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Determinants of corporate tax avoidance strategy: An empirical analysis

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Drexel University, 1990

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Determinants of Corporate Tax Avoidance Strategy: An Empirical Analysis

A Thesis

Submitted to the Faculty

of

Drexel University

By

Bruce Alan Leauby

In Partial Fulfillment of the Requirements for
the Degree of Doctor of Philosophy

June 1990

Thesis Approval Form

Drexel University

This thesis entitled Determinants of Corporate Tax Avoidance Strategy: An Empirical Analysis

and authored by Bruce Alan Leauby

is hereby accepted as approved.

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ACKNOWLEDGEMENTS

I would like to dedicate this dissertation to my wife, Joan, and our son, Jeffrey. Without their patience, support and understanding the completion of this project would never have become a reality.

I would like to thank the members of my dissertation committee, Dr. G. Ndubizu, Dr. S. Bajgier, Dr. R. Jain and Dr. B. Greenstein for their guidance, comments and suggestions which were instrumental in completing this project. Special thanks are given to Dr. G. Ndubizu for his insights, encouragement and devotion of time. I am also grateful to Dr. A. Cassill of the University of North Carolina for providing data and computer programs for the Political Action Committee contribution information. Thanks to Jim Poletti for computer assistance and to Joan Morrison for the typing of this thesis.

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ABSTRACT

Determinants of Corporate Tax Avoidance Strategy: An Empirical Analysis

Bruce Alan Leauby

Dr. Gordian Ndubizu

The Economic Recovery Tax Act of 1981 liberalized the tax code allowing a significant number of U.S. firms to systematically avoid federal income taxes while other firms paid their fair share during the 1982-1985 time period. The objective of this study is to document the determinants of corporate tax avoidance behavior.

This study developed hypotheses from the accounting choice literature to try to explain managerial decisions to avoid federal income tax. Seven firm specific variables were chosen either on the basis of their economic implications for tax avoidance behavior or because they proxy for the hypotheses developed in this study.

The statistical results support the debt covenant, bonus plan, and political action committee hypotheses. Support is not provided for the political cost, ownership control, and capital intensity hypotheses.

Based on these findings, the profile of a tax avoiding firm is a large firm, with a high debt to equity ratio, a bonus plan based on after-tax accounting earnings which gives a larger share of earnings to political action committees that are specifically established to contribute funds to members of the tax writing committees of Congress. The ownership percentage of voting stock held by directors and officers shows no relation-

ship to tax avoidance behavior providing empirical evidence to support Fama's labor market efficiency theory. Finally, capital intensity does not explain tax avoidance. This result failed to support the theory behind the investment tax credit.

Implications for changes in the national tax policy are provided in the thesis along with potential new accounting issues worth exploring.

CHAPTER 1

INTRODUCTION

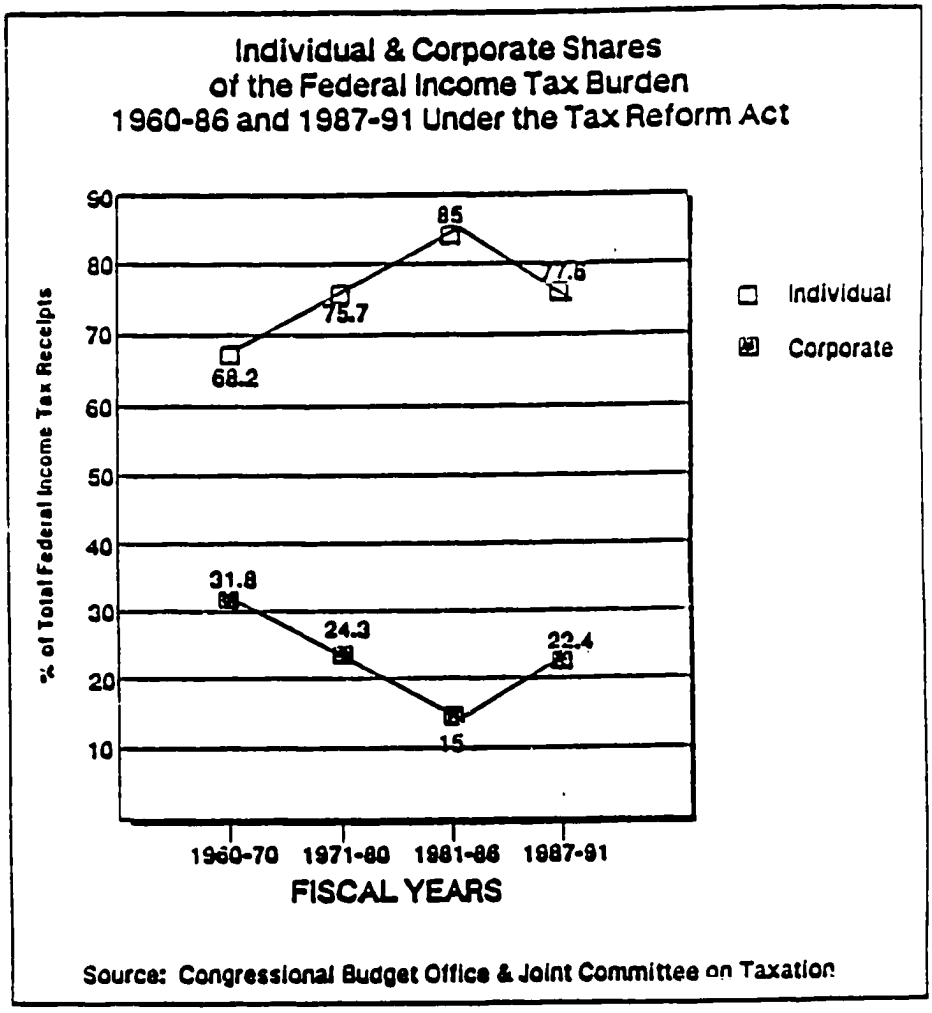
1.1 INTRODUCTION AND RESEARCH QUESTION

Almost one-third of the gross national product is represented by federal, state, and local government receipts. These receipts are comprised of taxes, fees, charges, and other miscellaneous sources. The taxes collected represent not only income taxes but also payroll, estate and gift, property, and other selective consumption taxes.

The U.S. tax system places great weight on individual and corporate income taxes. For example, in 1985 Federal income taxes accounted for 55 percent of the total receipts, with corporate income taxes representing 18 percent of the total income taxes. Corporate income taxes totaled 73.6 billion dollars in 1985, according to the U.S. Department of Commerce. However, the trend in sharing the federal income tax burden has been shifting from the corporate sector to the individual taxpayer in the last several decades (see Exhibit One). The early 1980's shows the most dramatic change between individual and corporate sharing of the tax burden, which was largely attributed to the Economic Recovery Tax Act of 1981 (ERTA).

Since ERTA enhanced tax preferences, many U.S. corporations have shed their tax burden or experienced a negative tax (tax refunds greater than tax payments). ERTA made several major changes in preference items. For example, under the Accelerated Cost Recovery System (ACRS), assets are written off over periods largely independent of any notion of useful life.

EXHIBIT ONE



ACRS established four cost recovery periods --- 3, 5, 10, and 15 years --- depending on the type of property, with the 15 year category reserved for all real property not designated as 5 or 10 year class property. In general, capital cost recovery was to be based on 150% declining-balance for property placed in service in the years 1981 through 1984, 175% declining balance for property placed in service in 1985, and 200% thereafter.

Additionally, the investment tax credit (ITC) rate increased for most eligible property. Under prior law, property with a useful life of less than 3 years obtained no ITC, that with a useful life of 3 or 4 years got a credit of 3 1/3 percent, that with a life of 5 and 6 years got a 6 2/3 percent credit, while property with a useful life of 7 or more years got a 10 percent ITC. Under ERTA, 3-year property got a 6 percent ITC and all other eligible property was given a 10 percent credit. ERTA also extended eligibility for the ITC to certain kinds of property formerly excluded from the credit's application. In addition, ERTA extended the period of years over which unused credits could be carried forward before being lost. However, not all companies, even companies in the same industry, have taken advantage of these preferences.

The underlying question is why some companies pay tax rates closer to the statutory federal income tax and others pay virtually none -- or in some cases received tax refunds. This study attempts to explain the differences in corporate income tax strategy for firms in the 1982-1985 time period, using the accounting choice methodology framework.

Specifically, this study developes hypotheses from accounting choice literature to explain managerial decisions to avoid the statutory federal

income tax. The Debt Covenant, Political Cost, Capital Intensity, Bonus Plan, Political Action Contribution and Ownership Control hypotheses are examined.

1.2 NEED FOR THE RESEARCH

The major objective of this study is to provide at least a partial explanation as to why some firms (tax avoiders) systematically avoid federal income taxes while other firms (tax non-avoiders) pay their fair share during 1982 to 1985.[1] The results of this study may assist in the development of an equitable and fair national tax policy.[2]

Tax policy is only one tool the federal government can use to promote overall economic stability and growth. Since the federal tax system generates such large amounts of revenues, it is important that policymakers create a consistent, logical and fair set of laws to insure compliance. Care must be exercised in passing tax provisions to create a fair and equitable taxing system for all. However, to gain this equitable taxation, it is imperative that Congress understand the economic consequences of their regulations on all tax paying entities.

Since none of the firms in this study was doing anything illegal by reducing taxes to the lowest level allowed within the tax regulations, the results of this study show only what type of firm characteristics were prevalent with tax avoiding companies.

1.3 ORGANIZATION OF REMAINING CHAPTERS

Chapter 2 provides an overview of how national tax policy affects managerial tax strategies. In addition, the firm specific variables used to explain tax avoidance are discussed.

Chapter 3 describes the sample selection criteria, and the research design.

Chapter 4 is a description of the statistical tests used and the results of applying these tests.

Chapter 5 presents the summary, implications, and limitations of the study.

CHAPTER 2

BACKGROUND AND HYPOTHESES DEVELOPMENT

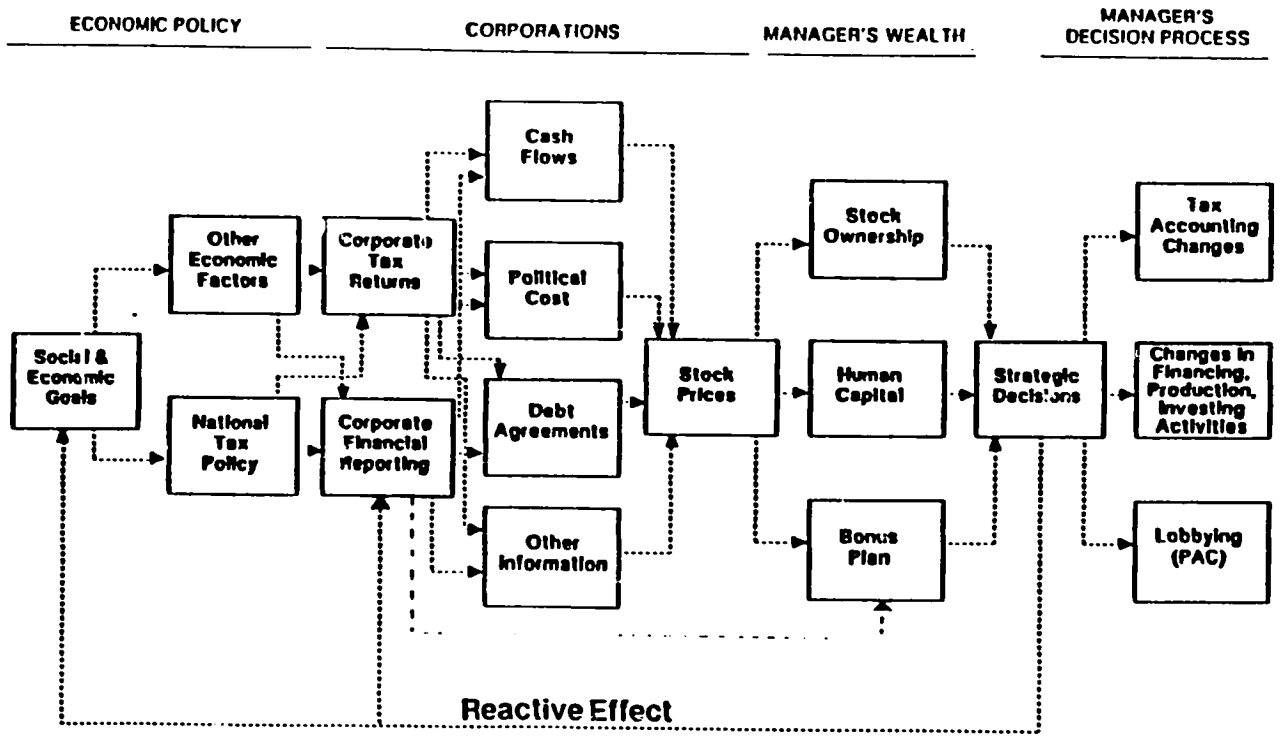
2.1 RESEARCH PARADIGM

A number of hypotheses used in the accounting choice and lobbying studies are used to explain corporate tax avoidance. The premise of this research is that managers and owners are not indifferent to alternative tax strategies (avoidance versus nonavoidance) because of the potential economic consequences. Economic consequences are expected to arise from restrictive covenants, political costs, management compensation plans, capital investment strategies, political action committee contributions, and ownership structure. (Figure 1 shows a broad overview of the relationship among corporate tax avoidance strategies, management wealth, and other external factors. These relationships will be expanded upon in this chapter.)

Since Congress is responsible for setting social and economic goals, it must anticipate managerial reactions to national tax policy in order for that policy to be effective. Initially, most tax policy impacts a firm's tax returns and generally accepted financial reporting practices. For example, the investment tax credit provided reduced tax liabilities on tax returns by offering tax credits for the purchase of certain eligible tangible property. Likewise, the financial statements of these same firms were impacted due to the reduced tax liabilities resulting from these credits. Additionally, firms could use either the flow-through method or the deferral method of accounting for investment tax credits. Policy makers may anticipate that

FIGURE ONE

Interactive Effects of National Tax Policy and Manager's Strategic Decisions



management will maximize the tax incentives offered in the tax regulations, but studies have shown that management does not always behave as expected (see Citizens for Tax Justice [1984]), perhaps because managers would rather maximize their own wealth than total firm value through available tax incentives.

As a consequence, managerial reactions to proposed or legislated tax policy is not predictable. First, lobbying efforts may be undertaken to influence or change proposed tax code revisions. Second, managers might alter the financing, investing, or production activities of the firm in order to produce the desired tax return or financial report. Finally, management could change the tax accounting practices to take advantage of or diminish the impact of the tax policy on financial statements.

Figure 1 shows that there is a circular effect produced between the on-going maintenance of national tax policy and the strategic decisions (reactions) of management. Influencing these reactions is the impact of tax policy on the wealth of management. Therefore, understanding the effect of tax policy on managers' wealth is critical to a successful national tax policy since managerial reactions are assumed to depend on the economic consequences of tax policy on managerial wealth.

A manager's wealth consists of salary, bonuses (either as cash or stocks), perquisites, and the value of managerial human capital. Fox (1980) reported that of the one thousand largest U.S. manufacturing corporations, 90 percent had a bonus plan based on accounting earnings, thus providing the main link between financial reporting and bonus plans as shown in Figure 1. The value of management's human capital is affected by a combination of financial reporting and the firm's stock prices.

Human capital is a concept that can be quantified as a manager's future wages and job prospects. A manager's worth can be calculated by work experience; however, the measuring devices are often tied to company performance. These measurements are often based on prior financial statements and stock price performance. As suggested by Fama (1980) managers often want to maximize these measurements in order to increase their future wealth.

