent necessary to assure the sound development of an air transportation system." In a 1967 address, the

then chair of the CAB described the Board's role as this: ". . . the CAB stands like a guardian at the gate holding back the natural forces of competition and letting it through only to the extent necessary."

(Murphy, 1967) The Board faced pressure from different interest groups, including the airlines themselves.

Some groups encouraged the Board to restrict competition in order to encourage financial stability in the industry. These groups included the airline labor unions and the trade associations of the larger scheduled carriers.² (Brown, 1987) Other groups, primarily consumer and small-business organizations, encouraged the Board to promote more competition among the airlines.

Competing pressures led the Board to a cyclical pattern of regulating competition. The Board shifted between competitive and anticompetitive policies, depending upon the economic conditions faced by the airlines. When conditions were favorable, the Board allowed some competition among the airlines. When economic conditions threatened industry profitability,

² The labor unions included the Airline Pilots Association, International Brotherhood of Teamsters, and Transport Workers Union of America. The trunks were represented by their trade association, the Air Transport Association. The locals were represented by the Association of Local Transport Carriers.

however, the Board would retreat to anticompetitive policies in an effort to buffer the industry.

2.2 Formation of Classes by CAB

Prior to the Civil Aeronautics Act of 1938, the United States airline industry consisted of 16 airlines. This group became known as the "trunk" airlines upon passage of the 1938 Act. In the interest of fulfilling its duty to promote "sound financial conditions" in the airline industry, entry was severely restricted by the CAB until after World War II. Following the war, the Board began segmenting the industry by creating new classes of airlines designed to serve different needs. Believing that the large trunk airlines could not meet the need for air service in smaller localities, the Board created a new category of airlines known as locals in 1947. The Board attempted to prevent the locals from competing directly with the trunks by prohibiting the locals from offering nonstop service between cities served by the trunks.

The Board created the local class with the idea that they would serve smaller communities which could not be economically served by the trunks. In the years following the local class creation, however, it became clear that local airlines could not survive financially

by just serving small localities. During the period of 1950-1970, the Board gradually eliminated some of the restrictions placed on the local carriers. They were allowed to compete more directly with the trunks for routes. Local airlines remained much smaller than the trunks and typically served a limited geographic area, but they encountered little hindrance from the CAB when attempting to grow.

Prior to World War II, the CAB paid little attention to the group of airlines known then as "irregular carriers." These were basically small airlines which flew unscheduled routes. They were exempted from CAB regulation of routes and rates. Following the war, however, the CAB began to take notice of these "fringe" airlines. The combination of pilots returning from war and the boom in air travel increased competition between the irregular carriers and the trunk airlines. Because of the freedom from rate restrictions, the irregulars could charge fares far below those offered by the trunks. The irregulars could also compete directly with the trunks on routes because they were unrestricted in that area as well. Within five years of the end of World War II, the irregulars "were carrying almost 7 percent of the nation's air-passenger traffic and posing a formidable

competitive challenge to the certificated carriers."

(Behrman, 1980) Beginning a pattern that persisted up until airline deregulation in 1978, the trunks began to blame financial problems on competition from the unregulated irregulars.

In response to complaints from the trunks, the CAB began chipping away at the regulatory exemptions enjoyed by the irregulars. In 1962, the CAB created a classification for the large irregulars. They became officially known as the "supplementals." By requiring certification of these airlines, the Board was able to restrict the number and the routes they served, and thus reduce the impact on the trunks. The supplementals were still given a relative amount of freedom in selecting rates.

By attempting to restrict the competitiveness of the irregulars, the Board made its priorities clear. The financial stability of the original certified airlines, the trunks, was of primary importance. Other airlines would be certified only if they did not pose a threat to the trunks. The battle by the supplementals to increase the number of routes they could serve and the trunks to keep the competitive supplementals out of their routes would wage for years.
(Biederman, 1982)

2.3 Use of Accounting Numbers by CAB

If the Civil Aeronautics Board had not used accounting numbers when setting policy, no incentive

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would have existed for airline managers to manipulate numbers in an attempt to influence CAB decisions. Ample evidence exists, however, that the CAB did use accounting numbers provided by the airlines when determining the course of airline industry policy.

First, the CAB required all airlines, including the smaller supplementals, to submit unaudited financial information on a quarterly basis. It is apparent that the CAB used this information. The Board released quarterly airline industry economic reports which contained information found in the airlines' financial statements. The importance of timely accounting information to the CAB was stressed in its 1971 annual report to the U. S. Congress. In its accounting and reporting section, the CAB states: "The Board adopted a regulation which requires the monthly filing of a balance sheet and an income statement to permit it to timely anticipate developing problems and evaluate future prospects of the air carriers financial condition." (United States Civil Aeronautics Board Reports to Congress, 1971) It is clear that the CAB considered accounting information a very important tool in its regulation of airlines.

Second, the CAB attempted to control what accounting methods the airlines could use. It went so

far as to fight in court for uniformity of accounting numbers. (U. S. CAB Reports to Congress, 1971) If the CAB had not used and relied on these numbers, it would not have taken the time to fight over accounting procedures. For example, in its 1971-1972 Annual Reports, the CAB expressed concern over the lack of uniformity in depreciation methods used by the carriers. The 1972 report states:

The lack [of uniformity in depreciation accounting] also enables carrier management to modify the Board's regulatory determination of depreciation costs in the official regulatory reports prescribed for the carriers and to present . . . results inconsistent with the agency's determination for ratemaking purposes. Trying to erase the regulatory gap caused by court rulings, the Board adopted regulations which require . . . carriers to disclose . . . depreciation costs recognized for regulatory purposes [and] depreciation costs established by carrier management for accounting purposes...The regulation is meant to make the carriers' reports more directly usable for regulatory purposes. . .

2.4 Accounting by Airlines

"Many airline activities are unique, and, as a consequence, . . . accounting . . . (is) peculiar to the industry." (AICPA, 1981) According to the AICPA 1981 Industry Audit Guide for airlines, the revenue cycle is the most unique part of airline accounting. The majority of airline revenue is generated from ticket sales. These sales are made by several

different parties including the airline itself and travel agents. Accounting problems arise because tickets are usually sold in advance of travel. The date of sale and date of revenue recognition are not usually the same. Also, an airline may issue a ticket that includes travel on that airline as well as on a competitor. These issues combine to complicate revenue recognition. Airlines must recognize unearned revenue, known as the **air travel plan liability**, for any tickets sold for which travel has not occurred. Because of airline agreements, this number may include the liability of another airline as well, if the customer is traveling on more than one. Management must perform some estimation of this liability at year-end, because sales are made by many different entities (creating reporting lags) and the booked liability may partially belong to other airlines. This unearned liability averages around 12% of current liabilities, 3% of revenues, and 2% of total assets for the trunks and locals in this study. For the supplementals, it accounts for about 18% of current liabilities, 10% of revenues, and 6% of total assets.

Airlines have a unique prepaid expense known as **passenger traffic commissions**. These are commissions paid to travel agents for tickets sold that have not

yet been used. Like the unearned ticket revenue, the airlines may record a commission that is actually due to the agent from another airline. Also, because of the numerous agencies involved and the delays which occur in settlements, an estimate of this number must be made by management at year-end. For the trunks and locals in this study, this prepaid expense accounts for approximately 3% of current assets, 1% of revenues, and .07% of total assets. It comprises about 7% of current assets, 2% of revenues, and 1% of total assets for the supplementals.

Payroll expenses typically represent a large portion of airline operating expenses. (AICPA, 1981) Under union contracts, the airlines must usually accrue any wages owed on flight time by employees over the maximum specified in the contract. A vacation accrual is booked for estimated probable future payments based on the work done by the employee in the current period. Retroactive wages must be accrued when employees work past the expiration of their contract. The accrual is based on management's prediction of the increase in pay and benefits that will result from contract negotiations. **Accrued vacation** and **accrued compensation** each account for around 7% of current liabilities, 2% of revenues, and 1% of total assets for

the trunks and locals. Accrued vacation is about 7% of current liabilities, 3% of revenues, and 2% of total assets for the supplementals. Accrued compensation comprises around 16% of current liabilities, 8% of revenues, and 4% of total assets for the supplementals.

Airlines have two types of airplane parts which must be accounted for separately: rotatable and expendable parts. Rotatable parts are accounted for as fixed assets, while expendable parts are reported as current assets. Management has discretion over whether a part belongs in the rotatable or expendable category. Some airlines categorize the parts based on manufacturer or engineering studies. Others have a unit value limit which distinguishes the two types. Rotatable parts are capitalized and depreciated like other fixed assets. Expendable parts are typically referred to as **spare parts inventory** and are expensed as used. An **allowance for obsolescence** must be made to distribute the cost of the expendable parts over the lives of the related equipment. For the trunks and locals, spare parts inventory comprises almost 20% of current assets, 6% of revenues, and 4% of total assets. Spare parts inventory accounts for approximately 15% of current assets, 4% of revenues, and 3% of total assets for the supplementals. The allowance for obsolescence

can range anywhere from 4% to as high as 50% of spare parts inventory for the airlines in this study.

Management also has some discretion over accounts common to most industries, such as **depreciation expense, amortization expense, accounts receivable, and accounts payable**. Depreciation expense accounts for around 7% of fixed assets, 9% of revenues, and 5% of total assets for the trunks, locals, and the supplementals. Amortization expense is less than 1% of both revenues and total assets for the trunks, locals, and supplementals. Accounts receivable accounts for over 50% of current assets, 16% of revenues, and 10% of total assets for the trunks and locals. For the supplementals, accounts receivable comprises 29% of current assets, 8% of revenues, and 5% of total assets. Accounts payable is approximately 70% of current liabilities, 16% of revenues, and 11% of total assets for the trunks and locals. Accounts payable comprises 52% of current liabilities, 23% of revenues, and 13% of total assets for the supplementals.

Management must make some decisions about the accrual amounts for each of the above accounts. Accruals are traditionally defined as the change in noncash working capital minus depreciation and amortization expense. These accruals made by managers,

therefore, have an impact on the income statement of the airline.

2.5 Summary

This chapter has discussed the CAB and the role of accounting in the regulation of the airlines. Chapter three will discuss why the airlines would use accounting in an attempt to influence CAB policy.

Chapter Three

HYPOTHESIS DEVELOPMENT

This chapter describes the theory used to support the hypotheses and formally states the hypotheses which will be tested. Section 3.1 introduces capture theory and relates it to the airline industry. A model of political influence posited by Becker in a 1983 study is described in section 3.2. Section 3.3 introduces the hypotheses to be tested, and section 3.4 summarizes the chapter.

3.1 Capture theory

In their influential studies of why regulation exists, Stigler (1970), Posner (1974), and Peltzman (1976), present two versions of what is known as "capture theory." The first posits that regulatory agencies are established for the good of the public, but eventually work for the good of the industries they regulate. The second version theorizes that the agencies are created for the good of the industry in the first place. Through formalizations, capture theory now is a framework which gives the purpose of regulation as the "redistribution of incomes in favor of groups that will supply electoral rewards to the politicians who engineer the redistribution." (Owen and Braeutigam, 1978)

This formal definition of the capture theory allows the regulatory body (in this study, the CAB) to be influenced by more than one interest group. The theory says that the regulators will be most strongly influenced by the group or groups which can do the most for (or to) the regulatory body or the regulators themselves. "There is a virtual consensus among independent commentators that . . . the Civil Aeronautics Board . . . (has) used rate-setting and entry-regulating power in such ways as to prevent or reduce economic competition in regulated industries to the detriment of consumers and the benefit of regulated firms." (Quirk, 1981) One source called the CAB "the epitome of an agency 'captured' by the industry it regulates." (Behrman, 1980) Caves (1962) notes "[the Board had] a friendly attitude towards the regulated carriers and an unfriendly one toward their enemies." If it is true that the CAB's regulatory actions primarily benefited the airlines, then capture theory would say that it is because the industry was able to exercise influence over the Board. Evidence exists that this is the case.

One way an industry can wield influence over its regulatory body is by its supply of information. "It is easy to see how exclusive reliance on industry for

information might lead to decisions predominantly favoring industry interests." (Quirk, 1981) "The ability to control the flow of information to the regulatory agency is a crucial element in affecting decisions. Agencies can be guided in the desired direction by making available carefully selected facts." (Owen and Braeutigam, 1978) The CAB required a great deal of information from the airlines for use in the regulatory process. As discussed earlier, much of this information was financial in nature. Thus, the industry could potentially use accounting to influence Board decisions.

Another influence of the industry over Board members was the possibility of working in the industry at the end of Board tenure. In a study of CAB members, two-thirds responded that members with more pro-industry positions would have more opportunities for industry jobs. (Quirk, 1981) Many positions existed for ex-Board members within the industry. Jobs were available for lawyers, managers, and those who wished to serve in trade organizations. It appears that the members were aware of this opportunity and how best to maximize it while still on the Board. One member commented: "They (the airlines) wouldn't take someone who was anti-industry. . . They'd figure, 'He never

did me any good, so why should I help him?" (Quirk, 1981) In his 1990 study, Spiller found that while only 1% of CAB regulators worked in the airline industry prior to being on the Board, 15% attained employment in the industry after Board tenure. This number does not include the increase in airline patronage which flowed to lawyers and businessmen who served on the Board and then returned to private sector positions.³

Evidence also exists that certain segments of the airline industry were able to exert much more influence over the Board than others. In the study referenced above, Board members were asked how their behavior might influence job prospects in the industry. One member responded that it was not so much a pro-industry leaning that mattered, but which *segment* of the industry the member supported. He said:

I would presume that someone whose philosophy on airline regulation is diametrically opposed to that of some segment of the industry can't be considered as attractive as someone whose views are more similar.

³ On the surface, this influence over the regulators' future job prospects makes it appear that the airlines may not have needed to manage accounting numbers to sway Board members to their side. However, the regulators reported to several different groups, including Congress. They would need to be able to justify their actions using financial information. Therefore, it could be that the airlines managed earnings to provide regulators with justification for the regulators choosing actions benefiting them.

The relative importance of each segment of the industry will be addressed in sections 4A and 4C.

Biederman (1982) points out that the Board was generally unresponsive to route applications made by the supplementals, "preferring instead to protect the scheduled carriers from this potential source of competition." These sources indicate that the Board was not actually captured by the entire industry, but was far more influenced by the trunks and locals.

3.2 Model of Political Influence

In his 1983 study, Becker models the political game played by interest groups who are competing for influence, and therefore, increased incomes, from regulatory bodies. He refers to these interest groups as "pressure groups," and posits that "competition among these pressure groups for political influence determines the equilibrium structure of taxes, subsidies, and other political favors." (Becker, 1983) This study uses Becker's model to predict the actions taken by the two groups of interest, the trunks and locals (called "supporters" in this study), and the supplementals (referred to as "dissenters" for the purposes of this study).

Becker does not limit taxes and subsidies to their narrowest definitions. Taxes include "hidden taxes" or

any action by the regulatory body which decreases the income of a group. Subsidies include "restrictions of entry into an industry" or actions which raise a group's income. (Becker, 1983) The amount of taxes raised must equal the subsidies paid. Therefore, any change in the influence of one group which affects its taxes or subsidies must affect the taxes and subsidies and, thus, the influence, of the other groups. However, no group entirely wins or loses the competition for influence ". . . because even heavily taxed groups can raise their influence and cut their taxes by additional expenditures on political activities." (Becker, 1983)

Becker uses analytical modeling to show how the optimal pressure exerted by one group is affected by a change in the pressure of another group [please see Becker (1983) for mathematical proof of the following]. Becker's model assumes two groups, s and t . Because they would receive the subsidy from the CAB, the supporters correspond to group s in Becker's study. Group t would be the dissenters as they were the group taxed.

Prior to any government action, s has full income Z_s^0 , and t has full income Z_t^0 . After redistribution, the incomes are Z_s and Z_t so that

$$(1) \quad R = Z_s - Z_s^0 \quad \text{and} \quad R = Z_t - Z_t^0$$

is the redistribution from t to s . The amount raised by the tax on t is

$$(2) \quad S = n_t F(R_t)$$

where n_t = number of members of t , F = a function of the revenue from a tax on each member of t , and R_t = the taxes paid by each member of t . The amount of the subsidy given to s is

$$(3) \quad n_s G(R_s) = S = n_t F(R_t)$$

where n_s = number of members of s , G = cost of providing the subsidy to each member of s , and R_s = the subsidy paid to each member of s .

Becker relates the amount of taxes and subsidies to the pressure exerted by the two groups and to other variables using "influence functions." The taxes raised are a function of influence which depends on the pressure (p_t) exerted by t , the pressure (p_s) exerted by s , and other variables (x),

$$(4) \quad n_t F(R_t) = -I^t(p_s, p_t, x).$$

The subsidy is also determined by this influence function,

$$(5) \quad n_s G(R_s) = I^s(p_s, p_t, x).$$

The political budget equation given in (3) above implies that as s' influence and, thus, its subsidy, increases, the taxes of t must increase and, thus, t 's influence is lowered. That is,

$$(6) \quad n_t F(R_t) = -I^t = n_s G(R_s) = I^s$$

or

$$(7) \quad I^s + I^t = 0.$$

If $R_t > 0$ and $R_s > 0$, the game would have been won by s and lost by t . However, the members of t can lower their losses by "lobbying, threats, disobedience, migration, and other kinds of political pressure to raise their influence." (Becker, 1983) The two groups compete for influence by exerting pressure. Becker models this competition by assuming that each group's production of pressure is dependent on various inputs:

$$(8) \quad p = p(m, n), \quad \text{where } m = an.$$

a = the resources spent by each member on gaining influence. This changes the incomes of s and t to

$$(9) \quad Z_s = Z_s^0 + R_s - a_s \quad \text{and} \quad Z_t = Z_t^0 + R_t - a_t$$

The income of each member is maximized when

$$(10) \quad \frac{dR_s}{da_s} = 1, \quad \text{and} \quad \frac{dR_t}{da_t} = -1.$$

Assuming that each group believes its behavior has no effect on the pressure exerted by the other group,

$$(11) \quad \frac{dR_s}{da_s} = \frac{1}{n_s G'} \frac{\partial I^s}{\partial p_s} \frac{\partial p_s}{\partial m_s} \frac{\partial m_s}{\partial a_s} = \frac{I_s^s p_m^s}{G'} = 1,$$

and using the differentiation of equation (7)

$$(12) \quad \frac{dR_t}{da_t} = - \frac{1}{n_t F'} \frac{\partial I}{\partial p_t} \frac{\partial p_t}{\partial m_t} \frac{\partial m_t}{\partial a_t} = \frac{I_t^s p_m^t}{F'} = -1.$$

The equilibrium values of a_s , a_t , p_s , and p_t can be found by solving the above equations. They also allow for the derivation of the effect on the optimal pressure exerted by one group given a change in the pressure exerted by the other. Becker finds that when the pressure exerted by t increases, so does the optimal pressure exerted by s . This is because any additional pressure exerted by s would be more effective. Interestingly, however, when s raises its pressure, the optimal pressure of t actually decreases. The negative effect on I of any additional pressure by t is lessened. The next section will apply Becker's modeling and findings to the airline industry.

3.3 Hypotheses

During the period of 1960-1969, the airline industry enjoyed growth and prosperity. The Board allowed some price competition. However, the end of the decade brought a decline in industry profits. In response, the CAB invoked an anticompetitive policy. The granting of new routes was considerably curtailed. The Board went so far as to declare a "route

moratorium" to prevent airlines from expanding into new routes. Price competition was also stymied. The Board's more liberal stance on discount fares was quickly changed to one of complete elimination. While the Board had approved of the fares only a few years earlier, suddenly "discount fares were 'unduly discriminatory' and (the Board) ordered their termination." (Brown, 1987)

The anticompetitive policies of the CAB were welcomed by some airlines, and fought by others. The trunk and local airlines ("supporters" in this study) generally supported the efforts of CAB to bolster sagging profits. Having most routes already well established, they benefited when the CAB prevented other airlines from expanding into their territory. In his 1985 study, Becker states that "subsidized groups try to limit the entry of additional members because that dilutes the gains of the established members." The supporters also gained when the Board disallowed discount fares. The trunk airlines were shackled with labor contracts and lease agreements which left them unable to compete (pricewise) with smaller, younger airlines. (Brown, 1987) These restrictions on entry and price were considered a subsidy to the trunk and local airlines in Becker's 1983 study.

Other airlines ("dissenters" in this study) resented the interference. They were hindered by the CAB's protection of incumbents by restricting entrances to routes. These airlines, which in general could operate more efficiently than the established airlines, were also hindered by the CAB's anticompetitive pricing policies. (Brown, 1987) For these airlines, entry into new markets was hindered because the CAB "generally (preferred) . . . to protect the scheduled carriers from this potential source of competition." (Biederman, 1982) Also, at the beginning of the economic downturn, the CAB introduced several new restrictions on pricing by supplementals. All of these actions of the CAB were classified as taxes in the 1983 Becker study, as they would have the effect of reducing the earning potential of the supplementals.