Agency theory can help explain the potential conflict between management interests and those of owners and bondholders. Assuming that each member is seeking to maximize self-interest, contracts must be established to control the potential conflict of interest. Stated another way, the capital providers (shareholders and bondholders who are the principals) hire management (the agent) to operate a firm. However, managerial decisions may not always maximize the benefits of the principals. Therefore, certain contracts are established to reduce the potential conflict between the principals and the agent.

The management compensation package is one of the most important contracts designed to help reduce this divergence of interest. Since both financial reporting and stock prices heavily influence managerial wealth, managers are concerned about the factors that will affect them.
A firm's reaction to tax policy plays a major role in both of these areas as displayed in Figure One.

Viewed from the stock price relationship, management's wealth can be directly related to existing holdings of a firm stock or to bonus plans that may involve stock or stock options. From an indirect relationship, the value of management's human capital can be tied to stock price performance

(Fama [1980]). The efficient market research has shown that stock prices are affected by cash flow. For this reason, tax avoidance creates direct cash flow consequences, which in turn influence stock prices. Adding to the market study literature is the research in the area of positive accounting theory, which shows that even the expectation of future cash flows resulting from political costs or changes in debt covenants will affect stock prices.[5]

When a firm enters into debt financing, the bondholders are aware that their interests have to be protected, so they establish covenants in the debt agreements that will limit or prevent value-reducing investing and financing activities on the part of managers and owners. These covenants set a range in which the company can operate because there may be restrictions on investing activities, financing arrangements, or dividend payouts. Thus, when determining corporate tax strategy the likelihood of technical default on the imposed covenants may highly influence management and create behavior patterns which national tax policy makers may not have anticipated. Certainly, a technical default would either increase a firm's financing costs or require costly amendments to existing debt agreements. When anticipated by the marketplace, these costs would result in lower stock prices. Thus, management may resist certain tax incentives if they place debt agreements closer to default levels, because this action may result in lower wealth levels for management due to declining stock prices. This reduction could be a direct reduction of wealth due to actual ownership or an indirect one due to a reduced value of human capital (ability to find a similar job in an efficient labor market).

Costs that may drive stock prices down may also be associated with political actions. The political sector transfers wealth from the corporate sector in order to provide services to the general welfare of society. One of the direct vehicles to create this wealth transfer is the use of taxes. Studies have shown that larger firms, with higher levels of absolute earnings, will incur more political costs because of apparently abnormal profits. Thus, management may try to avoid this political scrutiny in order to avoid reducing its own wealth.

As a result, tax policy may initially be created to induce certain desirable behavior patterns on the part of management, but other factors may create totally different managerial reactions depending on firm-specific situations as shown above. The following section of this chapter will develop the detailed hypotheses tested in the study.

2.2 DEVELOPMENT OF HYPOTHESES

This study identified seven hypotheses to measure firm-specific characteristics to explain why managers decide to avoid or not avoid federal income tax. Appendix A shows all hypotheses summarized. Appendix B provides a summary of the results of prior studies using these hypotheses. The detailed support for these hypotheses is developed below.

2.2.1 DEBT COVENANT HYPOTHESIS

It would appear that all firms want to minimize their current tax expense. However, some firms may have greater incentives than others to do

so. The debt covenant hypothesis may help explain the behavior of tax avoiding firms as opposed to tax paying firms.

Smith and Warner (1979), Leftwich (1980), Holthausen and Leftwich (1983), Hunt (1985), Watts and Zimmerman (1986), and Ayres (1986) suggest that covenants in debt agreements (both private and public placements) which are tied to accounting numbers may influence managerial accounting choices. The theory supporting the debt covenant hypothesis is that bondholders, owners, and managers are all trying to maximize their own utility. Aware of this behavior, bondholders acting in their own interest will establish covenants that will limit or prevent managers and owners from value-reducing investing and financing decisions.[6] If the firm violates these restrictions, it may have to obtain an amendment to its credit agreement and incur additional costs. Thus, firms are reluctant to trigger technical default on debt covenants because the increased costs and the cash outflows associated with obtaining the amendments would affect a firm's stock prices negatively. Decreasing stock prices would in turn affect managerial wealth.

Violation of a debt covenant sends a signal to the credit market that the manager was unable to operate within the guidelines of the debt agreement and that dealing with this firm in future debt placements may be risky. Such situations could lead to higher contracting and monitoring costs on the firm. The additional contracting cost decreases the expected cashflows of the firm. Holthausen and Leftwich (1983) point out that the decreased cash flow reduces the stock value of both the firm and management.

Therefore, managers of firms closer to violating debt agreements have greater incentive to avoid technical default than managers whose firms are

unlikely to default in debt agreements. One way to avoid technical default would be to have the lowest possible current tax payment in order to reduce cash outflows (i.e. be classified as a tax avoider in this study), allowing the tax savings to reduce existing debt or be invested to increase earnings. Either approach would reduce the possibility of technical default. Therefore, this study asserts that tax avoiders would initially be closer to the restrictive covenant criteria and are more likely to violate the debt agreement than non-avoiders. The subsequent tax avoidance is intended to avoid technical default on the debt agreement. It is expected that tax avoiders will have a higher debt-to-net-tangible-asset ratio.[7]

Stated in the alternate form, the hypothesis is:

H_1: Corporate tax avoiders have a higher debt-to-net-tangible-asset ratio than nonavoiders.

Previous studies have mostly used financial leverage ratios, interest coverage ratios, and dividends to unrestricted retained earnings as debt restriction measures. The problem with using any of these measures is the uncertainty as to how close an entity is to violating a debt covenant. Since the detailed debt agreements are not public information, studies have assumed a relationship between the ratio and expected default criteria.

Only a few studies have not been able to support the debt covenant hypothesis (Holthausen [1981] and Daley and Vigeland [1983]). These used the dividends to unrestricted retained earnings and interest coverage ratio, respectively. Leftwich (1983) noted that one of the most commonly found restrictions is the incurrence of additional debt and most recent

studies have used some leverage ratio with success (e.g. Hunt [1985] Johnson and Dhaliwal [1987]). This study will use two common debt ratio measures: the long-term debt to net tangible asset ratio and the debt to equity ratio.

The measurement of the debt covenant variable is to divide long-term debt (without deferred taxes) by net tangible assets.[8] The long-term debt to net tangible asset ratio has been used in other studies using the Debt Covenant Hypothesis (e.g., Bowen, Noreen, and Lacey [1981], Morse and Richardson [1983] and Hunt [1985]). Leftwich (1983) specifies which asset and liability items are normally included in lending agreements. The net tangible asset measure is preferred to total assets since managers can more easily manipulate the intangible asset valuation.

Since other studies show that firms with high debt to equity ratios tend to oppose income decreasing accounting choices (see Dhaliwal [1980], Zmijewski and Hagerman [1981], Bowen, Noreen, and Lacey [1981] and Aryes [1986]), it is hypothesized that such firms would maximize tax strategies and be classified as tax avoiders in this study. Stated in the alternate form, the hypothesis is as follows:

H_2: Corporate tax avoiders have higher levels of leverage (debt/equity ratio) in the capital structure than non-avoiders.

The measurement of leverage is total debt less deferred taxes divided by total equity.

2.2.2 POLITICAL COSTS HYPOTHESIS

Alchian and Kessel (1962) and Jensen and Meckling (1976) conceptualized the political cost hypothesis, while Watts and Zimmerman (1978) was one of

the first studies to test it empirically. This hypothesis asserts that managers of large firms have greater incentives to oppose income increasing accounting standards because of the political visibility and the associated political cost. Evidence of political costs have been documented in the accounting choice literature [see Appendix B for details]. These studies contend that political cost reduces the expected future cash flow of the firm which in turn decreases stock value. Managers' wealth via stock ownership and human capital is impacted. Consequently, managers are expected to choose accounting methods or investment strategies that minimize the political costs.

In this study, the political visibility is likely to depend on the firm's earnings (excessive) and size as related to federal income taxes paid. For example, larger firms who avoided taxes would have a higher profile than smaller firms in the same tax situation.[9]

In the 1970's, the excessive earnings of oil and gas firms led Congress to impose a "windfall profits" tax on all firms in that industry. This added tax (i.e. political cost) was imposed on these firms, in part, to appease the voter constituents of the politicians. Several studies supporting the political cost hypothesis have been directed at the oil and gas industry (e.g. Bowen, Noreen, and Lacey [1981] and Lilien and Pastena [1982]), and there were implied suggestions that the political cost hypothesis was industry oriented. However, in the 1980's, the political sector has imposed additional taxes on the insurance industry, an industry noted for low tax rates.

Leauby (1987) describes an "excess profit" tax imposed on selected (large premium writers) property and casualty insurance writers in New Jersey. This tax is not a cost to smaller, yet profitable, insurance companies writing business in New Jersey. This law even further supports the contentions of the political cost hypothesis.[10]

Finally, as noted earlier, the Tax Reform Act of 1986 has expanded the AMT calculation so that no U.S. firm reporting profits to its shareholders will escape paying some corporate income tax. These examples show that when politicians pass new tax laws and regulations, they are reacting in part to apparently abnormal (excessive) accounting earnings. These laws increase a firm's operating costs, ultimately reducing stock prices.

Managers of larger firms with excessive earnings should, then, be more sensitive to the economic consequences of political exposure associated with corporate tax avoidance. If so, large firms with excessive earnings are less likely to engage in aggressive tax avoidance. In the alternate form, the hypothesis is as follows:

H_3: Tax avoiding corporations are smaller in size and earnings growth than nonavoiding corporations.

Firm size has been used to measure political sensitivity, but not without some criticism. Ball and Foster (1982) question the use of firm size as a valid proxy for political costs and indicate that size is associated with industry classification. By not controlling for industry effect, studies may produce incorrect conclusions regarding the findings. Studies have chosen to match SIC codes to reduce the industry effect when using firm size as a proxy

for political costs (Zimmerman [1983], Stickney and McGee [1982], and U.S. Treasury [1978]). The present study also controls for industry effect as seen in the methodology section (Chapter Three).

Measurements of firm size in previous studies have used sales and total assets to a large extent. This study used both sales and total assets as a proxy for political cost in addition to calculating an interaction between sales and earnings growth.[11]

Studies supporting the political cost hypothesis and using total assets as a measurement surrogate include Watts and Zimmerman (1978), U. S. Treasury (1978), Hagerman and Zmijewski (1979), Dhaliwal et al. (1982), and Ayres (1986). Studies supporting the political cost hypothesis and using sales as a measurement surrogate include Watts and Zimmerman (1978), Hagerman and Zmijewski (1979), Zmijewski and Hagerman (1981), Bowen, Noreen, and Lacey (1981), Lilien and Pastena (1982), and Zimmerman (1983).

Watts and Zimmerman (1986) suggest that accounting earnings are a better proxy for political sensitivity. They also show that increased political scrutiny resulted in additional political costs when earnings from one accounting period compared to a prior period seemed "excessive." Certainly, the oil and gas industry is the classic example, but recently the insurance industry is facing similar pressures (see footnote no. 10). Additionally, Zimmerman (1983) argues that the more successful firms are larger firms who are subjected to higher effective tax rates because certain tax shields such as depreciation and interest are fixed in the short run. Thus, it would appear that significant upward shifts in earnings (excessive earning growth rates) associated with larger firms may lead to greater political scrutiny.

A third proxy for political costs is earnings growth rate multiplied by sales. It is expected that those firms experiencing higher earnings growth rates multiplied by sales will pay higher effective tax rates due to higher levels of political visibility and cost.

2.2.3 CAPITAL INTENSITY HYPOTHESIS

Several studies have used the Capital Intensity Hypothesis to explain the tax effects on firms which are heavily capitalized rather than labor intensive (Siegfried [1974], and Stickney and McGee [1982]). Results show that the tax code favors capital intensive over labor intensive firms, and thus tax avoiders may have greater levels of capital rather than labor.

Stickney and McGee (1982) use capital intensity to explain corporate effective tax rates. Stickney and McGee suggest that the larger investment in depreciable assets should produce investment tax credits (ITC), and using accelerated depreciation should thereby result in greater tax savings and lower effective tax rates. Their study, using individual firms, supports their contention.

Siegfried (1974) uses the same rationale as Stickney and McGee. However, instead of an individual firm basis he uses an industry wide approach. Siegfried's results support the conclusion that the more capital intense an industry is, the lower the effective tax rate.

Since this study focuses on the tax years 1982-1985, it cannot ignore the influence of the 1981 ERTA provisions. ERTA introduced ACRS (accelerated cost recovery system), which allows a more liberal write-off of depreciable

assets than ever before and increases potential tax savings. Additionally, during the tax years used in this study, the investment tax credits (ITC) were liberalized in the tax code. Both the ITC and the more liberal depreciation methods should produce favorable tax treatment for capital intensive firms. The potential tax savings would increase the expected cashflow of the firms which in turn increases managerial wealth. Thus, capital intensive firms would avoid more taxes relative to labor intensive firms. Stated in the alternate form, the hypothesis is:

H_4: Corporate tax avoiders have a higher degree of capital intensity than non tax avoiders.

Capital intensity is measured by the ratio of depreciation expense to labor expense.

2.2.4 BONUS PLAN HYPOTHESIS

Compensation plans may influence the motivation of managers to avoid income tax. Specifically, a bonus type plan based on after tax accounting earnings may produce tax avoidance behavior, while a compensation package based on before tax accounting earnings would not create such an incentive.

Previous accounting choice studies have tested whether the existence of a bonus plan influences accounting procedures. As described by Watts and Zimmerman (1986), these studies were exploratory and resulted in mixed results. Additionally, Fox (1980) reported that of the one thousand largest U.S. manufacturing corporations, 90% have a bonus plan based on some type of accounting earnings. Thus, the mere existence of a bonus plan does not explain managers' choices of accounting standards.

Healy (1985) extended the research in this area and found that most bonus plans have a lower and upper bound. The lower bound is measured as a percentage of stockholders' equity (or some similar measure) beyond which net income must extend if a bonus is to be paid out. Most plans also have an upper bound which limits the maximum bonus that can be paid out. The limits of the plan and the earnings expectations influence managerial behavior. Thus, in some years a manager may want to increase earnings to maximize a bonus payout, while in other years the manager may want to reduce earnings either because the maximum bonus level has already been reached or there is a low probability of reaching the lower limits. Therefore, it is not only useful to know if a plan exists but also where earnings relate to the lower and upper limits of the bonus plan before a manager chooses different accounting procedures.

Healy indicates that more than 50% of the bonus plans studied in his research use income before taxes as a factor for bonus payouts. Newman (1988), whose study looks at the tax laws and compensation plans, shows that 66% of the firms had bonus payouts based on income before taxes. Therefore, an important element in this study is whether an existing bonus plan is based on accounting earnings before or after income tax considerations. Newman has found that firms using after tax bonus plans are more responsive to changes in tax regulations than firms with before tax bonus plans.

It is asserted that those firms having bonus plans based on earnings after income taxes are more likely to be classified as tax avoiders than non-avoiding firms. In the alternate form, the hypothesis is as follows:

H_5: Corporate tax avoiders are more likely to have bonus plans based on earnings after income taxes than non-tax avoiders.

Healy's (1985) research shows that the boundaries of bonus plans must be known before any indication of management strategy can be formulated. Therefore, the individual years used in this study may provide questionable results due to the lack of details known about bonus plans and the relationship of earnings to the lower and upper limits. However, the strength of the present study is the four year model which should eliminate the variations due to any income smoothing behavior on the part of management. Using a four year window should disclose a pattern about management's tax strategy that can be linked to the structure of the bonus plan.