Becker models influence as a function of the pressure exerted by the two groups and other variables. Some of the methods the two groups of airlines were able to use to exert pressure are presented in Section 3A. One of these methods is control over the information presented to the CAB. The airlines could exert some control over the information through earnings management.

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Many accounting studies have attempted to show that firms influence regulatory bodies by manipulating accounting numbers. Early positive accounting studies use firm size to proxy for firm response to regulation. (Watts and Zimmerman, 1986) These studies assume that larger firms would be subject to more regulatory actions than smaller firms, and would thus choose more income-decreasing accruals in an attempt to avoid scrutiny by regulators. Some studies have found support for this proxy (Zimmerman, 1983), (Christie, 1990), (Omer, Molloy, and Ziebart, 1993), while the results of other studies have been inconsistent with this theory (Porcano, 1986), (Moyer, 1990), (Kern and Morris, 1992).

More recent studies examine specific regulatory actions and look at the response of companies affected by such actions. The first study which shows that companies manage earnings to achieve regulatory goals is Jones (1991). She finds that managers choose income-decreasing accruals when attempting to obtain import relief from the US International Trade Commission. Jones theorizes that the companies in her sample wish to encourage increased protection from competition from the regulatory body. They want to appear as if they are being injured by competition. To

accomplish this, the firms manipulated income downward. Other studies of the use of accounting in regulatory settings (Cahan, 1992), (Hall, 1993), (Key, 1997), and (Cahan, Chavis, and Elmendorf, 1997) have found that firms under regulatory scrutiny will choose income-decreasing accruals. These studies are not as applicable to this study, because the firms examined were trying to discourage regulatory interference as a result of good financial performance.

Evidence exists that firms use accounting numbers in an attempt to influence regulators. This study, however, is trying to show how two different groups of firms in the same industry used accounting numbers differently to influence a regulatory body. Becker's model of political influence from his 1983 paper supports this study. In the political game played out in the early 1970's, the supporters were attempting to gain a larger subsidy, and the dissenters wished to avoid a larger tax. Becker's results state that the subsidized firms, in this case the supporters, can increase their subsidy by increasing the pressure they exert on the regulator. Therefore, the supporters would want to increase pressure on the CAB. In this study, the method of pressure being tested is the firms' manipulation of discretionary accruals.

Manipulating earnings upward at this stage of the game would not have helped the supporters. This strategy would decrease the likelihood that the CAB would implement anticompetitive strategies. After the measures were enacted, it might be in the interest of the supporters to show that the measures were helping by reporting better income numbers, but that is not the time period of interest in this study. Following Jones (1991), these firms would use income-decreasing accruals in an attempt to encourage regulatory interference.

Hypothesis 1: Discretionary accruals for the supporter firms are significantly more negative in 1970 than in other time periods.

Becker also finds that if the subsidized firms are increasing pressure, the optimal pressure exerted by the taxed firms is lowered. Therefore, this study purports that the dissenters would not have manipulated accounting numbers in an attempt to influence the CAB. They did not have an incentive to exert more pressure on the CAB.

Hypothesis 2: Discretionary accruals for the dissenter firms are not significantly different in 1970 than in other time periods.

Because this study includes both publicly-traded and non-publicly traded firms, the data will be pooled

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and a dummy variable for public status will be included. Hypothesis 3 concerns this test.

Hypothesis 3: Discretionary accruals for the supporter firms are significantly more negative in 1970 than discretionary accruals for the dissenter firms.

Tests of Hypotheses 1 and 2 are necessary (as opposed to just testing Hypothesis 3). While tests of Hypothesis 3 will indicate whether the supporters used more negative accruals in 1970 than the dissenters, the tests will not show in which direction (if any) the dissenters managed accruals.

3.4 Summary

This chapter contains the development of the three hypotheses which predict the behavior of the two groups of airlines in 1970. The supporter airlines are predicted to have significantly more negative discretionary accruals in 1970 than in other time periods, while the discretionary accruals of the dissenters are not predicted to be significantly different. The research design used to test the three hypotheses is explained in Chapter Four.

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Chapter Four

RESEARCH DESIGN

This chapter details the research design used to test the hypotheses. Section 4.1 details the sample selection and data collection. Section 4.2 discusses the time period selection. Section 4.3 talks about the airlines during the selected time period. The chapter is summarized in section 4.4.

4.1 Data

In the United States Civil Aeronautics Board Reports to Congress, the CAB lists all carriers certified in 1970. This was used to identify sample firms. The 1970 report lists 11 trunk carriers, 9 local service carriers, and 13 supplementals. Several firms were omitted from the sample due to merger activity that occurred during the investigation period. The final sample consists of 23 firms over five years, two firms over four years, and one firm over three years. Five years of data are used when available to increase the number of observations. Table 1 lists the sample firms.

The CAB released annually-audited data on the airlines known as Air Carrier Financial Statistics. Information given for each individual airline includes a detailed balance sheet and income statement. This

TABLE 1

List of Sample Firms

Airline Name	CAB Classification	Trading Status	Study Classification
American Airlines	Trunk	Public	Supporter
Braniff Airways	Trunk	Public	Supporter
Continental Air Lines	Trunk	Public	Supporter
Delta Air Lines	Trunk	Public	Supporter
Eastern Airlines	Trunk	Public	Supporter
National Airlines	Trunk	Public	Supporter
Northwest Airlines	Trunk	Public	Supporter
Trans World Airlines	Trunk	Public	Supporter
United Air Lines	Trunk	Public	Supporter
Western Air Lines	Trunk	Public	Supporter
Allegheny Airlines	Local	Public	Supporter
Frontier Airlines	Local	Public	Supporter
Mohawk Airlines	Local	Public	Supporter
North Central Airlines	Local	Public	Supporter
Ozark Airlines	Local	Public	Supporter
Piedmont Aviation	Local	Public	Supporter
Southern Aviation	Local	Public	Supporter
Texas International Airlines	Local	Public	Supporter
American Flyers Airlines	Supplemental	Public	Dissenter
Capitol International Airways	Supplemental	Public	Dissenter
Johnson Flying Service	Supplemental	Non-public	Dissenter
Modern Air Transport	Supplemental	Non-public	Dissenter
Overseas National Airways	Supplemental	Public	Dissenter
Purdue Airlines	Supplemental	Non-public	Dissenter
Saturn Airways	Supplemental	Public	Dissenter
Trans International Airlines	Supplemental	Non-public	Dissenter
World Airways	Supplemental	Public	Dissenter

financial statement information is provided for all certified airlines, which allows this study to include non-publicly traded airlines and increase the sample size. Twenty-two of the 27 sample firms are publicly-traded.

Descriptive statistics for the two groups in the event year, 1970, and the two years surrounding it, are provided in Tables 2 (supporters) and 3 (dissenters). Table 2 indicates that while average revenues increased for the supporter group over all three years, average income decreased in 1970. Both average and median accruals decreased for this group between 1969 and 1970, and increased between 1970 and 1971. Table 3 shows that average revenues decreased between 1969 and 1970 for the dissenters. Average income decreased in 1970 and 1971, but median income increased. Average accruals for the dissenters took a different path from those of the supporter companies. Both average and median accruals were more positive in 1970 than in 1969, and more negative in 1971 than in 1970.

4.2 Time Period Identification

The selection of the time period of predicted earnings management results from a review of CAB documents, pertinent literature, and firms' annual reports. The CAB first publicly expressed concern

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TABLE 2
DESCRIPTIVE STATISTICS
SUPPORTER AIRLINES
(000'S OMITTED)
n=18 per column

ACCOUNT	1969 MEAN STDEV MEDIAN	1970 MEAN STDEV MEDIAN	1971 MEAN STDEV MEDIAN
REVENUE	331,187 372,532 196,466	359,110 408,880 192,012	388,421 421,174 246,566
DEPRECIATION EXPENSE	27,713 30,719 14,861	30,742 36,119 15,203	31,130 35,900 13,511
AMORTIZATION EXPENSE	2,134 2,206 1,321	2,604 2,660 1,409	2,019 2,048 1,452
OBSOLESCENCE EXPENSE	3,982 5,259 1,436	4,544 6,200 1,003	5,331 7,133 1,483
NET INCOME	2,615 18,930 -2,378	-6,891 24,158 -3,333	1,692 11,763 454
CASH	15,936 14,721 8,356	17,693 14,814 14,212	22,119 18,001 16,566
ACCOUNTS RECEIVABLE	53,580 65,276 28,261	56,469 69,061 27,757	58,794 70,311 29,309
SPARE PARTS INVENTORY	17,900 21,526 6,425	20,311 25,412 9,494	21,003 25,567 10,364
PREPAIDS	2,889 3,187 1,686	3,990 3,258 2,361	3,639 3,838 2,565
OTHER ASSETS	386 864 69	450 981 68	528 912 65
GROSS PROPERTY, PLANT AND EQUIPMENT	435,507 48,974 311,090	478,066 526,935 329,404	492,829 547,739 289,904
TOTAL ASSETS	511,948 576,511 339,098	544,298 603,568 361,193	552,938 619,011 346,718

TABLE 2 CONTINUED
 DESCRIPTIVE STATISTICS
 SUPPORTER AIRLINES
 (000'S OMITTED)
 n=18 per column

ACCOUNTS PAYABLE	54,729 47,393 38,931	62,057 50,987 47,388	59,005 53,447 34,882
ACCRUED VACATION	5,554 9,582 945	6,719 11,574 1,471	7,459 12,509 1,651
ACCRUED COMPENSATION	5,815 3,171 2,319	6,038 3,101 2,274	6,096 2,981 2,697
AIR TRAVEL PLAN LIABILITY	9,200 13,319 2,829	10,578 16,715 2,470	10,888 16,206 4,469
LOAD FACTOR	.484 .044 .483	.454 .040 .446	.456 .040 .453
NUMBER OF EMPLOYEES	14,679 18,278 7,653	14,267 18,087 7,228	13,972 16,959 7,600
TOTAL ACCRUALS	-43,635 39,734 -23,859	-45,167 46,353 -24,205	-41,484 47,048 -20,362