2.2.5 POLITICAL ACTION COMMITTEE CONTRIBUTION HYPOTHESIS

Political Action Committee (PAC) contributions are lobbying efforts seeking to gain favorable political treatment for specific industries or corporations. The expected rewards may be government contracts or favorable tax legislation. This study examines the relationship between PAC contributions to members of the Senate Finance and the House Ways and Means Committees and corporate tax avoidance.

Welch (1980) and Chappell (1981) show that PAC contributions have a significant impact on the voting patterns of politicians. These findings support the theory of economic regulation presented by Stigler (1971) and extended by Posner (1974) and Peltzman (1976). The theory of economic regulation suggests that corporations are motivated to lobby for benefits resulting from regulation. Ndubizu and Cassell (1990) have documented that firms with higher PAC contributions to members of the Senate Finance and the House Ways and Means Committees have relatively less tax burden than other sample firms.

Politicians' reactions to PAC contributions are hypothesized to be consistent with Mecklings' (1976) assertion that political parties seek to increase resources controlled, since that increases their ability to broker to various interest groups. The brokering function allows politicians to transfer wealth to constituent groups. Corporate PAC contributions may motivate politicians to broker favorable tax legislation for corporations if the action will not result in a significant loss of votes from the voter group.

Given information cost, it seems appropriate to assume the individual has little incentive to obtain information.[12] Thus, the voter constituency will be at a comparative disadvantage in trying to obtain wealth-transfers brokered by politicians. The hypothesis is as follows:

H_6: Corporate tax avoiders have a higher PAC contribution to earnings ratio than non-avoiders.

One criticism of the lobbying research is that most studies use a single issue, one-period model. Amershi et al. (1982) suggest multiple periods in modeling of the political process. Consequently, this study uses a four year model.

2.2.6 OWNERSHIP CONTROL HYPOTHESIS

Kelly (1983) suggests that in owner controlled (OC) firms, shareholders can monitor the behavior of managers directly since owners exercise more active control and have access to more information. However, manager controlled (MC) firms do not have such direct shareholder control, thereby creating additional contracting and monitoring costs on the part of shareholders.[13] One form of these costs is bonus plans, which are intended to

better align the interests of owners and managers. Due to the increased costs of monitoring managers, Monsen and Downs (1965) suggest that the separation of ownership and control may result in owners becoming satisficers instead of maximizers.

Neuman (1988) found that the more dispersed the ownership (i.e. MC firms) the more likely the bonus plan would be based on after-tax income compared to before-tax income measures. Therefore, managers in MC firms are more likely to benefit than are the managers in OC firms from tax avoidance strategies.

Fama (1980) provides a contrary view that there is an efficient labor market which will restrict managers from attempting to maximize their own utility at the expense of the shareholder. This marketplace provides an ex post facto settling up process between managers and firms. Thus, if managers fail to maximize firm value, subsequent remuneration and job opportunities will be revised downward to reflect this previous sub-optimal performance.

This labor market efficiency theory would automatically align the decision process of MC and OC firms so that no differences in behavior or selection of accounting choices would be expected. However, little empirical evidence is available to support this theory. The empirical evidence currently available clearly shows systematic differences in the adoption of accounting methods by MC and OC firms.[14] These findings show MC firms to have greater propensity than OC firms to select income or equity increasing accounting strategies.

In the context of the tax strategies, one would expect that MC firms would be classified as tax avoiders. In the alternate form, the hypothesis is as follows:

H_7: Corporate tax avoiders have a lower percentage of stock owned by directors and officers than non-tax avoiders.

Hunt (1986) defines control of a firm as the ability to control the selection of a majority of the board of directors through voting rights assigned to ownership shares of the firm. To operationalize the concept of control several techniques have been used. Dhaliwal et al. (1982) have used a dichotomous variable to represent MC and OC. Other studies have used the percentage of stock ownership by top management as an explanatory variable. (See; Hunt [1985], Niehaus [1986], Ayres [1985], Dunne [1988], and Newman [1988]). Since a continuous variable is a more precise measure than the dichotomous variable, the present study used a continuous variable, an approach consistent with Holthausen and Leftwich (1983).

CHAPTER 3

SAMPLE/METHODOLOGY

3.1 SAMPLE

The Citizens for Tax Justice (CTJ) is a non-profit agency that provides surveys of America's major corporations and their taxpaying or tax avoiding habits. Recently the CTJ, in a joint project with the Institute on Taxation and Economic Policy, issued the Third Annual List of America's Corporate Taxpayers and Corporate Freeloaders (July, 1986) which covers 250 of America's largest and most profitable corporations. The pre-tax domestic profits of these companies, covering 1982-1985, represents about 50% of the total pre-tax domestic profits of all U.S. companies as reported by the Commerce Department.

CTJ selected the top 300 firms from the Fortune 500, along with Fortune's top 50 companies among utilities, service industries, commercial banks, life insurance companies, and transportation companies. Companies were eliminated from the CTJ sample if they lost money over the 1982-1985 period or if a company's report did not provide sufficient information to calculate domestic profits, current federal income tax expense, or both.[15] This elimination process resulted in the 250 firms included in the latest report.

The CTJ report shows effective tax rates, on a four year combined basis, from a low of -17.3% to a high of +52.8% with the average of all companies paying 14.9%. The methodology used to obtain effective tax rates was to divide current federal income tax expense by net domestic pre-tax profits before federal income tax. Those companies paying zero or less in federal

income taxes numbered 75 in 1982, 51 in 1983, 33 in 1984 and 42 in 1985. Exhibit Two shows federal corporate income taxes as a percent of domestic pre-tax profits for all U.S. Companies from 1950 to 1985. The decline in federal income taxes, as related to domestic profits, is most noticeable in the 1982 to 1985 period which is reflective of the more liberal provisions contained in the 1981 ERTA laws. The average of the 1982-85 percentages is 16.15% which is comparable to the CTA's average of 14.9%.

The 250 firms in the CTJ report represents the initial sample of the study. The purpose of the study is to determine if measures of tax avoidance are related to the variables hypothesized to be related to tax avoidance in the previous chapter. An individual analysis was conducted on each of the four years as well as a combined analysis of the entire four years of data. Therefore, five different models were developed in this study. The initial sample of 250 firms was reduced if information was unavailable on any independent variable. Selection criteria include (1) financial data available on the Compustat Annual Industrial Tape from 1981-1986, (2) proxy statements and annual reports available on the National Databank Microfich file, and (3) Political Action Committee contributions to members of the House Ways and Means Committee and Senate Finance Committee available on the Federal Election Committee's "Non-Party Report on Financial Activity Tape" for the years being studied. The number of firms in the final sample totaled 215. The reduction in sample size was attributed solely to information not available on the Compustat tapes.

EXHIBIT TWO

General Corporation Income Tax Rate and Effective Rate of the Federal Income Tax on Profits of U.S. Corporations from Domestic Operations, 1950–85

Year	Corporation income tax rate (percent)	Corporation profits before tax (billions of dollars)[a]	Federal corporation taxes[b]	
			Amount (billions of dollars)	Percent of profit before tax
1950	42.00	42.6	15.5	36.4
1951	50.75	44.4	18.9	42.6
1952	52.00	39.5	16.7	42.3
1953	52.00	41.6	17.6	42.3
1954	52.00	40.5	16.5	40.7
1955	52.00	51.7	20.7	40.0
1956	52.00	51.8	20.6	39.8
1957	52.00	50.3	19.9	39.6
1958	52.00	45.8	17.5	38.2
1959	52.00	55.2	21.5	38.9
1960	52.00	53.0	20.6	38.9
1961	52.00	54.2	20.8	38.4
1962	52.00	60.8	21.7	35.7
1963	52.00	65.6	23.6	36.0
1964	50.00	72.7	24.6	33.8
1965	48.00	84.7	27.6	32.6
1966	48.00	91.1	29.9	32.8
1967	48.00	89.8	28.1	31.3
1968	52.80	99.7	30.2	30.3
1969	52.80	96.3	29.7	30.8
1970	49.20	82.3	26.4	32.1
1971	48.00	95.7	30.0	31.3
1972	48.00	112.4	33.4	29.7
1973	48.00	131.6	39.0	29.6
1974	48.00	140.3	39.5	28.2
1975	48.00	141.8	38.2	26.9
1976	48.00	175.8	48.7	27.7
1977	48.00	211.0	55.7	26.4
1978	48.00	246.0	64.4	26.2
1979	46.00	263.0	65.1	24.8
1980	46.00	259.9	58.6	22.5
1981	46.00	272.3	51.7	19.0
1982	46.00	232.2	33.9	14.6
1983	46.00	297.1	47.1	15.9
1984	46.00	334.5	59.8	17.9
1985	46.00	345.0	55.8	16.2

1982-1985 average= 16.15%

Source: Appendix table D-15.

a. Profits before taxes as defined in the national income accounts plus accelerated depreciation over straight-line depreciation, dividends allocated by corporations to nonmutual private pension plans, and net gains from sales of property, less taxable foreign income, state income taxes, Federal Reserve Board earnings, and Sallie Mae's income.

b. Federal corporation income tax as defined in the national income accounts less the Federal Reserve Board payments to the U.S. Treasury and the temporary surcharges of 1950–53 and 1968–70. Excludes excess profits taxes and state income taxes.

Source: Federal Tax Policy, Fifth Edition
Edited by Joseph Pechman
The Brookings Institution, Wash. D.C. 1987

3.2 DEPENDENT VARIABLE

The dependent variable is corporate effective tax rate (designated as CTR) as provided in the CTJ study with one adjustment. The adjustment was required to standardize corporate effective tax rates for industry differences.

The tax code is industry based as can be seen in Appendix C. Industry effects can be controlled by matching on SIC codes; however, this could reduce sample size significantly so that appropriate tests may not be possible. Therefore, to control for this industry effect, CTR (the ratio of current tax expense to domestic pre-tax profits) was adjusted by effective industry tax rates.

An industry tax rate and average tax rate for all industries were obtained from the Statistics of Income compiled by the Internal Revenue Service (see Appendix C). For example, using the data in Appendix C, the utility industry used 45/41 to arrive at 109.7%. The 45% represents the average effective tax rate for the utility industry while the 41% is the average of all U.S. firms with net income in 1982. This indicates that utility firms have an effective tax rate equal to 109% of all U.S. firms combined. This effective tax rate was then divided into the ratio of current tax expense to domestic pre-tax profits to arrive at an industry adjusted tax rate. This standardizing treatment was applied to every firm selected, based on SIC classification in the Compustat files as follows:

$$CTR = \frac{\text{current federal income tax expense}}{\text{domestic pre-tax profits}} \div \frac{\text{industry rate}}{\text{average tax rate for U.S. firms}}$$

3.3 INDEPENDENT VARIABLES

The following independent variables were computed annually for each company in the 1982-1985 period:

LEV =(long-term debt/net tangible assets) x 100;

CAS =(total debt/total equity) x 100;

SIZE =accounting earnings in period t/accounting earnings in period t-1 = earnings growth ratio multiplied by sales and [two additional measures of size are sales and total assets (in millions)];

CAI =(depreciation expense/labor expense) x 100;

BP = "1" for bonus plan based on earnings after income tax, and "0" for bonus plan based on earnings before income tax;

PAC =PAC contribution ratio = $\frac{\text{PAC Contributions}}{\text{Pre-tax domestic profits plus PAC Contributions}} \times 100$;

OC = percentage voting stock held by directors and officers as a group.

3.4 MODEL

A multiple regression and a multiple discriminant model were used in this study.

3.4.1 REGRESSION MODEL

The regression model was used to determine how well the selected independent variables predicted the dependent variable, CIR. Since the dependent and all but one of the independent variables are interval scaled (continuous), the appropriate statistical tool was the ordinary least squares (OLS) regression model (with a dummy variable for bonus plan).

The hypothesized relationship between corporate adjusted tax rate (CTR), the dependent variable, and the independent firm-specific characteristics is provided below:

$$CTR = b_o + b_1 LEV + b_2 CAS + b_3 SIZE + b_4 CAI + b_5 BP + b_6 PAC + b_7 OC + e$$

Part of the analysis of the data included tests of the underlying assumptions of OLS. These tests included, but were not limited to, the potential problem of multicollinearity (highly correlated independent variables), nonlinearity of regression function, constancy of variance and normality of the error term.

The statistical analysis consists of both univariate tests and a multivariate test. The univariate tests investigate each individual hypothesized independent variable separately, while the multivariate approach investigates the simultaneous effect of all independent variables.

Regression coefficients were tested for the multiple regression model as well as individual simple regression models for each variable. These tests were used to determine if the regression coefficients were in the hypothesized direction. Below are the expected hypothesized direction for each regression coefficient.

Hypothesis	Regression Coefficients	Expected Hypothesized Direction
H_1:	b LEV	negative
H_2:	b CAS	negative
H_3:	b SIZE	positive
H_4:	b CAI	negative
H_5:	b BP	negative
H_6:	b PAC	negative
H_7:	b OC	positive

The testing and results obtained are detailed in the next chapter.

3.4.2 DISCRIMINANT MODEL

The discriminant model determines how well the developed model can classify firms between tax avoiders and non-avoiders. Various strategies were used to separate the entire sample of firms into 2 groups based on CTR. For a particular partitioning of firms into groups, the following hypothesis was tested.

$$H_o: \begin{bmatrix} u_{11} \\ u_{12} \\ u_{1p} \end{bmatrix} = \begin{bmatrix} u_{21} \\ u_{22} \\ u_{2p} \end{bmatrix}$$

Where $p = 7$ (number of independent variables) and u = means of vectors for each classification with 1 representing tax avoiders and 2 representing non-avoiders.

Chapter four will provide summaries of all tests and related results.

CHAPTER 4

STATISTICAL ANALYSES AND DISCUSSION OF RESULTS

4.1 INTRODUCTION

This chapter discusses the measurement of the variables hypothesized to be determinants of corporate tax avoidance strategy and presents the results of the statistical analysis performed on these variables. Both univariate and multivariate tests were employed to test for significance. The results of the univariate tests are presented first, followed by those of the multivariate models.

4.2 UNIVARIATE TESTS

The univariate test used was the Mann-Whitney U-Test for each variable, the results of which are summarized on Tables 4A-4E. The variable definitions are provided in Table 1 for easy reference, along with summary statistics provided in Table 3 (all Tables are included at the end of this chapter).

The separation of corporate tax avoiders and non-tax avoiders in the study is not explicity defined with respect to an absolute tax rate. Rather, the criterion is based on relevant tax rates with all other firms. This study segregates firms into tax avoiders or non-avoiders, comparing a firm's tax rate to the tax rates of all other firms in the study.

Several different classification schemes were developed to determine if results are sensitive to classes employed. The first classification scheme was to divide the sample into two equal groups with the bottom

half of firms having the lower tax rates being classified as tax avoiders and the upper half of firms with the higher tax rates being classified as non-tax avoiders. The firms were also segregated into tertiles and quartiles. The testing performed on firms classified into tertiles was on the bottom versus the upper third, while the quartile testing was done on the first (lowest tax rates) and fourth (highest tax rates) quartiles. Additionally, tests were performed on the first and second quartiles and the third and fourth quartiles to determine if significant statistical differences were noted between high and low tax avoiders and non-tax avoiders groups.

4.2.1 DEBT COVENANT HYPOTHESIS

The first two hypotheses relate to constraints commonly used to proxy for debt agreements. The leverage ratio (LEV) was measured by long-term debt divided by net tangible assets. The debt to equity ratio (CAS) was measured by total debt divided by total equity. Both of these variables were expected to relate to tax avoidance behavior in a negative manner. In other words, as debt increased, tax avoidance was expected to increase (lower tax rates).