TABLE 3
DESCRIPTIVE STATISTICS
DISSENTER AIRLINES
(000'S OMITTED)
n=9 per column

ACCOUNT	1969 MEAN STDEV MEDIAN	1970 MEAN STDEV MEDIAN	1971 MEAN STDEV MEDIAN
REVENUE	32,094 27,518 27,135	29,484 23,363 23,328	32,758 26,696 30,055
DEPRECIATION EXPENSE	2822 2233 2568	2977 2248 2688	3181 2118 3613
AMORTIZATION EXPENSE	290 223 258	280 240 278	300 218 355
OBSOLESCENCE EXPENSE	340 456 185	340 428 193	386 479 216
NET INCOME	1440 4847 1	701 1945 113	-106 4379 -301
CASH	3,821 5,367 1,236	3,807 4,909 1,289	5,057 7,899 1,445
ACCOUNTS RECEIVABLE	2,073 2,051 984	2,591 2,314 1,591	2,460 2,130 1,596
SPARE PARTS INVENTORY	1,236 3,045 2,273	1,288 2,856 2,268	1,445 3,195 2,579
PREPAIDS	535 621 419	976 981 923	629 652 542
OTHER ASSETS	624 1263 653	211 634 215	247 742 236
GROSS PROPERTY,PLAN TAND EQUIPMENT	47,601 44,183 41,891	46,114 42,096 46,306	45,333 44,937 46,441
TOTAL ASSETS	56,182 54,532 45,107	53,807 49,684 46,073	55,229 54,929 38,745

TABLE 3
DESCRIPTIVE STATISTICS
DISSENTER AIRLINES
(000'S OMITTED)
n=9 per column

ACCOUNTS PAYABLE	7,406 6,338 8,541	6,760 5,934 6,051	7,331 7,129 6,705
ACCRUED VACATION	1,057 1,551 470	935 1,163 651	1,715 1,847 1,266
ACCRUED COMPENSATION	2,208 3,055 1,059	2,209 2,471 1,323	2,422 2,488 1,915
AIR TRAVEL PLAN LIABILITY	3,270 3,378 2,086	3,530 3,244 1,722	3,348 3,425 2,402
LOAD FACTOR	.64 .13 .65	.62 .13 .64	.64 .12 .65
NUMBER OF EMPLOYEES	695 1,006 375	704 920 400	783 939 547
TOTAL ACCRUALS	-6,227 6,568 -4,721	-2,755 2,511 -1,859	-3,996 2,776 -4,078

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about declining airline profits in 1969. Several books about the events of this period in airline history also note the decline in profits during the 1969-1971 timeframe.

The CAB published a quarterly summary of airline financial results known as The Quarterly Airline Industry Economic Report. This report detailed the financial condition of the industry, including information about airline profits, revenues, expenses, load factors, and rates of return. The reports indicate that the period of July 1970-March 1971 was the worst time for the airlines financially in the history of their existence. They experienced record losses during this time, as well as posting the lowest rates of return in the five years shown by the report.

The Board also mentions the airlines' problems and its response to them in The United States Civil Aeronautics Board Reports to Congress. An examination of the 1969 and 1970 reports uncovered no mention of the Board adopting anticompetitive policies in an attempt to bolster sagging airline profits. The 1971 report, however, details its change in policy in response to ". . . declining traffic growth and worsening economic conditions within the industry." (US CAB Reports to Congress, 1971) The 1972 report states

that even though conditions were improving, the Board made few changes to its policy in that year. This supports the idea that the airlines used earnings management in 1970 to influence Board actions in 1971.

This information on the CAB's policies is confirmed in various books which chronicle the airlines' history. The Politics of Airline Deregulation mimics the CAB reports:

In late 1969, the airline industry began experiencing financial difficulties which were exacerbated in the early 1970s . . . The CAB responded . . . by retrenching and returning to an anticompetitive stance that discouraged rate and route competition . . . to offset declining carrier profits."

Airline Deregulation: The Early Experience states that the CAB began hearings in 1970 in response to falling airline profits. These turned into the Domestic Passenger Fare Investigation, which ultimately increased the airline rate of return the CAB deemed appropriate. Both of these sources confirm that managers would have had the most incentive to manage accruals in 1970.

4.3 The Airline Industry in 1970

Eleven of the original 16 trunks remained in business in 1970. They controlled almost 87% of the passenger market. There were nine local airlines, accounting for over 10% of the market. The 13

supplemental airlines held a little over 1% of the market. The remainder of the market was controlled by smaller segments, such as those airlines which were all-cargo.

Although it seems relatively insignificant, the larger airlines were concerned with the 1% of the market held by supplementals. A national economic recession beginning in 1969 had severe financial consequences for all three classes of airlines. In December 1970, the CAB reported that "break-even passenger load factors equaled or exceeded the actual passenger load factors for each of the carrier groups" during 1970. (Quarterly Airline Economic Report, December 1970) [Load factors are the ratio of passengers carried to the number of seats.] None of the airline groups could generate enough business to exceed break-even load factor. The 1% of the market held by the supplementals represented customers to the larger airlines which could have helped them meet or exceed their break-even point and possibly generate profits.⁴

"The scheduled airlines viewed charter carriers as

⁴ According to the December 1970 Quarterly Airline Industry Economic Report released by the CAB, the break-even load factor for the trunks for the year ended 12/31/70 was 50.1% while the actual load factor was 49.9%, a difference of .2%. The 1% market share held by the supplementals could have had an impact on the inability of the trunks to meet their break-even load factor for 1970.

economic competitors capable of diverting passengers from their markets. As scheduled profits began to decline in the late 1960's, the carriers attributed part of their losses to charter operations." (Brown, 1987)

In 1967, the airlines experienced record profits and demand for air travel. In response to these favorable conditions, the airlines invested heavily in new aircraft. They were not prepared for the recession and the resulting slow-down in market demand. According to a quarterly report released by the CAB in March 1970, operating expenses were increasing more than revenues for all airline groups. (Quarterly Airline Industry Economic Report, March 1970) At least part of this problem can be attributed to fuel shortages and increasing fuel prices, as well as record inflation. (Brown, 1987) Both of these economic problems would affect all of the airlines, regardless of size.

The CAB reports discuss the financial problems of each class of airlines. Revenues increased during 1970, reflecting fare increases implemented by the CAB in 1969. However, as stated above, operating expenses increased by a larger percentage than revenues. The supplementals experienced a decline in operating profit

of 3% in the first quarter of 1970. For the trunks, expenses increased by 12% from the first quarter of 1969 to the first quarter of 1970, while revenues only increased by 4.7%. (Quarterly Airline Economic Report, March 1970)

Changes in several financial items from 1969 to 1970 are given for both groups in Table 4. Scaled revenues increased for both groups in 1970, at statistically the same rate. This confirms the CAB's reports of increasing revenues. The scaled change in cash did not increase or decrease significantly between 1969 and 1970 for either group. These two financial items support the idea that the groups faced similar economic circumstances. Scaled income did not significantly change for the dissenters in 1970, but significantly decreased for the supporter companies. Average scaled accruals significantly increased for the dissenters, but significantly decreased for the supporter companies. Although median scaled accruals are not significantly more negative in 1970 than 1969 for the established companies, expectations modeling of accruals (performed in Section 5) allows for the assessment of whether the actual scaled accruals are more negative than expected scaled accruals given other financial statement information. The difference between

TABLE 4
CHANGES IN FINANCIAL ITEMS
COMPARISON OF SUPPORTER VS. DISSENTER AIRLINES
YEAR=1970

ACCOUNT	SUPPORTERS n=18 MEAN STDEV (t:mean=0) MEDIAN [t:median=0]	DISSENTERS n=9 MEAN STDEV (t:mean=0) MEDIAN [t:median=0]	SUPPORTERS vs DISSENTERS Difference in means (t: difference in means=0) [t: difference in medians=0]
SCALED CHANGE IN ACCRUALS	-.0163 .0518 (t=-1.33)* -.0045 [t=.368]	.0631 .0957 (t=1.98)** .0602 [t=1.88]**	-.0794 (t=-4.02)*** -.0647 [t=-3.655]***
SCALED CHANGE IN REVENUE	.0631 .1055 (t=2.53)*** .0672 [t=2.70]***	.0469 .0971 (t=1.45)* .0147 [t=.459]	.0162 (t=.272) .0525 [t=.665]
SCALED CHANGE IN NET INCOME	-.0176 .0390 (t=-1.97)** -.0216 [t=2.35]**	.0047 .0433 (t=.326) .0109 [t=.758]	-.0223 (t=1.79)** -.0325 [t=1.71]**
SCALED CHANGE IN CASH	.0025 .0234 (t=.453) .0011 [t=.199]	.0025 .0354 (t=.212) .0072 [t=.616]	0 (t=0) -.0061 [t=.200]

$$\text{Scaled change in account}_i = \frac{\text{Account}_{i,1970} - \text{Account}_{i,1969}}{\text{Total Assets}_{i,1969}}$$

* Statistically significant at alpha < .10 (two-tailed test)

** Statistically significant at alpha < .05 (two-tailed test)

*** Statistically significant at alpha < .01 (two-tailed test)

the scaled change in accruals in 1970 for the two groups is significant.

While the different classes of airlines did not operate in the same manner, they all experienced financial troubles in the early seventies and were subject to governance by the same regulatory body. The CAB also considered the different classes similar enough to lump them together when describing many of the economic occurrences of this time period, as evidenced by quarterly reports.

4.4 Summary

This chapter describes the sample selection and time period selected to test for earnings management. Chapter five will discuss the models used to test the hypotheses and give the results.

Chapter Five

EMPIRICAL TESTS

This chapter presents the models used to test the hypotheses, as well as the results of those tests. Section 5.1 presents the traditional tests of earnings management. Sections 5.2 and 5.4 discuss the models used to test the hypotheses. Sections 5.3 and 5.5 give the results of linear regression. Section 5.6 discusses the nonparametric tests performed. Section 5.7 details the sensitivity analysis, and section 5.8 summarizes the chapter.

5.1 Traditional Models of Accruals

Earnings management occurs in various ways. The two methods most commonly examined by researchers are manipulation of accruals and changes in accounting methods. This study examines managers' use of discretionary accruals as opposed to switches of accounting methods.⁵ Changes in accounting methods require disclosure in financial statements, and thus, could have easily been undone by the CAB. This seems even more likely in light of the CAB's statement that it was aware airlines were "modifying"

⁵ The financial statements of the publicly-traded companies were examined for changes in accounting methods during this study's time period. No significant changes were found.

depreciation costs to influence the Board (see Section 2).

Managerial manipulation of accruals, however, is not easily detectable. Even if the CAB was aware of those actions, they may not have had the means or the motive to undo management's actions. Jones (1991) argues that regulators have less incentive to undo managerial manipulation than other parties such as unions because the regulators have no real payoff for adjustment. Also, if the regulators were "captured," and evidence has been offered to show they were (see Sections 2 and 3), then it is doubtful the Board would have been motivated to spend the time and resources necessary to adjust the financial numbers.