The results of these variables support the hypothesis when comparing halves, tertiles, and extreme quartiles. In fact, each year showed significant results representing the strongest statistical findings of all variables tested. These results are consistent with many of the prior accounting choice studies that have supported the debt covenant hypothesis. However, weaker results were observed when comparing low tax avoiders and high tax avoiders (first versus second quartiles) and low non-tax avoiders and high non-tax avoiders (third versus fourth quartiles).

These results clearly show that firms with higher debt ratios consistently paid lower U.S. federal income taxes as related to domestic profits during the 1982 to 1985 period. This tax avoidance behavior is partially explained by the tax code, which favors debt versus equity financing: interest payments made by a firm are tax-deductible, while dividend payments are not.

Additionally, these results show the effectiveness of covenants used in debt agreements to influence managerial behavior. To reduce the possibility of technical default on debt covenants and the resulting additional contracting and monitoring costs, highly leveraged firms need income increasing performance, and lowering current tax payments achieves this goal.

Bernanke (1989) argues that higher concentrations of debt may lead to more efficient managerial performance due to higher interest payments imposing a permanent discipline on the managers. Thus, reducing federal income taxes to the lowest legal limit may indicate more efficiently managed firms. This suggests that higher levels of debt in the capital structure (up to certain levels) may create an environment for the most efficient management performance.

Caution needs to be exercised in attributing explanatory power to the LEV and CAS variables since they are both testing the same hypothesis. Results could be misleading if the independent variables are correlated with one another, because the variables may be surrogates for one another and may, therefore, be capturing the same information. In order to check for significant correlations between these two variables, Pearson correlation

coefficients were calculated on yearly data and are displayed in Table 5. The correlations appear low and suggests that the variables are not surrogates for each other.

4.2.2 POLITICAL COSTS HYPOTHESIS

It was hypothesized that larger firms with excessive earnings would be less likely to engage in aggressive tax avoidance due to the potential political costs. However, none of the tests on the variables used to measure political cost supported this hypothesis.

Considerable controversy exists concerning the appropriate measure of political cost. This study used three different measures (or variations thereof), which included total assets, net sales, and an interaction of earnings growth and net sales. Since the variance of total assets and net sales was dispersed widely across firms, a log transformation was performed on both of these measures. Additionally, the interaction of positive earnings growth and sales was examined, eliminating the effect of negative earnings growth. Only the results using the log of total assets are reported in Tables 4A-4E. All the different measures produced similar results.

The political cost variable with the most significant findings was the log of total assets (SIZE); however, the findings do not support the hypothesis. The results clearly show larger firms are tax avoiders. These findings are consistent with the mixed findings documented in other positive accounting studies (Watts and Zimmerman [1986]).

These findings suggest that since large profitable firms aggressively pursued tax avoidance, their behavior became a target for

further political costs. The avoidance of taxes by large profitable firms created criticism from tax reform groups (e.g. Citizens for Tax Justice) which paved the way for the Tax Reform Act of 1986. As mentioned in the introductory chapter, TRA of 1986 was designed to transfer the tax burden from individuals to corporations. The rationale for the tax avoidance behavior of the large profitable firms may be that the present value of current tax savings exceeded estimated future costs. Only after statistics are available on the impact of TRA of 1986 can the monetary effects be compared to tax savings to determine if the behavior in 1982 to 1985 actually maximized managerial and/or firm wealth.

The discrepancy between the findings of this study and similar studies [e.g. Zimmerman (1983) and U. S. Treasury (1978)] may be due to the selection of sample firms. This study only selected profitable firms while the other studies did not differentiate between firms with profits or losses before tax considerations.

4.2.3 CAPITAL INTENSITY HYPOTHESIS

The fourth hypothesis expected capital intense firms to use investment tax credits and the accelerated cost recovery system to reduce taxes and be classified as tax avoiding firms as opposed to more labor intensive firms. The capital intensity ratio (CAI) was measured by the ratio of depreciation expense to labor expense. However, the COMPUSTAT tapes did not contain this data for all sampled companies. Each year has approximately sixty firms or 25% of the entire sample providing the needed data. This results in a reduced model for multivariate analysis and a reduced sample size for the univariate testing.

The findings for the CAI variable support the expected direction of the original hypothesis but are not significant at the .05 level across all temporal or classification dimensions. The most consistent significant result is when all four years are combined for the classifications on Tables 4A (bottom half versus top half), 4B (bottom third versus top third), 4C (first quartile versus fourth quartile) and 4E (third quartile versus fourth quartile). This suggests that over the four year period (1982 to 1985) the tax policy to encourage capital spending by liberalizing investment tax credits and depreciation lives was effective. This contradicts the CTJ study published in February, 1986 entitled "Money for Nothing - The Failure of Corporate Tax Incentives 1981-1984," which reported that ineffective tax incentives (e.g. investment tax credits and more liberal depreciation methods) did not create the investment in capital spending and job creation that the 1981 ERTA provisions intended. However, the multivariate results shown in the next section reveal no significant findings for the CAI variable. Thus, isolating the univariate results may lead to questionable interpretations.

4.2.4 BONUS PLAN HYPOTHESIS

Proxy statements of the sample firms were examined to determine whether an existing bonus plan was based on accounting earnings before or after income tax considerations. Newman (1988) found that firms with after tax bonus plans are more responsive to changes in tax regulations.

Some firms had bonus plans which were not related to accounting earnings but to some other measure. For example, some utilities measure bonus payouts by comparing cost efficiencies with other utilities in their

geographic area. These bonus plans were classified as "before tax" plans for purposes of this study. The sample started with 250 firms, 106 of them (42%) having bonus plans based on after tax payout formulas.

The univariate test generally supports the expected direction of the hypothesis except for 1983 on Table 4A (bottom half versus top half) and 1984 and 1985 on Table 4D (first versus second quartile) and 1983 and 1985 on Table 4E (third versus fourth quartile). The only significant finding is reflected in 1982 in Tables 4A-4D and when all years are combined on Table 4C. These findings show that the after tax provision in bonus plans is responsive to tax law changes (i.e. 1981 ERTA changes), but the motivation may be short term, which is reflected by its only being significant in the first year after a major tax revision.

4.2.5 POLITICAL ACTION COMMITTEE CONTRIBUTIONS HYPOTHESIS

The extent to which firms avoided federal income tax and used lobbying efforts to gain favorable political treatment was tested. Political Action Committee (PAC) contributions to members of the tax writing committees (i.e. Senate Finance and House Ways and Means Committees) were isolated to each firm in the study. Not all firms participated in PACs, but over 55% of the sampled firms had some contributions in each reporting period. The use of PACs has gained in popularity as shown by the increased dollars allocated to these committees. In 1982, $4,569,016 was spent by all corporations to these two committees, while in 1985 a 61% increase resulted in $7,369,862 being spent. Clearly corporations see this as an effective vehicle to seek favorable tax legislation.

The results support the hypothesis and show that those firms with lower tax rates contributed, as a percentage of pre-tax profits, more funds to members of the tax writing committees. The test results are in the direction hypothesized, and significant results at the .05 level were found in all years for the first three Tables (4A-C), with only 1982 not being significant when comparing the upper and bottom halves of firms. The differences between low and high tax avoiders (Table 4D) and tax non-avoiders (Table 4E) are not significant, suggesting similar types of firms in the bottom and top halves of the sample.

These results suggest that corporate PAC contributions motivate politicians to broker favorable tax legislation to selected corporations. However, it is difficult to determine if the contributions are for prior or future activities or a combination thereof. The significant increase of contributions in 1985 could possibly represent firms trying to lessen the impact of the inevitable closing of loopholes contained in the provisions of the TRA of 1986. Nevertheless, firms with higher PAC ratios had reduced tax burdens.

Measuring PAC contributions without any adjustment for size would clearly show larger firms spending more dollars than smaller firms. To reduce this potential bias, the measurement of the PAC formula divided PAC contributions by pre-tax domestic profits plus PAC contributions. This resulted in a percentage measure of PAC contributions to potential taxable dollars, eliminating the size variable (e.g. sales or total assets) from dominating the statistics.

4.2.6 OWNERSHIP CONTROL HYPOTHESIS

The extent to which a firm is more manager-controlled versus owner-controlled was suggested as a possible factor in tax avoidance behavior. The hypothesis predicted that firms that were classified as tax avoiders would tend to be manager controlled. This was based on Newman's (1988) study that found that manager-controlled firms were more likely to have bonus plans based on after-tax provisions. Additionally, manager-controlled firms tend to select income or equity increasing accounting strategies of which tax avoidance would be classified. The results support this hypothesis and are significant in all years for the analysis of halves, tertiles, and the extreme quartiles.

All firms combined had approximately an 8% ownership interest by officers and directors. When classified into tax avoiders and non-avoiders, each group consistently had approximately 6% and 10% ownership interests, respectively.

These results show managerial efforts are indeed different depending on levels of voting stock owned by directors and officers. Coupled with Newman's (1988) findings, manager controlled firms are more motivated to seek tax avoidance strategies due to incentives created for maximizing manager's wealth when viewed from univariate results only. The multi-variate results, shown in the next section, do not support these findings.

4.2.7 SUMMARY OF UNIVARIATE TESTS

The firms were tested under five different classification schemes using the Mann-Whitney U-Test. The first three classifications (i.e. top versus bottom half, top versus bottom tertile, and highest and lowest quartile) provide the most significant findings, while the last two classification categories (i.e. top and low corporate tax avoiders and non-tax avoiders) provide weaker support for differences between these groups.

Taken together, the univariate tests provide support for the debt covenant, political action committee contribution, and ownership control hypotheses. The results for the bonus plan and capital intensity hypotheses are insignificant but have the expected sign. The only variable that does not have the expected sign is the political cost variable; however, this variable was significant at the .05 level in all years.

Based on these findings, tax avoiders are large firms having high debt structures and lower concentrations of ownership interests by directors and officers. Tax avoiders contribute a larger share of pre-tax income to PACs and, directly after major tax revisions, the most aggressive tax avoiders have short-term bonus plans based on after-tax earnings measures.

To determine which factors actually explains corporate tax avoidance, the independent variables were jointly examined and the results are reported in the next section.

4.3 MULTIVARIATE MODELS

Three different multivariate techniques were used to investigate the simultaneous effect of all independent variables. These techniques were multiple regression, discriminant analysis, and logistic regression. The results of each technique will be discussed separately.

4.3.1 MULTIPLE REGRESSION

Because the variable CAI (capital intensity ratio) was available for only approximately 25% of the sample, two different multiple regression models were used. The first model (Model One) used all hypothesized variables except CAI. A reduced model (Model Two) was then created which included the CAI variable but resulted in a significant reduction in sample size. Model One results are provided on Tables 6A-6E with each Table corresponding to a separate year in the study and Table 6E reflecting all years combined. Tables 7A-7E contain the results for Model Two and are discussed after Model One.

Table 2A provides the frequency distribution of the sample for Model One by industry. The results show that the sample is diversified across industries, with minor concentration in Standard Industry Classification (SIC) 20 -- Food and Kindred, SIC 28 -- Chemical and Allied Products, SIC 36 -- Electrical Equipment and Supplies, and SIC 49 -- Electric, Gas and Sanitary Services. The industry concentration may lead to cross-sectional correlation.

To check for heteroscedasticity, the Park (1966) test was applied.[16] The results suggest the presence of heteroscedastic error terms in 1982

and 1983; consequently, the weighted least square procedure was used in both of these years. The Park test was re-applied on the weighted data, but there was no evidence of cross sectional correlation.

When using the ordinary least squares (OLS) method, the variance inflation factors (VIF) were used as diagnostics for multicollinearity. The VIF measures how much the variances of the estimated regression coefficients are inflated compared to an analysis in which the independent variables have pairwise correlations of zero with each other. The OLS results show extremely low VIF's; however, the VIF's increase when the heteroscedastic error terms are corrected in 1982 and 1983. The increased VIF's do not seem large enough to influence unduly the estimates of the weighted least square model.

MODEL ONE

Model One found the following variables to be significant at the .05* or .10** level (see below).

Variable	All Years Combined	1982	1983	1984	1985
LEV			*		
CAS	*	*	*		
SIZE	**	*	*	*	
BP	*	*			**
PAC	*	*		*	*
OC					

The results of the four year model are provided in Table 6E. The coefficients of CAS, BP, and PAC are negative and significant at the .05 level using a one-tailed test. The coefficient of SIZE is negative (opposite of expected sign) and significant at the .10 level using a one-tailed test. The coefficients of LEV and OC are positive and are not

significant at the .10 level. The R^2 statistic is 20 percent. These results are consistent with the debt covenant, bonus plan, and political action committee contribution hypotheses. These results do not support the political cost and ownership control hypotheses.

The four year model shows firms classified as tax avoiders have more assets, a higher debt to equity ratio, bonus plans with after-tax provisions, and a larger share of earnings contributed to political action committees that earmark their funds for members of the tax writing committees. The ownership percentage of voting stock held by directors and officers show no relationship to tax avoidance behavior, providing empirical evidence to support Fama's labor market efficiency theory.

The results of the 1982 model are provided in Table 6A. The coefficients of CAS, BP, and PAC are negative and significant at the .05 level using a one-tailed test. The coefficient of SIZE is positive and significant at the .05 level using a one-tailed test. The coefficients of LEV and OC are not significant at the .05 level. The R^2 statistic is meaningless due to a correction for heteroscedasticity (Treble 1984). These results are consistent with the debt covenant, political cost, bonus plan, and political action committee contribution hypotheses. The results do not support the ownership control hypothesis.

The results for 1982 are identical to the four year model, except the political cost hypothesis is supported. Therefore, smaller firms, as measured by total assets, were tax avoiders in 1982.

The results of the 1983 model are provided in Table 6B. The coefficients of LEV and CAS are negative and significant at the .05 level

using a one-tailed test. The coefficient of SIZE is positive and significant at the .05 level using a one-tailed test. The coefficient of BP, PAC and OC is not significant at the .05 level. The R^2 statistics are meaningless due to a correction for heteroscedasticity (Treble 1984). These results are consistent with the debt covenant and political cost hypotheses. The results do not support the bonus plan, political action committee contribution, and the ownership control hypotheses.

The results for 1983 show tax avoiders to be smaller in size as measured by total assets with higher levels of debt in the capital structure. Tax avoiders were insensitive to ownership interests, bonus plan structure, or contributions to PACs.

The results of the 1984 model are provided in Table 6C. The coefficient of PAC is negative and significant at the .05 level using a one-tailed test. The coefficient of SIZE is negative (opposite of expected sign) and significant at the .05 level using a one-tailed test. The coefficients of LEV, CAS, BP and OC are not significant at the.05 level. The R^2 statistic is 6 percent. These results support the political action committee contribution hypothesis. Although the SIZE variable is significant, the sign is the opposite of the expected sign, showing a reversal of support for the political cost hypothesis when compared to 1982 and 1983. The results also do not support the debt covenant, bonus plan, and ownership control hypotheses.

Tax avoiders became less distinguishable in 1984 as only two variables were significant (SIZE and PAC). The SIZE variable reversed

signs from 1982 and 1983 showing larger firms were tax avoiders, thereby not supporting the political cost hypothesis. The contributions to PACs supporting members of the tax writing committees was the only other variable which was significant.

The results of the 1985 model are provided in Table 6D. The coefficients of PAC and BP are negative and significant at the .05 and .10 level, respectively, using a one-tailed test. The coefficients of LEV, CAS, SIZE and OC are not significant at the .10 level. The R^2 statistic is 5 percent. The results support the political action committee contribution and the bonus plan hypotheses. The results do not support the debt covenant, political cost, and ownership control hypotheses.

The results of Model One, when reviewed on a separate year basis, tend to lose explanatory power as time passes suggesting that other variables may be missing in the original model or just that significant differences are most evident after the passage of major tax revisions (i.e. Economic Recovery Act of 1981).

The variables that consistently displayed the anticipated direction in all years were CAS and PAC. As contrasted with the univariate tests, the major difference in the multivariate results is that the variable SIZE shows the expected direction in 1982 and 1983 along with being statistically significant at the .05 level. This provides support for other studies [Zimmerman (1983), Stickney and McGee (1982), and U.S. Treasury (1978)] which show that larger firms tend to pay higher taxes, thus supporting the

political cost hypothesis. However, the SIZE variable reverses the sign in 1984, 1985, and when all years are combined, resulting in mixed results for the political cost hypothesis consistent with other studies, as documented by Watts and Zimmerman (1986).

The BP variable was significant in 1982 and 1984 and was close to being significant in the other two years. Additionally, when all years are combined, the BP variable is significant, which suggests that contracts established between managers and owners that are linked to after-tax earnings for determination of bonus payouts are indeed effective in monitoring management's behavior. Why more firms do not include this consideration in bonus plans is an area worth exploring.

The PAC variable was significant in three out of four years and on a four-year combined basis, providing the strongest findings in the multivariate testing. Clearly, the increased spending of political action committees to members of the tax writing committees shows that lobbying efforts do permit significant wealth transfer between various interest groups.

MODEL TWO

Model Two contains all the variables originally hypothesized to explain tax avoidance strategy; however, the sample size is reduced due to the CAI variable being available for approximately 25% of the sample. Table 2B contains a frequency distribution of the sample of Model Two by industry. The results show that five industries account for over half of the sample; however, this industry concentration did not lead to cross-sectional correlation in the individual model years as measured by the Park test. When all four years were combined, the Park test

showed heteroscedastic error terms which were adjusted by using the weighted least square procedure.

The VIF to detect multicollinearity shows little to exist in this sample.

Model Two found the following variables to be significant at the .05* or .10** level (see below).

Variable	All Years Combined	1982	1983	1984	1985
LEV	**	*			
CAS					**
SIZE	*				
BP	*	*			
PAC	*	*	*		
OC					
CAI			**		

The results of the four year Model Two are provided in Table 7E. The coefficients of BP and PAC are negative, the coefficient of SIZE is positive, and all variables are significant at the .05 level using a one-tailed test. The coefficient of LEV is negative and significant at the .10 level using a one-tailed test. The coefficients of CAS, OC, and CAI are not significant at the .10 level. The adjusted R^2 statistic is not meaningful due to a correction for heteroscedasticity (Treble 1984). These results support the debt covenant, political cost, bonus plan, and political action committee contribution hypotheses. These results do not support the ownership control and capital intensity hypotheses.

The four year Model Two is identical to the four year Model One except the political cost hypothesis is supported by the results of model two. The additional variable, CAI, is not significant.

The results of the 1982 model two are provided in Table 7A. The coefficients of LEV, BP, and PAC are negative and significant at the .05 level using a one-tailed test. The coefficients of CAS, SIZE, OC, and CAI are not significant at the .05 level. The adjusted R^2 statistic is 21 percent. These results are consistent with the debt covenant, bonus plan, and political action committee contribution hypotheses. The results do not support the political cost, ownership control, and capital intensity hypotheses.

The 1982 Model Two results are identical to the 1982 Model One except for not supporting the political cost hypothesis.

The 1983 Model Two results are provided on Table 7B. The coefficients of PAC and CAI are negative and significant at the .05 level and the .10 level, respectively, using a one-tailed test. The coefficients of LEV, CAS, SIZE, BP, and OC are not significant at the .10 level. The adjusted R^2 statistic is 15 percent. The results are consistent with the political action committee contribution and capital intensity hypotheses. The results do not support the debt covenant, political cost, bonus, and ownership control hypotheses.

The results for the 1983 Model Two show the only situation in which the capital intensity hypothesis is significant for tax avoiding firms.

The 1984 and 1985 Model Two results are provided on Table 7C and 7D, respectively. The coefficients of all variables are not significant at the .05 level using a one-tailed test. These results support no hypotheses in 1984 and 1985.

Model Two is similar to Model One since both have higher adjusted R^2s in the early years. Clearly the inclusion of the CAI variable has not contributed to the explanatory powers of the model, possibly due to the decreased power due to the smaller sample size.

4.3.2 DISCRIMINANT ANALYSIS

Discriminant analysis was conducted to determine if the hypothesized variables could be used to more accurately classify tax avoiders and non-tax avoiders than a naive approach. The statistical theory underlining this technique assumes that the discriminating variables have a multivariate normal distribution. A log transformation was performed on the total asset variable so that an approximate normal distribution resulted.[17] All discriminant models used LEV, CAS, BP, OC, SIZE, and PAC variables. Based upon the results of previous testing, the CAI variable was not used due to the paucity of data available.

Another assumption underlying discriminant analysis is that each group has the same covariance matrix of discriminating variables. When this is true, a "pooled" covariance matrix is estimated. The SAS discriminant package performs a likelihood ratio test of the homogeneity of the within-group covariance matrices to determine if the within-group or the pooled covariance matrix is used. Preliminary tests were run allowing the software package to determine the appropriate covariance matrix. Tests were also run with a pooled covariance matrix, regardless of whether the test of homogeneity showed this to be appropriate. Results were quite similar under each approach. The results reported in the study are based on the pooled covariance matrix.

Discriminant analysis is only useful if there are significant differences between the population mean vectors. One statistic to test for these differences is the Wilk's Lambda. If the Wilk's Lambda statistic is significant at α = .05, we can be 95% certain that there are at least some variables that are different for tax avoiding and non-tax avoiding firms, assuming other conditions are met.

In classifying cases with a discriminant model, it is important to assign the appropriate prior probabilities of group membership. The generally accepted procedure is to use probabilities proportional to group sizes. All reported statistics and error rates were calculated using this specification. In presenting results, the prior probabilities are reported on each table and reflect the sample size of one group divided by the size of both groups combined. The significance of the model, the correct percent of classifications, and the individual variables which were significant are also provided with each table.

Tables 8A-8J present the results of the discriminant analysis. There are ten different tables to show the manner in which the sample was divided. The sample of firms was split in half, in thirds, and in quarters with respect to the adjusted tax rate, and an analysis was performed for each possible combination.

To evaluate the overall classification accuracy of the discriminant model, the total correct percent of classified firms can be compared to the prior probability of the group with the highest prior. For example, in Table 8A, group 2 in 1982 has a 53% prior, so, and using a naive rule, if all firms were classified as group 2, 53% would be classified properly.

The naive rule minimizes total misclassifications but results in only one type of error. The Fisher model gave 63% correct classification versus the naive rule of 53%. Additionally, the 1982 model is significant at .0004, and five of the six variables used in the model were significant discriminating factors in the univariate tests.

Correct classification probabilities in all of the tables are better than or equal to the naive rule. Those models using the more extreme groupings generally provided the better results. Since most groups are nearly equal in size, a general rule would be that any overall classification rate exceeding 50% is an improvement over the naive rule.

The more significant models are found on Table 8A (bottom vs. top half), 8B (bottom vs. top third), 8E (lowest vs. highest quartile), and 8J (second quartile vs. highest quartile). This is not surprising due to the positioning of the groups. The three variables consistently significant across time and models are PAC, CAS, and SIZE, which are consistent with the multiple regression models.

4.3.3 LOGISTIC REGRESSION

Logistic Regression was used as a third multivariate technique due to its having one categorical variable, BP (bonus plan). Logistic regression is considered to be a better procedure for classification purposes when some of the variables are categorical, because there is not a requirement that the independent variables follow a multivariate normal distribution. BP, being a dummy variable, cannot follow a normal distribution.

The classification results of logistic regression are almost identical to the discriminant technique (see Table 9). Selected data has been provided to show support for the results using the discriminant analysis, and thus similar interpretations would follow. These redundant findings are not described here.

4.4 SUMMARY

The results of statistical tests used to examine the importance of the seven variables hypothesized to be potential determinants of tax avoidance strategy are discussed in this chapter. The univariate testing was performed on both a parametric and non-parametric basis with the Mann-Whitney U-Test results being reported in this chapter.

Four of the seven independent variables (i.e. LEV, CAS, PAC, and OC) proved to be significantly different for the tax avoider and non-tax avoider groups in the univariate tests. Additionally, the SIZE variable was significant, but the directional sign was opposite from the original hypothesized sign. The two remaining variables (i.e. BP and CAI) were in the expected direction but were not statistically significant.

Taken together, the univariate tests provide support for the debt covenant, political action committee contribution, and ownership control hypotheses. Support is not consistently provided for the political cost, bonus plan, and capital intensity hypotheses.

Based on the findings of the univariate tests, tax avoiding firms are larger in asset size, have higher debt levels, and have lower concentrations of ownership interests by directors and officers. Tax avoiders contribute a larger share of pre-tax income to Political Action Committees

that earmark funds for members of tax writing committees. Directly after major tax changes, the most aggressive tax avoiders have short-term bonus plans based on after-tax accounting earnings.

The multivariate tests included multiple regression, discriminant analysis, and logistic regression. Additionally, a non-parametric discriminant model available in SAS, called NEIGHBOR, was used, and its results were closely aligned to those reported using the parametric discriminant analysis.

The multivariate tests support the debt covenant, bonus plan and political action committee hypotheses. The results do not support the political cost, ownership control, and capital intensity hypotheses.

Based on these findings, the tax avoider would have more assets, a higher debt to equity ratio, bonus plans with after-tax provisions, and contributes a larger share of earnings to political action committees that earmark their funds for members of the tax writing committees of Congress. The ownership percentage of voting stock held by officers and directors shows no relationship to tax avoidance behavior, providing empirical evidence to support Fama's labor market efficiency theory. The level of depreciation expense related to labor expense in a firm shows no relationship to tax avoidance behavior.

TABLE 1

OPERATIONAL VARIABLES AND HYPOTHESIZED DIRECTION TO CORPORATE TAX AVOIDANCE STRATEGY

VARIABLES	VARIABLE DEFINITION	HYPOTHESIZED* DIRECTION
LEV	Leverage - long-term debt divided by net tangible assets	(1) > (2)
CAS	Debt to Equity - total debt divided by total equity	(1) > (2)
SIZE	LOG of total assets	(1) < (2)
CAI	Capital asset intensity ratio - depreciation expense divided by labor expense	(1) > (2)
BP	BONUS PLAN - "1" represents bonus plan based on earnings after income tax or "0" represents bonus plan based on earnings before income tax	(1) > (2)
PAC	POLITICAL ACTION COMMITTEE (PAC) CONTRIBUTION RATIO - PAC contributions divided by pre-tax domestic profits plus PAC contributions	(1) > (2)
OC	Percentage ownership of stock held by directors and officers of the firm	(1) < (2)

*(1) represents lower paying tax firms (tax avoiders) and (2) represents higher paying tax firms (tax non-avoiders).

TABLE 2A

INDUSTRY MEMBERSHIP OF SAMPLE FIRMS

SIC	INDUSTRY	NUMBER
13	Crude Petroleum & Natural Gas	2
15	Building Construction	1
16	Construction other than building	1
20	Food & Kindred	23
21	Tobacco	2
22	Textile	2
23	Apparel & Other Fabric Products	2
24	Lumber & Wood	2
26	Paper	9
27	Printing & Publish	8
28	Chemical & Allied Products	28
29	Petroleum Refining	13
30	Rubber	3
32	Stone, Clay, Glass, Conc.	3
33	Primary Metal	3
34	Fabricated Metal	5
35	Machinery	3
36	Electrical Equipment & Supplies	21
37	Transportation Equipment	17
38	Professional, Scientific Instruments	8
39	Manufacturing-Miscellaneous	1
40	Railroad Transportation	5
41	Local/Suburban Transit	1
44	Water Transportation	1
45	Air Transportation	1
48	Communication	4
49	Electric, Gas, Sanitary Services	28
51	Wholesale Trade: Non-durable Goods	2
53	General Merch. - Retail	3
54	Food Stores	1
60	Banking	12
61	Credit Agencies	2
62	Security/Commodity Brokers	1
63	Insurance	1
70	Hotels/Lodging	1
78	Amusement & Recreation	2
80	Health Services	1
	Totals	215

TABLE 2B

INDUSTRY MEMBERSHIP OF SAMPLE FIRMS FOR MODEL TWO

SIC	INDUSTRY	1982	1983	1984	1985
20	Food & Kindred	10	10	10	10
22	Textile	2	2	2	2
24	Lumber & Wood	1	1	1	1
26	Paper	6	6	6	6
27	Printing & Publish	2	2	2	2
28	Chemical & Allied Products	12	12	11	9
29	Petroleum Refining	8	7	7	7
30	Rubber	3	3	3	3
32	Stone, Clay, Glass, Conc.	2	2	0	0
33	Primary Metal	2	1	1	1
34	Fabricated Metal	1	1	1	1
35	Machinery	1	1	1	1
36	Electrical Equipment & Supplies	4	4	4	4
37	Transportation Equipment	6	7	7	7
38	Professional, Scientific Instruments	3	3	3	3
40	Railroad Transportation	4	4	4	4
45	Air Transportation	1	1	1	1
53	General Merch. - Retail	1	1	1	1
TOTAL =		69	68	65	63

TABLE 3

SUMMARY STATISTICS 1982-1985 (ALL FIRMS)

VARIABLE		MEAN (N)	STD. DEV.	MAX.	MIN.
LEV -	1982	.363 (215)	.491	4.300	.000
	1983	.392	.569	4.089	.000
	1984	.472	.717	5.089	.000
	1985	.584	1.294	15.803	.000
CAS -	1982	.919 (215)	.553	4.500	.072
	1983	.860	.419	2.34	.097
	1984	.904	.427	2.36	.103
	1985	1.033	.642	5.017	.084
SIZE -	1982	8.057 (215)	1.279	12.000	5.180
	1983	8.140	1.264	11.400	5.300
	1984	8.263	1.259	11.400	5.310
	1985	8.344	1.240	11.500	5.421
CAI -	1982	.211 (69)	.219	1.031	.047
	1983	.226 (68)	.264	1.260	.052
	1984	.247 (64)	.294	1.365	.054
	1985	.267 (63)	.318	1.393	.064
BP -	1982	.431 (211)	.496	1.0	.000
	1983	.431	.496	1.0	.000
	1984	.431	.496	1.0	.000
	1985	.431	.496	1.0	.000

TABLE 3 (CONT.)