Total accruals can be separated into two components: accruals over which management exercises some degree of control (discretionary accruals) and those which are automatic (nondiscretionary accruals). Total accruals are the change in noncash working capital minus depreciation and amortization expense. Earnings management literature hypothesizes that management uses the discretionary component of accruals to achieve some goal.

Total accruals are traditionally modeled as:

$$TA_{it} = -Dep_{it} - Amort_{it} + (CA_{it} - CA_{it-1}) - (CL_{it} - CL_{it-1})$$

where:

TA_{it} = Total accruals for firm i at time t
 Dep_{it} = depreciation expense for firm i at time t
 $Amort_{it}$ = amortization expense for firm i at time t
 CA_{it} = current assets excluding cash for firm i at
time t
 CL_{it} = current liabilities for firm i at time t

Nondiscretionary accruals are the portion of total accruals that can be explained by regressing total accruals on a set of explanatory variables. Some accruals models {(Healy, 1985), (DeAngelo, 1986)} assume that nondiscretionary accruals are constant over time. Since total accruals are composed only of nondiscretionary and discretionary accruals, it follows from these models that any changes in total accruals are due to changes in discretionary accruals.

Jones (1991) developed a model that relaxes the constancy assumption about nondiscretionary accruals by allowing for changes in economic circumstances encountered by firms. A variation of this model (known as the modified Jones model) was proposed by Dechow, Sloan, and Sweeney (1995). The modified Jones model is very general; it is not designed for use in studying a specific industry. The unique characteristics of the airline industry allow for improvements to the model which should increase its power and specificity.

The modified Jones model proposed by Dechow, Sloan and Sweeney (1995) is:

$$TA_{it}/A_{it-1} = \alpha [1/A_{it-1}] + \beta_1 [(\Delta Rev_{it} - \Delta Rec_{it})/A_{it-1}] + \beta_2 [PPE_{it}/A_{it-1}] + \varepsilon_{it}$$

where:

TA_{it} = total accruals for firm i in year t
 A_{it-1} = total assets for firm i in year t-1
 ΔRev_{it} = revenues for firm i in year t less revenues for firm i in year t-1
 ΔRec_{it} = accounts receivable for firm i in year t less accounts receivable for firm i in year t-1
 PPE_{it} = gross property, plant and equipment for firm i in year t

Property, plant, and equipment is included in the model to control for the part of depreciation expense that is nondiscretionary. Change in revenue is included to account for its effects on working capital accounts. No hypothesized direction exists for the change in revenue, however. A change in revenue can lead to income-increasing changes in some working capital accounts, but income-decreasing changes in others. (Jones, 1991) The change in accounts receivable is subtracted from the change in revenues because the model assumes that it is easier to exercise discretion over credit sales than cash sales. All variables are scaled by the lag of total assets.

5.2 Model 1

Differences exist among studies as to what items appear in current assets and current liabilities in the model of accruals. The majority of earnings management studies use total current assets and total current liabilities and then subtract individual items. Because of this, accruals are potentially mismeasured. The data in this study were collected directly from financial statements rather than computerized databases; this allows only items over which management has some discretion to be included in current assets and current liabilities. Also, because this study addresses only the airline industry, a much more specific modeling of accruals is possible.

Accruals are modeled as:

$$TA_{it} = -Dep_{it} - Amort_{it} - Obsol_{it} + (AR_{it}-AR_{it-1}) + (Inv_{it}-Inv_{it-1}) + (PP_{it}-PP_{it-1}) + (OA_{it}-OA_{it-1}) - (AP_{it}-AP_{it-1}) - (AC_{it}-AC_{it-1}) - (AV_{it}-AV_{it-1}) - (AT_{it}-AT_{it-1})$$

where:

TA_{it} = total accruals for firm i at time t
 Dep_{it} = depreciation expense for firm i at time t
 $Amort_{it}$ = amortization expense for firm i at time t
 $Obsol_{it}$ = obsolescence expense for firm i at time t
 AR_{it} = accounts receivable for firm i at time t
 Inv_{it} = inventory for firm i at time t
 PP_{it} = prepaid expenses for firm i at time t
 OA_{it} = other current assets for firm i at time t
 AP_{it} = accounts payable for firm i at time t
 AC_{it} = accrued personnel compensation for firm i at time t
 AV_{it} = accrued vacation for firm i at time t
 AT_{it} = air traffic liability for firm i at time t

The change in revenue is included in the modified Jones model to control for changes to various working capital accounts. This measure may be useful for explaining some current accounts (such as accounts payable), but not all of them. The change in the number of employees is used to control for changes to the accrued compensation and accrued vacation accounts. The change in load factor controls for the portion of the change in the air travel plan liability which is not discretionary.

Beneish (1997) developed a model of earnings management which adds lagged total accruals to the Jones model. This follows the suggestion of Guay, Kothari, and Watts (1997) that models which include managers' economic incentives and that recognize the reversal of discretionary accruals should perform better.

A dummy variable, *Time*, is included to represent the time period of predicted earnings management. In this study, the predicted period in which managers will manipulate earnings is 1970. Additional tests are done using both 1969 and 1971 as the prediction period. Results from those tests are discussed in Section F.

Incorporating these additional variables into the modified Jones model yields the model used to test Hypotheses 1 and 2.

$$TA_{it}/A_{it-1} = \alpha[1/A_{it-1}] + \beta_1[(\Delta Rev_{it} - \Delta Rec_{it})/A_{it-1}] + \beta_2[PPE_{it}/A_{it-1}] + \beta_3[\Delta Emp_{it}/Emp_{it}] + \beta_4\Delta LF_{it} + \beta_5 Time + \beta_6[TA_{it-1}/A_{it-1}] + \varepsilon_{it}$$

where:

- TA_{it} = total accruals for firm i in year t
- A_{it-1} = total assets for firm i in year t-1
- ΔRev_{it} = revenues for firm i in year t less revenues for firm i in year t-1
- ΔRec_{it} = accounts receivable for firm i in year t less accounts receivable for firm i in year t-1
- PPE_{it} = gross property, plant and equipment for firm i in year t
- Emp_{it} = number of employees for firm i in year t
- ΔEmp_{it} = number of employees for firm i in year t less number of employees for firm i in year t-1
- ΔLF_{it} = average load factor for firm i in year t less average load factor for firm i in year t-1
- $Time$ = 1 if year = 1970, otherwise 0
- TA_{it-1} = total accruals for firm i in year t-1

A negative coefficient was expected for property, plant, and equipment because it is related to depreciation expense, an income-decreasing accrual. As explained above, no expectation existed for the change in revenue. A negative expectation existed for the coefficients of the change in load factor and the change in number of employees.

The regression was run twice, once using data from the supporter airlines and again with data from the dissenter group.⁶ In regression 1, using the supporter companies, a negative coefficient was predicted for *Time*, consistent with Hypothesis 1. No prediction was made on the coefficient of *Time* in regression 2, which uses the dissenter airlines, except that it would not be significant.

5.3 Results of Regressions 1 and 2

Table 5 reports results from regressions 1 and 2.⁷ The model has an F-statistic significant below the .0001 level. In regression 1, which includes only supporter airlines, *Time* has a negative coefficient and is significant at the .017 level, consistent with Hypothesis 1. The coefficient for property, plant, and equipment is negative and significant, as predicted. Change in revenues is also significant. Neither the coefficient for the change in load factor nor the coefficient for the change in number of employees is

⁶ A Chow test is performed to test that the two equations are structurally similar. With $F_{7,112} = .214$, the null hypothesis that the parameters of the equations are the same is not rejected at $\alpha < .10$.

⁷ Regression results are based on analysis after the removal of influential observations identified using Belsley et al. (1980) procedures. These procedures identified five observations in the analysis of the dissenter firms as influential. Results based on an analysis that includes these observations are qualitatively similar to those presented.

TABLE 5

Results of Regression Estimation, 1968-1972 - Model 1

$$TA_{it}/A_{it-1} = \alpha[1/A_{it-1}] + \beta_1[(\Delta Rev_{it} - \Delta Rec_{it})/A_{it-1}] + \beta_2[PPE_{it}/A_{it-1}] + \beta_3\Delta Emp_{it}/Emp_{it} \\ + \beta_4[\Delta LF_{it}] + \beta_5 Time + \beta_6[TA_{it-1}/A_{it-1}] + \varepsilon_{it}$$

INDEPENDENT VARIABLE	EXPECTED SIGN	REGRESSION 1	REGRESSION 2 ⁶
		SUPPORTER AIRLINES Parameter Std error t-statistic p-value	DISSENTER AIRLINES Parameter Std error t-statistic p-value
Intercept		.045 .023 1.940 .0557*	-.004 .094 -.038 .9700
ΔRev	?	-.160 .052 -3.060 .0031***	-.089 0.067 -1.322 .2011
PPE	-	-.116 .0238 -4.890 .0001***	-.131 .039 -3.311 .0035***
Time	-, ?	-.031 .012 -2.437 .0171**	.052 .027 1.901 .0718*
ΔLF	-	.129 .139 .925 .3581	.037 .118 .320 .7522
ΔEmp	-	.019 .020 1.002 .3197	.103 .080 1.290 .2119
TA_{it-1}	?	-.069 .0618 -1.116 .2681	-.208 .103 -2.027 .0562*

n=

84

42

F-statistic(significance level)

8.812(.0001)

6.561(.0006)

White test p-value

.40

.61

Adjusted R²

.36

.56

* Statistically significant at alpha < .10 (two-tailed test)

** Statistically significant at alpha < .05 (two-tailed test)

*** Statistically significant at alpha < .01 (two-tailed test)

Variable definitions:

 TA_t = total accruals for firm i in year t A_{t-1} = total assets for firm i in year t-1 ΔRev_t = revenues for firm i in year t less revenues for firm i in year t-1 ΔRec_t = accounts receivable for firm i in year t less accounts receivable for firm i in year t-1 PPE_t = gross property, plant and equipment for firm i in year t Emp_t = number of employees for firm i in year t ΔEmp_t = number of employees for firm i in year t less number of employees for firm i in year t-1 ΔLF_t = average load factor for firm i in year t less average load factor for firm i in year t-1

Time = 1 if year = 1970, otherwise 0

 TA_{t-1} = total accruals for firm i in year t-1

⁶ Regression results are based on analysis after the removal of influential observations identified using Belsley et al. (1980) procedures. These procedures identified five observations in the analysis of the dissenter firms as influential. Results based on an analysis that includes these observations are qualitatively similar to those presented.

significant. Prior-period accruals also do not appear to be a significant predictor in this regression. Adjusted R^2 for regression 1 is 36%.

Model 1 has an F-statistic significant below the .0006 level in regression 2. A marginally-significant positive coefficient exists on *Time* in regression 2: .07. Consistent with regression 1, the coefficient on property, plant, and equipment is negative and significant, and the coefficients on the change in load factor and the change in number of employees are not significant. Unlike regression 1, the change in revenues in regression 2 is not significant, but the lag of accruals is significant. Adjusted R^2 for regression 2 is higher than for regression 1, 56%. Five influential observations have been removed from the analysis - three from one firm and two from another. Results including the influentials are quantitatively similar to those reported.

Hypothesis 2 predicted that *Time* would not be a significant predictor of accruals for the dissenter firms. Following Becker, these firms were not expected to increase pressure on the CAB through a significant change in discretionary accruals. It is interesting to note that the dissenters used more income-increasing positive discretionary accruals in 1970, while the

supporters did as expected and used more income-decreasing negative discretionary accruals. While Hypothesis 2 is not supported, per se, the results do not contradict the main idea of this study that the two groups attempted to influence the CAB to their side by controlling the information they provided (in this case, accounting numbers). The results support the belief that the supporters and dissenters used accounting numbers differently in their battle over anticompetitive policies.

5.4 Model 2

The sample sizes for regressions 1 and 2 are small, 18 and 9 companies respectively. Also, the supporter group is composed entirely of publicly-traded firms, while the dissenter group contains non-publicly-traded companies. In order to increase the power of the test, another regression was run which pools the data, and thus increased the sample size to 27. A dummy variable, *Stock*, was used to partition the sample into those firms that were publicly traded and those that were not. Publicly traded companies may have different incentives to manage earnings than non-publicly-traded firms. This variable is included to ensure that any differences found between the supporter and dissenter airlines are not due to trading status.

Regression 3 tests Hypothesis 3, that the discretionary accruals of the supporters are significantly more negative than the discretionary accruals of the dissenters in 1970. An interaction variable was used to test Hypothesis 3, because it is the interaction of company status (supporter vs. dissenter) and the year 1970. *Co* is a dummy variable which partitions the sample into supporter and dissenter airlines. The interaction variable, *Time*Co*, was used to test the hypothesis that the supporters and dissenters will have significantly different accruals in the predicted time period. Incorporating these additional variables into Model 1 yields Model 2, which was used to test Hypothesis 3.

$$TA_{it}/A_{it-1} = \alpha[1/A_{it-1}] + \beta_1[(\Delta Rev_{it} - \Delta Rec_{it})/A_{it-1}] + \beta_2[PPE_{it}/A_{it-1}] + \beta_3[\Delta Emp_{it}/Emp_{it}] + \beta_4\Delta LF_{it} + \beta_5Co + \beta_6Time + \beta_7[Time*Co] + \beta_8Stock + \beta_9[TA_{it-1}/A_{it-1}] + \varepsilon_{it} \quad (2)$$

where:

TA_{it} = total accruals for firm *i* in year *t*
 A_{it-1} = total assets for firm *i* in year *t*-1
 ΔRev_{it} = revenues for firm *i* in year *t* less revenues for firm *i* in year *t*-1
 ΔRec_{it} = accounts receivable for firm *i* in year *t* less accounts receivable for firm *i* in year *t*-1
 PPE_{it} = gross property, plant and equipment for firm *i* in year *t*
 Emp_{it} = number of employees for firm *i* in year *t*
 ΔEmp_{it} = number of employees for firm *i* in year *t* less number of employees for firm *i* in year *t*-1
 ΔLF_{it} = average load factor for firm *i* in year *t* less average load factor for firm *i* in year *t*-1
 $Time$ = 1 if year = 1970, otherwise 0

Co = 1 if company is a supporter airline, otherwise 0
Stock = 1 if company is publicly traded, otherwise 0

The same expectations exist for property, plant, and equipment, the change in revenues, the change in load factor, and the change in the number of employees as in Model 1. The interaction variable *Time*Co* was expected to have a negative coefficient. A negative sign on this variable indicates that the supporter companies (designated 1 in the dummy variable *Co*) had significantly more negative accruals in 1970 than the dissenter companies. A positive expectation existed for *Time* in this regression. The coefficient of *Co* should be statistically zero, since earnings management was not predicted for any period but 1970.

5.5 Results of Regression 3

Table 6 reports regression 3 results.⁹ The total accruals model is significant at the .0001 level. The coefficient on the variable of interest, *Time*Co*, is negative and significant at the .005 level, indicating support for Hypothesis 3. The property, plant, and equipment coefficient is significant in the predicted

⁹ Regression results are based on analysis after the removal of influential observations identified using Belsley et al. (1980) procedures. These procedures identified five observations in the analysis of the dissenter firms as influential. Results based on an analysis that includes these observations are qualitatively similar to those presented.

TABLE 6

Results of Regression Estimation - Model 2¹⁰

$$TA_{it}/A_{it-1} = \alpha[1/A_{it-1}] + \beta_1[(\Delta Rev_{it} - \Delta Rec_{it})/A_{it-1}] + \beta_2[PPE_{it}/A_{it-1}] + \beta_3[\Delta Emp_{it}/Emp_{it}] \\ + \beta_4\Delta LF_{it} + \beta_5Co + \beta_6Time + \beta_7[Time*Co] + \beta_8Stock + \beta_9[TA_{it-1}/A_{it-1}] + \varepsilon_{it}$$

Independent Variable	Expected Sign	Coefficient	Std. Error	t-statistic	one-tailed or (two-tailed) probability
Intercept		0.046	0.062	0.753	(0.4530)
ΔRev_{it}	?	-0.135	0.037	-3.634	(0.0004)***
PPE_{it}	-	-0.112	0.019	-5.659	0.0001***
Co		0.023	0.024	.892	(0.3746)
Time	+	0.034	0.022	1.515	0.1326
Time*Co	-	-0.074	0.026	-2.870	0.0049***
ΔLF	-	-0.036	0.076	-0.482	0.6309
ΔEmp	-	0.017	0.014	1.208	0.2298
Stock	-	-0.018	0.018	-1.033	0.3039
TA_{it-1}	?	-0.214	0.053	-4.007	(0.0001)***
n = 121			F-statistic 10.24 .42	probability .0001	
<u>Adjusted R²</u>					

* Statistically significant at alpha < .10 (two-tailed test)

** Statistically significant at alpha < .05 (two-tailed test)

*** Statistically significant at alpha < .01 (two-tailed test)

Variable definitions:

 TA_t = total accruals for firm i in year t A_{t-1} = total assets for firm i in year t-1 ΔRev_t = revenues for firm i in year t less revenues for firm i in year t-1 ΔRec_t = accounts receivable for firm i in year t less accounts receivable for firm i in year t-1 PPE_t = gross property, plant and equipment for firm i in year t Emp_t = number of employees for firm i in year t ΔEmp_t = number of employees for firm i in year t less number of employees for firm i in year t-1 ΔLF_t = average load factor for firm i in year t less average load factor for firm i in year t-1

Time = 1 if year = 1970, otherwise 0

Co = 1 if company is a supporter airline, otherwise 0

Stock = 1 if company is publicly traded, otherwise 0

¹⁰ Regression results are based on analysis after the removal of influential observations identified using Belsley et al. (1980) procedures. These procedures identified five observations in the analysis of the dissenter firms as influential. Results based on an analysis that includes these observations are qualitatively similar to those presented.

direction. The coefficients for the change in revenues and lagged total accruals are also significant. The coefficient on stock is not significant, indicating that the difference in the direction of accruals between the supporter and dissenter companies is not due to public status. The coefficients on the change in load factor and the change in number of employees are not significant. Adjusted R^2 for the model is 42%. The model appears to be well specified, with a White's test p-value = .60.

The results of this regression supply additional evidence to support the idea that the two groups of airlines used accounting differently in 1970 to help achieve varying regulatory goals. The next section will describe additional tests of Hypotheses 1,2, and 3.

5.6 Nonparametric Tests

The classic linear regression model makes many assumptions, one of which is that the underlying population is normally-distributed (Hollander, 1973). The population used in this study, the airlines existing in 1970, may or may not be normal. Therefore, in addition to the linear regressions already run, nonparametric tests were employed to test hypotheses 1-3. Following Jones (1991), Wilcoxon signed-rank tests

were performed on the discretionary accruals of: 1) only the supporter firms, 2) only the dissenter firms, and 3) the pooled data.¹¹

The prediction errors, u_{ip} , are obtained by using the OLS estimates of the regressors in models 1 and 2. u_{ip} , which represents discretionary accruals at time p , is defined as:

$$u_{ip} = TA_{ip}/A_{ip-1} - (a_i [1/A_{ip-1}] + b_{1i} [(\Delta Rev_{ip} - \Delta Rec_{ip})/A_{ip-1}] + b_{2i} [PPE_{ip}/A_{ip-1}] + b_{3i} [\Delta Emp_{ip}/Emp_{ip}] + b_{4i} [\Delta LF_{ip}] + b_{5i} [TA_{ip-1}/A_{ip-1}])$$

when only the supporter or dissenter firms are used and

$$u_{ip} = TA_{ip}/A_{ip-1} - (a_i [1/A_{ip-1}] + b_{1i} [(\Delta Rev_{ip} - \Delta Rec_{ip})/A_{ip-1}] + b_{2i} [PPE_{ip}/A_{ip-1}] + b_{3i} [\Delta Emp_{ip}/Emp_{ip}] + b_{4i} [\Delta LF_{ip}] + b_{5i} Stock + b_{6i} [TA_{ip-1}/A_{ip-1}])$$

when the pooled data are used.

For a test of Hypothesis 1, only the estimate of the 1970 discretionary accruals of the supporter firms are used. The Wilcoxon signed-ranks test indicates that the discretionary accruals are marginally significantly negative, with a significance level of .09. For Hypothesis 2, the estimates of the 1970

¹¹ The Wilcoxon signed-rank test assumes that the only difference between the population for the X observations, in this case the supporters, and the Y observations, the dissenter firms in this study, is a difference in location (Hollander, 1973). To test the validity of this assumption, the Moses ranklike test was performed to assess the dispersion of the two populations. H_0 of equal scale parameters was not rejected at $\alpha < .10$.

discretionary accruals of the dissenter firms are used. The Wilcoxon signed-ranks test results are similar to those from regression 1, test 2. The discretionary accruals of the dissenters are significantly greater than 0 at the .05 level. The pooled data were used to test Hypothesis 3. The results of the Wilcoxon signed-ranks test show that discretionary accruals of the supporter firms are significantly more negative than those of the dissenter firms at the .01 level. Results from all three Wilcoxon signed-ranks tests are reported in Tables 7.