SUMMARY STATISTICS 1982-1985

VARIABLE		MEAN (N)	STD. DEV.	MAX.	MIN.
PAC -	1982	.309 (211)	2.527	37.000	.000
	1983	.180	.483	6.000	.000
	1984	.133	.261	2.700	.000
	1985	.294	1.321	15.300	.000
OC -	1982	.083 (211)	.154	1.0	.001
	1983	.086	.158	1.0	.001
	1984	.084	.164	1.0	.001
	1985	.083	.163	1.0	.001
UNADJUSTED TAX RATE -	1982	.014 (211)	.675	.600	[6.484]
	1983	.130	.203	.659	[1.153]
	1984	.158	.209	.588	[1.671]
	1985	.100	.588	.713	[7.714]
ADJUSTED TAX RATE -	1982	.013 (211)	.632	.700	[6.059]
	1983	.122	.192	.616	[1.078]
	1984	.149	.197	.550	[1.561]
	1985	.095	.564	.679	[7.346]

TABLE 4A

RESULTS OF MANN-WHITNEY U-TESTS

BOTTOM HALF (1) VERSUS TOP HALF (2)

Variable	Original Hypothesis N = (1)&(2)		Avoiders (1) Mean (STD. DEV.)	Non-Avoiders (2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
LEV	(1) > (2)					
1982			.434 (.490)	.298 (.489)	4.4472	.0001*
1983			.487 (.668)	.304 (.445)	4.4537	.0001*
1984			.568 (.739)	.385 (.689)	4.0947	.0001*
1985			.778 (1.795)	.412 (.504)	2.6172	.0045*
All years	429	430	.566 (1.055)	.350 (.540)	7.6638	.0001*
CAS	(1) > (2)					
1982			1.032 (.670)	.814 (.401)	2.7728	.0028*
1983			.954 (.457)	.774 (.361)	3.088	.0010*
1984			1.036 (.453)	.783 (.363)	4.3533	.0001*
1985			1.158 (.721)	.922 (.543)	3.1796	.0008*
All years	429	430	1.045 (.588)	.824 (.427)	6.6987	.0001*
SIZE	(1) < (2)					
1982			8.367 (1.240)	7.771 (1.250)	3.8129	.0001**
1983			8.442 (1.229)	7.863 (1.236)	3.7976	.0001**
1984			8.707 (1.142)	7.859 (1.229)	5.4717	.0001**
1985			8.760 (1.166)	7.976 (1.191)	5.0423	.0001**
All years	429	430	8.568 (1.203)	7.868 (1.224)	9.0264	.0001**

* Significant results at .05 supporting original hypothesis.
** Significant results at .05, however, in opposite direction.

TABLE 4A (CONT.)

RESULTS OF MANN-WHITNEY U-TESTS

BOTTOM HALF (1) VERSUS TOP HALF (2)

Variable	Original Hypothesis N = (1)&(2)		Avoiders (1) Mean (STD. DEV.)	Non-Avoiders (2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
BP	(1) > (2)					
1982			.515	.357		
			(.500)	(.481)	2.3060	.0105*
1983			.414	.446		
			(.495)	(.499)	.4702	.3192
1984			.449	.420		
			(.500)	(.496)	.4257	.3352
1985			.454	.412		
			(.500)	(.494)	.6013	.2738
All years	429	430	.458	.409		
			(.499)	(.492)	1.4355	.0755
PAC	(1) > (2)					
1982			.540	.104		
			(3.680)	(.177)	1.8166	.0693
1983			.257	.111		
			(.664)	(.203)	2.7618	.0026*
1984			.195	.077		
			(.352)	(.112)	3.4025	.0004*
1985			.499	.118		
			(1.917)	(.224)	2.6544	.0040*
All years	429	430	.373	.103		
			(2.109)	(.185)	5.2726	.0001*
OC	(1) < (2)					
1982			5.703	10.638		
			(10.940)	(18.248)	3.1193	.0009*
1983			6.276	10.743		
			(12.352)	(18.178)	3.8959	.0001*
1984			6.516	10.187		
			(14.950)	(17.457)	3.2186	.0006*
1985			6.667	9.745		
			(16.673)	(15.934)	3.7441	.0001*
All years	429	430	6.288	10.326		
			(13.842)	(17.418)	6.9937	.0001*

* Significant results at .05 supporting original hypothesis.
** Significant results at .05, however, in opposite direction.

TABLE 4A (CONT.)

RESULTS OF MANN-WHITNEY U-TESTS

BOTTOM HALF (1) VERSUS TOP HALF (2)

Variable	Original Hypothesis N = (1)&(2)		Avoiders (1) Mean (STD. DEV.)	Non-Avoiders (2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
CAI	(1) > (2)					
1982			.217 (.230)	.207 (.218)	.6476	.2586
1983			.247 (.296)	.210 (.240)	.9449	.1724
1984			.335 (.381)	.194 (.214)	2.0641	.0390*
1985			.322 (.380)	.225 (.258)	.9475	.1717
All years	113	151	.277 (.323)	.209 (.230)	2.2090	.0136*

* Significant results at .05 supporting original hypothesis.
** Significant results at .05, however, in opposite direction.

TABLE 4B

RESULTS OF MANN-WHITNEY U-TESTS

BOTTOM THIRD (1) VERSUS TOP THIRD (2)

Variable	Original Hypothesis N = (1)&(2)		Avoiders (1) Mean (STD. DEV.)	Non-Avoiders (2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
LEV	(1) > (2)					
1982			.386 (.320)	.206 (.149)	4.4269	.0001*
1983			.482 (.630)	.271 (.401)	4.3041	.0001*
1984			.562 (.696)	.323 (.427)	3.7039	.0001*
1985			.861 (2.124)	.453 (.581)	2.6381	.0042*
All years	268	280	.573 (1.177)	.314 (.428)	7.3851	.0001*
CAS	(1) > (2)					
1982			.989 (.630)	.742 (.374)	2.9024	.0019*
1983			1.029 (.470)	.722 (.326)	4.0934	.0001*
1984			1.050 (.446)	.796 (.351)	3.6321	.0003*
1985			1.266 (.777)	.890 (.467)	3.6175	.0001*
All years	268	280	1.083 (.599)	.789 (.387)	7.0197	.0001*
SIZE	(1) < (2)					
1982			8.384 (1.240)	7.583 (1.203)	3.9173	.0001**
1983			8.422 (1.180)	7.604 (1.157)	4.2704	.0001**
1984			8.695 (1.029)	7.647 (1.114)	5.5928	.0001**
1985			8.748 (.998)	8.054 (1.273)	4.0359	.0001**
All years	268	280	8.561 (1.122)	7.725 (1.197)	8.8655	.0001**

* Significant results .05 supporting original hypothesis.
** Significant results at .05, however, in opposite direction.

TABLE 4B (CONT.)

RESULTS OF MANN-WHITNEY U-TESTS

BOTTOM THIRD (1) VERSUS TOP THIRD (2)

Variable	Original Hypothesis N = (1)&(2)		Avoiders (1) Mean (STD. DEV.)	Non-Avoiders (2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
BP	(1) > (2)					
1982			.603	.352		
			(.490)	(.481)	2.8332	.0023*
1983			.484	.437		
			(.500)	(.499)	.5514	.2907
1984			.383	.373		
			(.490)	(.487)	.1160	.4538
1985			.483	.452		
			(.504)	(.501)	.3558	.7220
All years	268	280	.488	.403		
			(.501)	(.491)	1.9442	.2595
PAC	(1) > (2)					
1982			.828	.099		
			(4.800)	(.171)	2.3359	.0098*
1983			.210	.160		
			(.370)	(.277)	2.3910	.0084*
1984			.236	.086		
			(.429)	(.127)	2.7629	.0028*
1985			.742	.099		
			(2.412)	(.181)	2.9934	.0014*
All years	268	280	.497	.098		
			(2.653)	(.179)	5.2412	.0001*
OC	(1) < (2)					
1982			7.031	11.073		
			(12.210)	(17.078)	2.1646	.0152*
1983			5.602	12.165		
			(11.870)	(19.719)	3.9783	.0001*
1984			6.213	9.392		
			(15.426)	(14.708)	3.0650	.0011*
1985			5.920	9.379		
			(11.561)	(16.450)	2.2546	.0121*
All years	268	280	6.175	10.479		
			(12.779)	(17.001)	5.7203	.0001*

* Significant results at .05 supporting original hypothesis.
** Sifnificant results at .05, however, in opposite direction.

TABLE 4B (CONT.)

RESULTS OF MANN-WHITNEY U-TESTS

BOTTOM THIRD (1) VERSUS TOP THIRD (2)

Variable	Original Hypothesis N = (1)&(2)	Avoiders (1) Mean (STD. DEV.)	Non-Avoiders (2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
CAI	(1) > (2)				
1982		.247 (.260)	.202 (.231)	1.3553	.0876
1983		.238 (.280)	.151 (.122)	.6634	.2535
1984		.322 (.381)	.198 (.228)	1.4494	.0736
1985		.297 (.372)	.261 (.326)	.6902	.2451
All years	75 96	.273 (.317)	.201 (.233)	2.1401	.0162*

* Significant results at .05 supporting original hypothesis.
** Significant results at .05, however, in opposite direction.

TABLE 4C

RESULTS OF MANN-WHITNEY U-TESTS

FIRST QUARTILE (1) VERSUS FOURTH QUARTILE (2)

Variable	Original Hypothesis N = (1)&(2)		Avoiders (1) Mean (STD. DEV.)	Non-Avoiders (2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
LEV	(1) > (2)					
1982			.403	.199		
			(.350)	(.155)	3.9090	.0001*
1983			.385	.241		
			(.287)	(.300)	3.9652	.0001*
1984			.560	.356		
			(.638)	(.490)	2.6478	.0041*
1985			.820	.495		
			(2.287)	(.652)	2.0287	.0212*
All years	214	215	.539	.325		
			(1.195)	(.456)	6.1235	.0001*
CAS	(1) > (2)					
1982			.989	.710		
			(.680)	(.376)	2.8454	.0022*
1983			1.008	.684		
			(.477)	(.299)	3.7106	.0001*
1984			1.047	.784		
			(.487)	(.393)	2.8923	.0019*
1985			1.330	.898		
			(.868)	(.494)	3.2289	.0006*
All years	214	215	1.091	.770		
			(.654)	(.403)	6.2091	.0001*
SIZE	(1) < (2)					
1982			8.481	7.341		
			(1.280)	(1.025)	4.7999	.0001**
1983			8.316	7.576		
			(1.094)	(1.088)	3.5365	.0002**
1984			8.653	7.600		
			(1.080)	(1.051)	4.7302	.0001**
1985			8.679	7.949		
			(.955)	(1.169)	3.7267	.0001**
All years	214	215	8.530	7.620		
			(1.109)	(1.099)	8.3789	.0001**

* Significant results at .05 supporting original hypothesis.
** Significant results at .05, however, in opposite direction.

TABLE 4C (CONT.)

RESULTS OF MANN-WHITNEY U-TESTS

FIRST QUARTILE (1) VERSUS FOURTH QUARTILE (2)

Variable	Original Hypothesis N = (1)&(2)		Avoiders (1) Mean (STD. DEV.)	Non-Avoiders (2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
BP	(1) > (2)					
1982			.651 (.480)	.340 (.478)	3.0184	.0012*
1983			.489 (.506)	.472 (.504)	.1648	.4345
1984			.386 (.493)	.382 (.490)	.0418	.4833
1985			.452 (.504)	.436 (.501)	.1523	.4394
All years	214	215	.494 (.501)	.407 (.492)	1.7123	.0434*
PAC	(1) > (2)					
1982			1.034 (5.576)	.100 (.179)	1.7020	.0444*
1983			.243 (.422)	.068 (.116)	2.8688	.0020*
1984			.236 (.317)	.097 (.142)	2.3363	.0097*
1985			.995 (2.852)	.096 (.160)	2.6463	.0040*
All years	214	215	.619 (3.114)	.091 (.151)	4.7282	.0001*
OC	(1) < (2)					
1982			6.963 (11.600)	11.198 (16.565)	2.1501	.0158*
1983			5.244 (10.810)	12.211 (20.632)	3.0219	.0012*
1984			7.402 (17.553)	10.269 (16.058)	2.2350	.0127*
1985			7.036 (13.387)	9.702 (16.072)	1.9113	.0280*
All years	214	215	6.647 (13.497)	10.829 (17.317)	4.6438	.0001*

* Significant results at .05 supporting original hypothesis.
** Significant results at .05, however, in opposite direction.

TABLE 4C (CONT.)

RESULTS OF MANN-WHITNEY U-TESTS

FIRST QUARTILE (1) VERSUS FOURTH QUARTILE (2)

Variable	Original Hypothesis N = (1)&(2)		Avoiders (1) Mean (STD. DEV.)	Non-Avoiders (2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
CAI	(1) > (2)					
1982			.241 (.230)	.125 (.083)	2.2235	.0131*
1983			.270 (.309)	.160 (.132)	.8984	.1845
1984			.335 (.421)	.209 (.265)	.8205	.2059
1985			.362 (.468)	.141 (.004)	.8485	.1981
All years	54	66	.296 (.351)	.156 (.146)	2.4503	.0072*

* Significant results at .05 supporting original hypothesis.
** Significant results at .05, however, in opposite direction.

TABLE 4D

RESULTS OF MANN-WHITNEY U-TESTS

FIRST QUARTILE (1) VERSUS SECOND QUARTILE (2)

Variable	Original Hypothesis N = (1)&(2)		Low Avoiders(1) Mean (STD. DEV.)	High Avoiders(2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
LEV	(1) > (2)					
1982			.403 (.350)	.460 (.575)	.5661	.2856
1983			.385 (.287)	.579 (.880)	.1156	.4540
1984			.560 (.638)	.575 (.824)	.6470	.2588
1985			.820 (2.287)	.744 (1.266)	1.8514	.0320*
All years	214	215	.539 (1.195)	.589 (.918)	1.0022	.1581
CAS	(1) > (2)					
1982			.989 (.680)	1.069 (.655)	.8641	.1938
1983			1.008 (.477)	.904 (.440)	.9542	.1700
1984			1.047 (.487)	1.026 (.424)	.4794	.3158
1985			1.330 (.868)	1.014 (.537)	2.2605	.0238*
All years	214	215	1.091 (.654)	1.004 (.523)	1.2861	.0992
SIZE	(1) < (2)					
1982			8.481 (1.280)	8.272 (1.215)	.6522	.2571
1983			8.316 (1.094)	8.556 (1.340)	.6901	.2450
1984			8.653 (1.080)	8.755 (1.203)	.3922	.3474
1985			8.679 (.955)	8.828 (1.321)	.4467	.3275
All years	214	215	8.530 (1.109)	8.601 (1.281)	.4349	.3319

* Significant results at .05 supporting original hypothesis.

TABLE 4D (CONT.)

RESULTS OF MANN-WHITNEY U-TESTS

FIRST QUARTILE (1) VERSUS SECOND QUARTILE (2)

Variable	Original Hypothesis N = (1)&(2)		Low Avoiders (1) Mean (STD. DEV.)	High Avoiders (2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
BP	(1) > (2)					
1982			.651 (.480)	.411 (.496)	2.3567	.0092*
1983			.489 (.506)	.352 (.480)	1.3672	.0858
1984			.386 (.493)	.500 (.505)	1.1150	.1324
1985			.452 (.504)	.455 (.503)	.0169	.4932
All years	214	215	.494 (.501)	.429 (.496)	1.2831	.0998
PAC	(1) > (2)					
1982			1.034 (5.576)	.160 (.215)	.0646	.4742
1983			.243 (.422)	.267 (.817)	.1516	.4400
1984			.236 (.317)	.162 (.378)	.8343	.2020
1985			.995 (2.852)	.121 (.150)	1.3743	.0847
All years	214	215	.619 (3.114)	.178 (.467)	1.259	.1301
OC	(1) < (2)					
1982			6.963 (11.600)	4.736 (10.414)	2.3604	.0091*
1983			5.244 (10.810)	7.135 (13.540)	.4300	.3336
1984			7.402 (17.553)	5.794 (12.566)	1.1415	.1268
1985			7.036 (13.387)	6.385 (18.920)	.7438	.2285
All years	214	215	6.647 (13.497)	6.003 (14.135)	2.339	.0098*

* Significant results at .05 supporting original hypothesis.

TABLE 4D (CONT.)

RESULTS OF MANN-WHITNEY U-TESTS

FIRST QUARTILE (1) VERSUS SECOND QUARTILE (2)

Variable	Original Hypothesis N = (1)&(2)		Low Avoiders (1) Mean (STD. DEV.)	High Avoiders (2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
CAI	(1) > (2)					
1982			.241 (.230)	.192 (.223)	.7466	.2276
1983			.270 (.309)	.223 (.290)	.2489	.4017
1984			.335 (.421)	.335 (.350)	.6255	.2658
1985			.362 (.468)	.295 (.324)	.0000	.5000
All years	54	59	.296 (.351)	.259 (.296)	.0144	.4943

TABLE 4E

RESULTS OF MANN-WHITNEY U-TESTS

THIRD QUARTILE (1) VERSUS FOURTH QUARTILE (2)

Variable	Original Hypothesis N = (1)&(2)		Low Non-Avoiders (1) Mean (STD. DEV.)	High Non-Avoiders (2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
LEV	(1) > (2)					
1982			.387 (.648)	.199 (.155)	2.3952	.0083*
1983			.361 (.540)	.241 (.300)	1.4511	.0734
1984			.412 (.840)	.356 (.490)	.1164	.4537
1985			.335 (.296)	.495 (.652)	.9612	.1683
All years	215	215	.373 (.608)	.325 (.456)	1.5168	.0647
CAS	(1) > (2)					
1982			.908 (.402)	.710 (.376)	3.1469	.0009*
1983			.854 (.390)	.684 (.299)	2.5641	.0500*
1984			.782 (.340)	.784 (.393)	.2503	.4012
1985			.944 (.589)	.898 (.494)	.3346	.3689
All years	215	215	.873 (.443)	.770 (.403)	3.1522	.0008*
SIZE	(1) < (2)					
1982			8.158 (1.314)	7.431 (1.025)	3.5490	.0002**
1983			8.121 (1.310)	7.576 (1.088)	2.4184	.0078**
1984			8.108 (1.340)	7.600 (1.051)	2.2407	.0250**
1985			8.001 (1.220)	7.949 (1.169)	.4933	.3109
All years	215	215	8.097 (1.290)	7.620 (1.099)	4.4066	.0001**

* Significant results at .05 supporting original hypothesis.
** Significant results at .05, however, in opposite direction.

TABLE 4E (CONT.)

RESULTS OF MANN-WHITNEY U-TESTS

THIRD QUARTILE (1) VERSUS FOURTH QUARTILE (2)

Variable	Original Hypothesis N = (1)&(2)		Low Non-Avoiders(1) Mean (STD. DEV.)	High Non-Avoiders(2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
BP	(1) > (2)					
1982			.373 (.488)	.340 (.478)	.3616	.3588
1983			.424 (.500)	.472 (.504)	.5042	.3071
1984			.456 (.500)	.382 (.490)	.7898	.2148
1985			.390 (.492)	.436 (.501)	.4988	.3089
All years	215	215	.410 (.493)	.407 (.492)	.0609	.4757
PAC	(1) > (2)					
1982			.108 (.177)	.100 (.179)	1.2005	.1150
1983			.151 (.252)	.068 (.116)	2.4922	.0064*
1984			.057 (.068)	.097 (.142)	.3083	.3789
1985			.138 (.270)	.096 (.160)	.6928	.2442
All years	215	215	.115 (.211)	.091 (.151)	2.1029	.0177
OC	(1) < (2)					
1982			10.136 (19.766)	11.198 (16.565)	1.9935	.0231*
1983			9.424 (15.720)	12.211 (20.632)	.8403	.2003
1984			10.109 (18.850)	10.269 (16.058)	1.2205	.1112
1985			9.785 (15.942)	9.702 (16.072)	.3975	.3500
All years	215	215	9.861 (17.536)	10.892 (17.317)	1.8751	.0304*

* All significant results at .05 supporting original hypothesis.
** All significant results at .05, however, in opposite direction.

TABLE 4E (CONT.)

RESULTS OF MANN-WHITNEY U-TESTS

THIRD QUARTILE (1) VERSUS FOURTH QUARTILE (2)

Variable	Original Hypothesis N = (1)&(2)		Low Non-Avoiders(1) Mean (STD. DEV.)	High Non-Avoiders(2) Mean (STD. DEV.)	Mann-Whitney Z-Score	Mann-Whitney Prob. (One-Tailed)
CAI	(1) > (2)					
1982			.278 (.270)	.125 (.083)	2.9440	.0016*
1983			.271 (.320)	.160 (.132)	.5578	.2885
1984			.187 (.190)	.209 (.265)	.0745	.4703
1985			.281 (.322)	.141 (.044)	1.2627	.1033
All years	85	66	.249 (.273)	.156 (.146)	2.4928	.0064*

* Significant results at .05 supporting original hypothesis.
** Significant results at .05, however, in opposite direction.

TABLE 5

CORRELATIONS AMONG THE POTENTIAL EXPLANATORY VARIABLES OF DEBT COVENANT HYPOTHESIS *

		LEV
1982	CAS	.07184
		(.2844)
1983	CAS	.02633
		(.6951)
1984	CAS	.06161
		(.3578)
1985	CAS	.15727
		(.0185)**

* Results were obtained using Pearson correlation coefficients (two tailed significance level).

** Significant at .05

TABLE 6A

MULTIVARIATE REGRESSION MODEL ONE

1982

VARIABLE	EXPECTED SIGN	COEF.	T-VALUE	SIGNIFICANCE (ONE-TAILED)	VARIANCE INFLATION FACTOR
PANEL A: Ordinary least squares model with no adjustment for heteroscedasticity.					
INTERCEPT		.4711	1.816	.0354	-
LEV	-	- .0261	- 0.331	.3706	1.246
CAS	-	- .2052	- 3.187	.0009*	1.042
SIZE	+	- .0144	- 0.447	.3278	1.389
BP	-	- .2276	- 3.136	.0010*	1.060
PAC	-	- .1363	- 9.803	.0001*	1.009
OC	+	- .0006	- 0.267	.3947	1.129
Ajusted R^2 = .36		N = 211	F = 20.412	Prob>F = .0001	
PANEL B: Weighted least squares model with adjustment for heteroscedasticity (weighting = 1/OC to the .27 power)					
INTERCEPT		.0956	1.057	.1458	-
LEV	-	- .0791	- 1.225	.1109	1.428
CAS	-	- .1754	- 3.000	.0015*	2.039
SIZE	+	.0292	2.281	.0118*	3.006
BP	-	- .1904	- 3.087	.0012*	1.054
PAC	-	- .1362	-11.482	.0001*	1.008
OC	+	- .0000	- 0.031	.4876	1.434
Adjusted R^2 = .42**		N = 211	F = 25.71	Prob>F = .0001	

* Significant at .05 level.

** R^2 becomes meaningless when correcting for heteroscedasticity in regressions where the dependent variable is a logarithm (Treble 1984).

TABLE 6B

MULTIVARITE REGRESSION MODEL ONE

1983

VARIABLE	EXPECTED SIGN	COEF.	T-VALUE	SIGNIFICANCE (ONE-TAILED)	VARIANCE INFLATION FACTOR
PANEL A: Ordinary least squares model with no adjustment for heteroscedasticity					
INTERCEPT		.4447	4.486	.0001	-
LEV	-	- .0094	- 0.372	.3551	1.313
CAS	-	- .0067	- 2.145	.0166*	1.053
SIZE	+	- .0302	- 2.495	.0067*	1.476
BP	-	- .0253	- 0.965	.1677	1.068
PAC	-	- .0625	- 2.390	.0089*	1.005
OC	+	+ .0005	0.693	.2447	1.153
Adjusted R^2 = .09		N = 211	F = 4.603	Prob>F = .0001	
PANEL B: Weighted least squares model with adjustment for heteroscedasticity.					
INTERCEPT		- .2621	- 0.676	.2500	-
LEV	-	- .0748	- 4.180	.0001*	2.742
CAS	-	- .1385	- 5.743	.0001*	13.591
SIZE	+	.0301	8.259	.0001*	17.997
BP	-	.4746	0.990	.1617	1.059
PAC	-	- .0547	- 0.113	.4550	1.018
OC	+	.0025	0.164	.4350	1.062
Adjusted R^2 = .36**		N = 211	F = 20.868	Prob>F = .0001	

* Significant at .05 level

** R^2 becomes meaningless when correcting for heteroscredasticity in regression where the dependent variable is a logarithm (Treble 1984).

TABLE 6C

MULTIVARIATE REGRESSION MODEL ONE

1984

VARIABLE	EXPECTED SIGN	COEF.	T-VALUE	SIGNIFICANCE (ONE-TAILED)	VARIANCE INFLATION FACTOR
PANEL A: Ordinary least squares model with no adjustment for heteroscedasticity.					
INTERCEPT		.4794	3.988	.0001	-
LEV	-	.0046	0.188	.4253	1.312
CAS	-	- .0287	- 0.769	.2215	1.067
SIZE	+	- .0357	- 2.449	.0076*	1.443
BP	-	.0309	0.964	.1681	1.080
PAC	-	- .1836	- 3.042	.0014*	1.046
OC	+	- .0010	- 1.038	.1503	1.132
Adjusted R^2 = .06		N = 211	F = 3.139	Prob>F = .0029	

* Significant at .05 level.

Note: The OLS model had no detectable heteroscedasticity in 1984.

TABLE 6D

MULTIVARIATE REGRESSION MODEL ONE

1985

VARIABLE	EXPECTED SIGN	COEF.	T-VALUE	SIGNIFICANCE (ONE-TAILED)	VARIANCE INFLATION FACTOR
PANEL A: Ordinary least squares model with no adjustments for heteroscedasticity.					
INTERCEPT		.2331	0.809	.2097	-
LEV	-	-.0004	-0.015	.4942	1.123
CAS	-	-.0274	-0.406	.3425	1.063
SIZE	+	-.0051	-0.150	.4405	1.242
BP	-	-.1077	-1.369	.0863**	1.058
PAC	-	-.0997	-3.406	.0004*	1.035
OC	+	.0009	0.404	.3432	1.104
Adjusted R^2 = .05		N = 211	F = 2.681	Prob> = .0079	

* Significant at .05 level.

** Significant at .10 level.

Note: The OLS model had no detectable heteroscedasticity in 1985.

TABLE 6E

MULTIVARIATE REGRESSION MODEL ONE

ALL YEARS COMBINED

VARIABLE	EXPECTED SIGN	COEF.	T-VALUE	SIGNIFICANCE (ONE-TAILED)	VARIANCE INFLATION FACTOR
PANEL A:	Ordinary least squares model - no adjustment for heteroscedasticity was needed.				
INTERCEPT		.3987	3.813	.0001	-
LEV	-	.0051	0.287	.3872	1.168
CAS	-	-.0871	-3.067	.0011*	1.051
SIZE	+	-.0199	-1.589	.0563**	1.306
BP	-	-.0831	-2.867	.0020*	1.059
PAC	-	-.0096	-13.404	.0001*	1.007
OC	+	.0000	0.028	.4887	1.124
Adjusted R^2 = .20		N = 844	F = 35.624	Prob>F = .0001	

* Significant at .05 level.

** Significant at .10 level.

TABLE 7A

MULTIVARIATE REGRESSION MODEL TWO

1982

VARIABLE	EXPECTED SIGN	COEF.	T-VALUE	SIGNIFICANT (ONE-TAILED)	VARIANCE INFLATION FACTOR
PANEL A:	Ordinary least squares model - no adjustment for heteroscedasticity was necessary.				
INTERCEPT		1.0532	1.501	.0693	-0-
LEV	-	-1.9599	-1.995	.0254*	1.455
CAS	-	-0.3126	-0.159	.4373	1.406
SIZE	+	-0.0318	-0.354	.3623	1.311
BP	-	-0.4919	-2.442	.0088*	1.179
PAC	-	-1.4320	-2.700	.0045*	1.213
OC	+	-0.0067	-1.248	.1085	1.117
CAI	-	0.6533	1.288	.1014	1.341
Adjusted R^2 = .21		N = 69	F = 3.429	Prob> F = .0020	

* Significant at .05 level.

TABLE 7B

MULTIVARIATE REGRESSION MODEL TWO

1983

VARIABLE	EXPECTED SIGN	COEF.	T-VALUE	SIGNIFICANCE (ONE-TAILED)	VARIANCE INFLATION FACTOR
PANEL A:	Ordinary least squares model - no adjustment for heteroscedasticity was needed.				
INTERCEPT		.4445	2.142	.0182	-
LEV	-	-.1982	-0.799	.2139	1.334
CAS	-	.0216	0.248	.4027	1.315
SIZE	+	-.0223	-0.825	.2062	1.445
BP	-	-.0364	-0.630	.2656	1.177
PAC	-	-.5017	-2.260	.0138*	1.302
OC	+	.0011	0.763	.2242	1.101
CAI	-	-.1978	-1.566	.0614**	1.460
Adjusted R^2 = .15		N = 68	F = 2.582	Prob> F = .0109	

* Significant at .05 level.
** Significant at .10 level.

TABLE 7C

MULTIVARIATE REGRESSION MODEL TWO

1984

VARIABLE	EXPECTED SIGN	COEF.	T-VALUE	SIGNIFICANCE (ONE-TAILED)	VARIANCE INFLATION FACTOR
PANEL A:	Ordinary least squares model - no adjustment for heteroscrdasticity was needed.				
INTERCEPT		.1321	0.519	.3031	-
LEV	-	.2472	1.071	.1444	1.274
CAS	-	.0368	0.353	.3627	1.493
SIZE	+	-.0041	-0.126	.4501	1.402
BP	-	.0268	0.348	.3646	1.355
PAC	-	-.4202	-1.125	.1328	1.524
OC	+	-.0014	-0.832	.2045	1.148
CAI	-	-.0269	-0.178	.2967	1.553
Adjusted R^2 = -.05		N = 65	F = .607	Prob>F = .3747	

TABLE 7D

MULTIVARIATE REGRESSION MODEL TWO

1985

VARIABLE	EXPECTED SIGN	COEF.	T-VALUE	SIGNIFICANCE (ONE-TAILED	VARIANCE INFLATION FACTOR
PANEL A:	Ordinary least squares model - no adjustment for heteroscedasticity was needed.				
INTERCEPT		.2593	1.670	.0504	-
LEV	-	.0324	0.243	.4044	1.405
CAS	-	-.0598	-1.278	.1034	1.857
SIZE	+	-.0045	-0.236	.4072	1.270
RP	-	-.0286	-0.632	.2651	1.240
PAC	-	-.1076	-1.032	.1535	1.214
OC	+	-.0001	-0.138	.4452	1.130
CAI	-	.0021	0.025	.4900	1.641
Adjusted R^2 = -.03		N = 63	F = .785	Prob> F = .3020	

TABLE 7E

MULTIVARIATE REGRESSION MODEL TWO

ALL YEARS COMBINED

VARIABLE	EXPECTED SIGN	COEF.	T-VALUE	SIGNIFICANCE (ONE-TAILED)	VARIANCE INFLATION FACTOR
PANEL A: Ordinary least squares model with no adjustment for heterocedasticity.					
INTERCEPT		.4080	1.880	.0307	-
LEV	-	-.1616	-0.751	.2268	1.258
CAS	-	-.0424	-0.624	.2666	1.325
SIZE	+	-.0101	-0.368	.3536	1.310
BP	-	-.1408	-2.235	.0132*	1.207
PAC	-	-.7709	-4.250	.0001*	1.156
OC	+	-.0009	-0.602	.2738	1.089
CAI	-	.0757	0.594	.2765	1.347
Adjusted R^2 = .08		N = 265	F = 4.007	Prob> F = .0002	
PANEL B: Weighted least squares model with adjustment for heteroscedasticity (weighting = 1/OC to the .27 power)					
INTERCEPT		.1157	1.187	.1182	-
LEV	-	-.3593	-1.586	.0570**	1.715
CAS	-	.0074	0.123	.4510	1.759
SIZE	+	.0341	2.869	.0023*	2.411
BP	-	-.1870	-2.995	.0015*	1.393
PAC	-	-.9660	-4.627	.0001*	1.363
OC	+	-.0050	-0.915	.1806	2.006
CAI	-	-.0024	-0.021	.4918	1.348
Adjusted R^2 = .11***		N = 257	F = 5.384	Prob> F = .0001	

* Significant at .05 level.