In general, the results of the nonparametric tests agree with the linear regression results. Hypothesis 1 is not as strongly supported by the Wilcoxon signed-ranks test as it was by regression 1, test 1. Hypothesis 2 is not supported by either test. Hypotheses 3, however, was equally supported by linear regression and the Wilcoxon signed-ranks test. Overall, the nonparametric tests support the idea that accruals were manipulated by the two groups of airlines in 1970, and that they were manipulated differently.

5.7 Sensitivity Analysis

To gain more confidence in the results of the linear regressions, two additional tests were performed. First, a change was made to Model 2. The

TABLE 7
Results of Nonparametric Tests, 1968-1972
Changes in Accruals

	Supporters Only	Dissenters Only	Pooled Data
Mean	-0.011	0.049	-0.002
t-statistic	-1.300	n/a	-2.212
Median	-0.012	.044	-0.012
Significance level for Wilcoxon signed-ranks test	.09	.05	.01

changed model is identical to Model 2 except that total assets for each firm in time t were included to test for the effect of firm size on total accruals. The alternative model yields results similar to Model 2 above. The variable of main interest, $Time*Co$, has a negative and significant coefficient. Size is not a significant predictor of accruals when included in the alternative model.

Models 1 and 2 were run using both 1969 and 1971 as the predicted year of earnings management. When 1969 or 1971 was used as the prediction in either Model 1 or Model 2, the coefficient on $Time*Co$ was not significant.

5.8 Summary

This chapter contains the models used to test Hypotheses 1-3 and the results of these tests. The results of testing the hypotheses using both linear regression and nonparametric tests indicate that the two sets of airlines examined did indeed manage earnings differently during 1970. It appears that the trunks and locals, who were helped by increased regulatory interference, used more income-decreasing accruals in an attempt to encourage such interference. The supplementals, who were hurt by the CAB's anticompetitive policies, did not manage earnings in

the same way. These airlines were predicted to do nothing. The results, however, show that the supplementals chose more income-increasing accruals. The evidence supports the idea that the two groups of airlines managed accruals differently during the time period examined.

Chapter 6 adds a new time period to the study. In 1980, the airline industry experienced financial conditions very similar to those present in 1970. Inflation and fuel prices were very high. However, unlike 1970, the airline industry was now deregulated. The CAB still possessed some power, but chose not to exercise it in most instances. The same incentives for earnings management would not exist in 1980 as existed in 1970.

Chapter 6

THE DEREGULATED AIRLINE INDUSTRY

This chapter introduces a new time period to the study. In 1980, the airlines faced similar economic circumstances to those experienced in 1970, but the industry was now effectively deregulated. The different groups of airlines would not face the same incentives to manage earnings in this new time period. Section 6.1 discusses the industry under deregulation and the hypotheses for this new time period. Section 6.2 gives the data used in the tests. Section 6.3 details the model used to test Hypothesis 4, and section 6.4 gives the results of this test. Section 6.5 discusses nonparametric tests run on Hypotheses 4 and 5 and gives the results. A summary of the chapter is given in section 6.6.

6.1 The Industry and Hypotheses

Tremendous change occurred in the airline industry during the 1974-1978 time period. Partially in response to the CAB's return to anticompetitive policies in the early 1970s, calls for reforms in the regulation policies of airlines began to appear. In 1974, Senator Edward Kennedy, chair of the Judicial Subcommittee on Administrative Practices and Procedures, announced that his committee would begin

hearings on CAB regulation. In the beginning, the talk was of reformation of the CAB, not abolishment. Within the next four years, however, with the support of two Presidents and key Congressmen, and eventually even the CAB itself, the decision was made to do away with the CAB.

In 1977, noted economist Alfred Kahn ascended to the chairmanship of the CAB. Even before any actual legislation mandating deregulation was passed, Kahn began implementing policies designed to relax the regulatory constraints on the airlines. In an almost complete change of direction, the CAB began encouraging competition between the supplementals and scheduled airlines. Price competition was also permitted. Obstacles to route expansion were drastically reduced.

Showing support for competition among the airlines, Congress passed the Airline Deregulation Act of 1978 in October of that year. The CAB was not immediately abolished; instead, sunset provisions existed that extended the CAB's authority until 1985. Congress now described the CAB's role as "(placing) maximum reliance on competitive forces." The bill relaxed entry and exit restrictions, granted more pricing freedom, and made it easier to enter new routes. As stated above, the CAB had already begun

implementing these new policies more than a year earlier.

Although the CAB was not abolished until the mid-1980s, it had effectively ceased to regulate the airlines around the time the Deregulation Act was passed. One effect of this was to "(reduce) the distinction between supplemental and scheduled operations." (Brown, 1987) With pricing and route restrictions removed, the supplementals could now compete with the trunks and locals. When financial troubles struck again in 1980, the CAB was no longer there to "rescue" the trunks and locals through implementation of anticompetitive policies.

(In) the first half of 1980 . . . all but two of the major carriers ran operating losses . . . Passenger traffic had slumped throughout the industry. The price of jet fuel had doubled. And intense competition for key routes, with wild discounting of fares, had squeezed yields and forced load factors below the break-even point, turning the industry's bottom line red. (Vietor, 1994)

Adding to the debilitating effects of the above circumstances, the trunks were not at all prepared for the speed with which deregulation was occurring. They had expected a gradual diminishing of regulatory policies. "But neither the Civil Aeronautics Board nor

the host of new entrants followed the plan." (Vietor, 1994).

"Like the previous period of airline crisis (1970), macroeconomic conditions had a significant effect (on the financial problems of the airlines)." (Vietor, 1994) However, even though the two time periods were similar, the incentives once in place for earnings management by the different segments of the airline industry no longer existed in 1980. The line of distinction between the scheduled carriers and the supplementals (now called charters), once clear, was blurred. Also, no strong, powerful regulatory body existed to protect the interests of the larger airlines at the expense of the charters. The shell of the CAB that remained after the Deregulation Act had clearly signaled that it would not interfere with competition again.

With these new game rules in effect, this study hypothesizes that no differing incentives existed for earnings management between the trunk and local group and the charters. While incentives to manage earnings might still have existed in the publicly-traded airlines, no longer would the airlines be motivated to manage earnings because of regulation. This leads to Hypotheses 4 and 5:

Hypothesis 4: *Discretionary accruals for the former supporter firms are not significantly different in 1980 than in other time periods.*

Hypothesis 5: *Discretionary accruals for the former dissenter firms are not significantly different in 1980 than in other time periods.*

6.2 Data and Descriptive Statistics

The airlines continued to submit annual financial statements to the CAB until its demise in the mid-1980s. As before, both public and non-publicly traded companies provided financial information. Thirty-three airlines were operating in 1980. Only 21 of these, however, provided data over the minimum three-year period needed for this study. Sixteen of these 21 are included in the 1970 tests performed in this study. The other five began operations in the time period between 1973-1979. Table 8 lists the 21 airlines used to test Hypotheses 4 and 5.

6.3 Empirical Tests 1978-1982

The same models will be used for the testing of the 1978-1982 time period as were used for the 1968-1972 time period. Accruals are modeled as:

$$TA_{it} = -Dep_{it} - Amort_{it} - Obsol_{it} + (AR_{it} - AR_{it-1}) + (Inv_{it} - Inv_{it-1}) + (OA_{it} - OA_{it-1}) - (AP_{it} - AP_{it-1}) - (AC_{it} - AC_{it-1}) - (AV_{it} - AV_{it-1}) - (AT_{it} - AT_{it-1})$$

where:

TA_{it} = total accruals for firm i at time t
 Dep_{it} = depreciation expense for firm i at time t
 $Amort_{it}$ = amortization expense for firm i at time t

TABLE 8

List of Sample Firms - 1979-1982

Airline Name	CAB Classification	Trading Status	Study Classification
American Airlines	Trunk	Public	Supporter
Braniff Airways	Trunk	Public	Supporter
Continental Air Lines	Trunk	Public	Supporter
Delta Air Lines	Trunk	Public	Supporter
Eastern Airlines	Trunk	Public	Supporter
Northwest Airlines	Trunk	Public	Supporter
Trans World Airlines	Trunk	Public	Supporter
United Air Lines	Trunk	Public	Supporter
Western Air Lines	Trunk	Public	Supporter
Frontier Airlines	Local	Public	Supporter
Ozark Airlines	Local	Public	Supporter
Piedmont Aviation	Local	Public	Supporter
Republic Airlines	Local	Public	Supporter
Texas International Airlines	Local	Public	Supporter
USAir	Local	Public	Supporter
Capitol International Airways	Charter	Public	Dissenter
Evergreen Airways (formally Johnson Flying)	Charter	Non-public	Dissenter
Rich Airways	Charter	Non-public	Dissenter
Transamerica Airways	Charter	Non-public	Dissenter
World Airways	Charter	Public	Dissenter
Zantop Airways	Charter	Non-public	Dissenter

$Obsol_{it}$ = obsolescence expense for firm i at time t
 AR_{it} = accounts receivable for firm i at time t
 Inv_{it} = inventory for firm i at time t
 PP_{it} = prepaid expenses for firm i at time t
 OA_{it} = other current assets for firm i at time t
 AP_{it} = accounts payable for firm i at time t
 AC_{it} = accrued personnel compensation for firm i at time t
 AV_{it} = accrued vacation for firm i at time t
 AT_{it} = air traffic liability for firm i at time t

Please see Section 5.2 for a detailed explanation of this model.

The model used to test Hypotheses 4 is as follows:

$$\begin{aligned}
 TA_{it}/A_{it-1} = & \alpha [1/A_{it-1}] + \beta_1 [(\Delta Rev_{it} - \Delta Rec_{it})/A_{it-1}] + \\
 & \beta_2 [PPE_{it}/A_{it-1}] + \beta_3 [\Delta Emp_{it}/A_{it-1}] + \\
 & \beta_4 [\Delta LF_{it}/A_{it-1}] + \beta_5 Time + \beta_6 [TA_{it-1}/A_{it-1}] \\
 & + \varepsilon_{it} \quad (1)
 \end{aligned}$$

where:

TA_{it} = total accruals for firm i in year t
 A_{it-1} = total assets for firm i in year t-1
 ΔRev_{it} = revenues for firm i in year t less revenues for firm i in year t-1
 ΔRec_{it} = accounts receivable for firm i in year t less accounts receivable for firm i in year t-1
 PPE_{it} = gross property, plant and equipment for firm i in year t
 Emp_{it} = number of employees for firm i in year t
 ΔEmp_{it} = number of employees for firm i in year t less number of employees for firm i in year t-1
 ΔLF_{it} = average load factor for firm i in year t less average load factor for firm i in year t-1
 $Time$ = 1 if year = 1970, otherwise 0
 TA_{it-1} = total accruals for firm i in year t-1

The regression will be run only with the trunks and locals (the former supporter firms); thus only

Hypothesis 4 will be tested using linear regression. There are 15 firms in the trunk and local classification, while only six airlines compose the charter sample. Six is not a large enough sample to provide meaningful results from linear regression. Hypothesis 5 will be tested using nonparametric tests.

A negative coefficient was expected for property, plant, and equipment because it is related to depreciation expense, an income-decreasing accrual. No expectation existed for the change in revenue. A negative expectation existed for the coefficients of the change in load factor and the change in number of employees. The coefficient on *Time* in this regression was not expected to be significant, following Hypothesis 4.

6.4 Results of Regression 4

Table 8 reports results from regression 4. The model has an F-statistic significant below the .003 level. As predicted, *Time* is not significant. The coefficient for property, plant, and equipment is negative and significant, as predicted. Change in revenues and prior-period accruals are also significant. Neither the coefficient for the change in load factor nor the coefficient for the change in

TABLE 9

Results of Regression Estimation, 1979-1982

$$TA_{it}/A_{it-1} = \alpha[1/A_{it-1}] + \beta_1[(\Delta Rev_{it} - \Delta Rec_{it})/A_{it-1}] + \beta_2[PPE_{it}/A_{it-1}] + \beta_3[\Delta Emp_{it}/Emp_{it}] + \beta_4\Delta LF_{it} + \beta_5 Time + \beta_6[TA_{it-1}/A_{it-1}] + \varepsilon_{it}$$

Independent Variable	Expected Sign	Coefficient	Std. Error	t-statistic	one-tailed or (two-tailed) probability
Intercept		-0.129	0.214	-0.605	(0.5486)
ΔRev_{it}	?	-0.077	0.025	-3.081	(0.0037)***
PPE_{it}	-	-0.047	0.024	-1.999	0.0525**
$Time$	?	0.006	0.011	-0.535	(0.5956)
ΔLF	-	-0.036	0.114	-0.322	0.7491
ΔEmp	-	0.002	0.012	0.174	0.8631
TA_{it-1}	?	-0.079	0.035	-2.252	(0.0299)**
n = 121			F-statistic 4.013		probability .0031
Adjusted R ²	.28				

* Statistically significant at alpha < .10 (two-tailed test)

** Statistically significant at alpha < .05 (two-tailed test)

*** Statistically significant at alpha < .01 (two-tailed test)

Variable definitions:

TA_t = total accruals for firm i in year t

A_{t-1} = total assets for firm i in year t-1

ΔRev_t = revenues for firm i in year t less revenues for firm i in year t-1

ΔRec_t = accounts receivable for firm i in year t less accounts receivable for firm i in year t-1

PPE_t = gross property, plant and equipment for firm i in year t

Emp_t = number of employees for firm i in year t

ΔEmp_t = number of employees for firm i in year t less number of employees for firm i in year t-1

ΔLF_t = average load factor for firm i in year t less average load factor for firm i in year t-1

$Time$ = 1 if year = 1970, otherwise 0

number of employees is significant. Adjusted R^2 for regression 4 is 28%.

6.5 Nonparametric Tests

The classic linear regression model makes many assumptions, one of which is that the underlying population is normally-distributed (Hollander, 1973). The population used in this study, the airlines existing in 1980, may or may not be normal. Also, the charter sample, which will be used to test Hypothesis 5, contains only six airlines. Therefore, in addition to the linear regression already run, nonparametric tests will be employed to test Hypotheses 4 and 5. Following Jones (1991), Wilcoxon signed-rank tests will be performed on the discretionary accruals of the trunks and locals and of the charters.

The prediction errors, u_{ip} , are obtained by using the OLS estimates of the regressors in Model 1. u_{ip} , which represents discretionary accruals at time p , is defined as:

$$u_{ip} = TA_{ip}/A_{ip-1} - (a_i [1/A_{ip-1}] + b_{1i} [(\Delta Rev_{ip} - \Delta Rec_{ip})/A_{ip-1}] + b_{2i} [PPE_{ip}/A_{ip-1}] + b_{3i} [\Delta Emp_{ip}/Emp_{ip}] + b_{4i} [\Delta LF_{ip}] + b_{5i} [TA_{ip-1}/A_{ip-1}])$$

For a test of Hypothesis 4, only the estimate of the 1980 discretionary accruals of the trunks and locals are used. The Wilcoxon signed-ranks test

indicates that the discretionary accruals are not significant, with a p-value of .242. For Hypothesis 5, the estimates of the 1980 discretionary accruals of the charter firms are used. The Wilcoxon signed-ranks test results indicate that the discretionary accruals of the dissenters are not significantly different from 0 at the .50 level.

The results of the nonparametric tests agree with the linear regression results for Hypothesis 4. *Time* is not a significant predictor of discretionary accruals for the trunks and locals during the 1979-1982 period. The nonparametric tests also support Hypothesis 5. *Time* does not appear to be a significant predictor of discretionary accruals for the charters during the 1979-1982 period. Results of the nonparametric tests are reported in Table 10.

6.6 Summary

This chapter introduces a new time period, 1979-1982, and makes predictions about the airlines' use of discretionary accruals during this period of deregulation. The results of testing Hypotheses 4 and 5 using both linear regression and nonparametric tests indicate that the two sets of airlines examined did not manage earnings differently during 1980. These results lend additional support to the findings in Chapter

TABLE 10
Results of Nonparametric Tests, 1979-1982
Changes in Accruals

	Supporters Only	Dissenters Only
Mean	0.009	-0.08
t-statistic	-0.70	n/a
Median	-0.003	0.01
Significance level for Wilcoxon signed-ranks test	.24	.50

Five. Under regulation, the supporters and dissenters had incentives to use discretionary accruals differently in an attempt to influence the CAB. However, once the industry was deregulated, no such incentives existed. Chapter Seven will discuss the findings in more detail and indicate future directions.

Chapter Seven

DISCUSSION AND FURTHER WORK

Previous accounting studies concerning regulation have assumed that all the firms in an industry have the same incentives for managing earnings. This study presents evidence that contradicts this assumption. Using an economic model derived from capture theory literature, this study attempts to explain why companies within the same industry, the airline industry in this case, would want to influence a regulatory body differently.

Section 7.1 details the major findings of the study. Section 7.2 discusses the contributions made by this paper. Discussion of future research directions will be given in section 7.3.

7.1 Summary of Research Findings

The primary questions pursued by this study are:

1) whether two groups of companies within the same regulated industry have differing incentives for managing earnings in an attempt to influence their regulatory body, and 2) if so, whether they use accounting (specifically, discretionary accruals) as one medium of influence. The airline industry is used to answer these questions because during the time period studied (1969-1972), it had two distinct groups

with different motivations, and it had a strong regulatory body, the CAB. A second, deregulated time period (1979-1982) is added to provide more support for the findings from the first time period.

Positive accounting theory and a model of political influence developed from economic capture theory are used to develop the Hypotheses 1-3. Hypothesis 1 states that the supporter airlines would use more income-decreasing discretionary accruals during 1970. This would be an attempt by these airlines to encourage the CAB to implement more anticompetitive policies that benefited these airlines. The results of both linear regression and the nonparametric tests support hypothesis one, although the nonparametric tests only lend marginal support.

Hypothesis 2 addresses the dissenter airlines. It says that these companies would not choose significantly different discretionary accruals in 1970. Becker's (1983) model of political influence indicates that these airlines would not gain anything by trying to increase their influence over the CAB when the supporter airlines are doing the same. The hypothesis is not supported by either linear regression or the nonparametric tests. Both of these tests indicate that the dissenter airlines chose more income-increasing

accruals in 1970. This finding does not negate the basic premise of the paper, which is that the two groups would use accounting *differently*.

Hypothesis 3 pools the data from the supporters and dissenters, increasing the power of the tests and allowing for the possibility that public status may be causing the differences in discretionary accruals between the two groups. Hypothesis 3 states the supporter airlines used more negative discretionary accruals in 1970 than the dissenters. This hypothesis is supported by both linear regression and the nonparametric tests.

The second time period is added to give more support to the findings from the first. In 1980, the airlines were no longer under the iron grip of the CAB but they were facing economic circumstances similar to those in 1970. If the two groups did not manage earnings differently in 1980, it supports the idea that the earnings management found in 1970 was due to the regulatory environment.

Hypothesis 4 is similar to Hypothesis 1. It says that the former supporter airlines would not choose significantly different accruals in 1980. This hypothesis is not rejected by linear regression and nonparametric tests.

Hypothesis 5 corresponds to Hypothesis 2. It states that the former dissenter airlines would not choose significantly different accruals in 1980 than in other years. It is not rejected by nonparametric tests. Linear regression is not run for this hypothesis because of the small sample size.

7.2 Contributions

This study contributes to both the accounting literature and economics literature in several ways. First, this study is the first in accounting to examine a regulatory setting in which not all firms in one industry have the same incentives for earnings management. Other studies have assumed that all of the firms in an industry will manage earnings in the same way. This study indicates that this may not be the case. Two groups of airlines are presented and support is offered to show that they had incentives to use accounting differently. The results of this study may have implications for other industries, such as utilities, where not all companies have the same regulatory goals.

Second, a new model of accruals is presented. Most studies of earnings management use a generic model of accruals that may contain accounts over which management does not have discretion. Because only one

industry is examined here, a model of the accruals of that industry was developed. This allowed only the accounts of the airlines that management can manipulate to be included in the model, increasing the power of the tests.

Third, this study conducts tests of an economic model that had previously not been empirically tested. Becker's 1983 model of political influence has been proven mathematically, but no study has tested it within the context of two groups trying to gain influence over their regulatory body.

Fourth, this paper presents a more balanced view of the use of accounting in the regulatory process than is typically found in accounting studies. Most accounting studies of earnings management under regulation look at firm response to regulatory actions. This study, however, also presents the role accounting plays in the setting of policy by regulators.

7.3 Suggestions for Future Research

As stated above, the findings of this study have implications for other regulated industries. Studies of other industries that have two distinct interest groups, such as utilities, could provide more support for the results found here. Also, industry-specific studies provide a medium for the development of better

models of earnings management. Bernard and Skinner (1996) suggest "researchers focus on narrower settings where modeling opportunities are richer . . . [such as] modeling accruals in particular industries. . ."

More research needs to be done into how accounting fits into the overall regulatory process. As stated above, one contribution of this study is that it presents a more balanced view of how accounting is used in regulation. However, more research should be done into how regulators use accounting and what accounting information is most important and/or useful to them.

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