** Significant at .10 level.

*** R^2 becomes meaningless when correcting for heteroscedasticity in regressions where the dependent variable is a logarithm (Treble 1984).

TABLE 8A

DISCRIMINANT ANALYSES

BOTTOM HALF (1) VS. TOP HALF (2)

(PRIOR PROB.)	WILKS LAMBDA	SIGNI-FIANCE	% CORRECT CLASSIFICATION	SIGN. UNIVARIATE VARIABLE	PROB.
1982	.8874	.0004			
GROUP 1 (47%)			55%	LEV	.0377
GROUP 2 (53%)			70%	CAS	.0051
TOTAL			63%	BP	.0207
				OC	.0200
				SIZE	.0010
1983	.8849	.0003			
GROUP 1 (47%)			56%	LEV	.0164
GROUP 2 (53%)			76%	CAS	.0024
TOTAL			66%	OC	.0406
				PAC	.0292
				SIZE	.0013
1984	.8039	.0001			
GROUP 1 (47%)			70%	CAS	.0001
GROUP 2 (53%)			79%	PAC	.0011
TOTAL			74%	SIZE	.0001
1985	.8802	.0002			
GROUP 1 (47%)			57%	LEV	.0363
GROUP 2 (53%)			77%	CAS	.0237
TOTAL			68%	PAC	.0361
				SIZE	.0001

TABLE 8B

DISCRIMINANT ANALYSES

BOTTOM THIRD (1) VS. TOP THIRD (2)

(PRIOR PROB.)	WILKS LAMBDA	SIGNI-FIANCE	% CORRECT CLASSIFICATION	SIGN. UNIVARIATE VARIABLE	PROB.
1982	.7814	.0001			
GROUP 1 (45%)			57%	LEV	.0001
GROUP 2 (55%)			80%	CAS	.0104
TOTAL			70%	BP	.0042
				SIZE	.0007
1983	.7749	.0001			
GROUP 1 (45%)			66%	LEV	.0176
GROUP 2 (55%)			76%	CAS	.0001
TOTAL			71%	OC	.0223
				PAC	.0489
				SIZE	.0002
1984	.7384	.0001			
GROUP 1 (45%)			75%	LEV	.0212
GROUP 2 (55%)			84%	CAS	.0011
TOTAL			80%	PAC	.0056
				SIZE	.0001
1985	.8570	.0031			
GROUP 1 (45%)			55%	CAS	.0023
GROUP 2 (55%)			77%	PAC	.0247
TOTAL			67%	SIZE	.0013

TABLE 8C

DISCRIMINANT ANALYSES

MIDDLE THIRD (1) VS. TOP THIRD (2)

(PRIOR PROB.)	WILKS LAMBDA	SIGNI-FIANCE	% CORRECT CLASSIFICATION	SIGN. UNIVARIATE VARIABLE	PROB.
1982	.8595	.0010			
GROUP 1 (54%)			70%	LEV	.0016
GROUP 2 (46%)			61%	CAS	.0009
TOTAL			65%	SIZE	.0022
1983	.8670	.0025			
GROUP 1 (52%)			75%	SIZE	.0002
GROUP 2 (48%)			65%		
TOTAL			70%		
1984	.8662	.0020			
GROUP 1 (50%)			65%	BP	.0495
GROUP 2 (50%)			71%	SIZE	.0001
TOTAL			68%		
1985	.9727	.6718			
GROUP 1 (52%)			60%	NONE	
GROUP 2 (48%)			52%		
TOTAL			56%		

TABLE 8D

DISCRIMINANT ANALYSES

BOTTOM THIRD (1) VS. MIDDLE THIRD (2)

(PRIOR PROB.)	WILKS LAMBDA	SIGNI-FIANCE	% CORRECT CLASSIFICATION	SIGN. UNIVARIATE VARIABLE	PROB.
1982	.9242	.1004			
GROUP 1 (42%)			45%	BP	.0083
GROUP 2 (58%)			75%		
TOTAL			62%		
1983	.9351	.1711			
GROUP 1 (46%)			40%	CAS	.0131
GROUP 2 (54%)			75%		
TOTAL			59%		
1984	.8914	.0199			
GROUP 1 (45%)			60%	PAC	.0095
GROUP 2 (55%)			75%		
TOTAL			68%		
1985	.9131	.0602			
GROUP 1 (44%)			25%	PAC	.0274
GROUP 2 (56%)			80%	SIZE	.0351
TOTAL			56%		

TABLE 8E

DISCRIMINANT ANALYSES

FIRST (LOWEST) QUARTILE (1) VS. FOURTH (HIGHEST) QUARTILE (2)

(PRIOR PROB.)	WILKS LAMBDA	SIGNI-FIANCE	% CORRECT CLASSIFICATION	SIGN. UNIVARIATE VARIABLE	PROB.
1982	.6996	.0001			
GROUP 1 (45%)			65%	LEV	.0002
GROUP 2 (55%)			85%	CAS	.0202
TOTAL			76%	BP	.0021
				SIZE	.0001
1983	.7354	.0001			
GROUP 1 (46%)			67%	LEV	.0141
GROUP 2 (54%)			81%	CAS	.0002
TOTAL			75%	BP	.0442
				PAC	.0046
				SIZE	.0029
1984	.7428	.0001			
GROUP 1 (45%)			73%	CAS	.0116
GROUP 2 (55%)			84%	PAC	.0058
TOTAL			79%	SIZE	.0001
1985	.8403	.0138			
GROUP 1 (43%)			45%	CAS	.0086
GROUP 2 (57%)			81%	PAC	.0215
TOTAL			66%	SIZE	.0028

TABLE 8F

DISCRIMINANT ANALYSES

FIRST (LOWEST) QUARTILE (1) VS. THIRD QUARTILE (2)

(PRIOR PROB.)	WILKS LAMBDA	SIGNI-FIANCE	% CORRECT CLASSIFICATION	SIGN. UNIVARIATE VARIABLE	PROB.
1982	.9015	.1225			
GROUP 1 (42%)			54%	BP	.0052
GROUP 2 (58%)			68%		
TOTAL			62%		
1983	.9404	.4147			
GROUP 1 (46%)			67%	NONE	
GROUP 2 (54%)			81%		
TOTAL			75%		
1984	.7875	.0007			
GROUP 1 (44%)			62%	CAS	.0063
GROUP 2 (56%)			86%	PAC	.0001
TOTAL			76%		
1985	.8670	.0332			
GROUP 1 (42%)			38%	CAS	.0332
GROUP 2 (58%)			88%	PAC	.0237
TOTAL			68%	SIZE	.0063

TABLE 8G

DISCRIMINANT ANALYSES

FIRST (LOWEST) QUARTILE (1) VS. SECOND QUARTILE (2)

(PRIOR PROB.)	WILKS LAMBDA	SIGNI-FIANCE	% CORRECT CLASSIFICATION	SIGN. UNIVARIATE VARIABLE	PROB.
1982	.8917	.0958			
GROUP 1 (44%)			54%	BP	.0175
GROUP 2 (56%)			79%		
TOTAL			67%		
1983	.9226	.2717			
GROUP 1 (46%)			42%	NONE	
GROUP 2 (54%)			76%		
TOTAL			60%		
1984	.9632	.7410			
GROUP 1 (46%)			33%	NONE	
GROUP 2 (54%)			81%		
TOTAL			60%		
1985	.9079	.1802			
GROUP 1 (44%)			29%	PAC	.0252
GROUP 2 (56%)			90%		
TOTAL			64%		

TABLE 8H

DISCRIMINANT ANALYSES

SECOND QUARTILE (1) VS. THIRD QUARTILE (HIGHEST TAX) (2)

(PRIOR PROB.)	WILKS LAMBDA	SIGNI-FIANCE	% CORRECT CLASSIFICATION	SIGN. UNIVARIATE VARIABLE	PROB.
1982	.9421	.3638			
GROUP 1 (49%)			50%	NONE	
GROUP 2 (51%)			71%		
TOTAL			61%		
1983	.9416	.3707			
GROUP 1 (48%)			58%	NONE	
GROUP 2 (52%)			75%		
TOTAL			64%		
1984	.8197	.0018			
GROUP 1 (49%)			70%	CAS	.0010
GROUP 2 (51%)			74%	PAC	.0429
TOTAL			72%	SIZE	.0087
1985	.8926	.0541			
GROUP 1 (48%)			62%	LEV	.0174
GROUP 2 (52%)			78%	SIZE	.0307
TOTAL			70%		

TABLE 8I

DISCRIMINANT ANALYSES

THIRD QUARTILE (LOWEST) (1) VS. FOURTH QUARTILE (2)

(PRIOR PROB.)	WILKS LAMBDA	SIGNI-FIANCE	% CORRECT CLASSIFICATION	SIGN. UNIVARIATE VARIABLE	PROB.
1982	.8303	.0029			
GROUP 1 (52%)			70%	LEV	.0426
GROUP 2 (48%)			64%	CAS	.0083
TOTAL			67%	SIZE	.0004
1983	.8683	.0195			
GROUP 1 (52%)			66%	CAS	.0124
GROUP 2 (48%)			62%	PAC	.0310
TOTAL			64%	SIZE	.0190
1984	.9068	.1065			
GROUP 1 (51%)			63%	SIZE	.0281
GROUP 2 (49%)			56%		
TOTAL			60%		
1985	.9503	.4753			
GROUP 1 (51%)			63%	NONE	
GROUP 2 (49%)			38%		
TOTAL			51%		

TABLE 8J

DISCRIMINANT ANALYSES

SECOND (LOWEST) QUARTILE (1) VS. FOURTH QUARTILE (2)

(PRIOR PROB.)	WILKS LAMBDA	SIGNI-FIANCE	% CORRECT CLASSIFICATION	SIGN. UNIVARIATE VARIABLE	PROB.
1982	.7600	.0001			
GROUP 1 (51%)			77%	LEV	.0019
GROUP 2 (49%)			66%	CAS	.0007
TOTAL			72%	OC	.0158
				SIZE	.0001
1983	.7501	.0001			
GROUP 1 (50%)			72%	LEV	.0091
GROUP 2 (50%)			77%	CAS	.0030
TOTAL			75%	SIZE	.0001
1984	.7181	.0001			
GROUP 1 (50%)			72%	CAS	.0025
GROUP 2 (50%)			76%	SIZE	.0001
TOTAL			74%		
1985	.8769	.0321			
GROUP 1 (50%)			75%	SIZE	.0003
GROUP 2 (50%)			69%		
TOTAL			72%		

TABLE 9

COMPARISON OF CORRECT CLASSIFICATION RATES

DISCRIMINANT ANALYSIS VERSUS LOGISTIC REGRESSION

	1982	1983	1984	1985
Bottom Half (1) vs. Top Half (2)				
Group 1 - Disc.	55%	56%	70%	57%
Log	57%	63%	68%	61%
Group 2 - Disc.	70%	76%	79%	77%
Log	70%	73%	79%	76%
Total - Disc.	63%	66%	74%	68%
Log	64%	68%	74%	69%
Bottom Third (1) vs. Top Third (2)				
Group 1 - Disc.	57%	66%	75%	55%
Log	59%	67%	75%	58%
Group 2 - Disc.	80%	76%	84%	77%
Log	79%	76%	84%	73%
Total - Disc.	70%	71%	80%	67%
Log	70%	72%	80%	66%

TABLE 10

ADJUSTED TAX RATES - CUTOFF POINTS

FOR GROUP CLASSIFICATION

	1982	1983	1984	1985
Mean	1.3 %	12.2 %	14.1 %	9.5 %
Std. Dev.	6.32%	1.92%	1.97%	5.64%
Low	(605.97%)	(107.84%)	(156.17%)	(734.69%)
High	70.00%	61.63%	54.96%	67.92%
Lower Quartile	(4.10%)	.42%	1.89%	1.70%
Lower Third	0.00%	2.59%	4.81%	3.95%
Halfway	5.86%	9.57%	12.35%	10.61%
Top Third	18.29%	23.28%	23.98%	21.93%
Top Quartile	25.96%	26.83%	27.97%	26.32%

CHAPTER 5

SUMMARY, LIMITATIONS AND CONTRIBUTIONS

5.1 SUMMARY OF THE RESEARCH PROJECT

The Economic Recovery Tax Act of 1981 (ERTA) encouraged firms to invest in capital goods by liberalizing the investment tax credit regulations and creating the Accelerated Cost Recovery System (ACRS) under which assets are written off over periods largely independent of any notion of useful life. Whether this tax policy was effective is debatable, but it did create a significant reduction in corporate income taxes being paid by U.S. firms. The four year period 1982 to 1985 represents the lowest percentage of federal corporate taxes related to domestic profits ever paid by U.S. corporations, as shown in Exhibit Two. However, the reduced tax burden was not shared equally by all firms, even firms in the same industry. Certain firms, classified as tax avoiders in this study, were systematically able to avoid federal income taxes, and other firms paid their fair share during 1982 to 1985. The objective of this study is to document the determinants of corporate tax avoidance behavior. It is hoped that the findings of this study will provide valuable information for the development of an equitable national tax policy.

This study developed hypotheses from the accounting choice literature to try to explain managerial decisions to avoid federal income tax. Seven firm specific variables were chosen either on the basis of their economic implications for tax avoidance behavior or because they proxy for the

hypotheses developed in this study. The following hypotheses were tested in this study:

Debt Covenant Hypothesis

H1: Corporate tax avoiders have higher debt to net tangible asset ratio than non-avoiders.

H2: Corporate tax avoiders have higher levels of leverage (debt/equity ratio) in the capital structure than non-avoiders.

Political Cost Hypothesis

H3: Tax avoiding corporations are smaller in size and earnings growth than non-avoiding corporations.

Capital Intensity Hypothesis

H4: Corporate tax avoiders have a higher degree of capital intensity than non-tax avoiding firms.

Bonus Plan Hypothesis

H5: Corporate tax avoiders are more likely to have bonus plans based on earnings after income taxes than non-tax avoiders.

Political Action Committee Contribution Hypothesis

H6: Corporate tax avoiders have a higher PAC contribution to earnings ratio than non-avoiders.

Ownership Control Hypothesis

H7: Corporate tax avoiders have a lower percentage of stock owned by directors and officers than non-tax avoiders.

Both univariate and multivariate statistical methods were used to analyze the data. The Mann-Whitney U-Test was used in the univariate analysis. A two-group discriminant model, multiple regression, and a

logistic regression model were used to conduct multivariate tests on the variables. Individual years and a four year model were tested. The results of the multivariate tests conducted with the four year model are reflected in this summary since they are associated with the more powerful statistical testing procedure. The tests performed on each individual year shows variations do exist between years. The results of the four year combined model reduces or eliminates individual year aberrations and clearly shows the consistent significant findings.

The four independent variables that are statistically significant are the debt to equity ratio (CAS), the Political Action Committee contributions (PAC) to tax policy making committees, the type of bonus plan (BP), and the size of the firm (SIZE). Even though the SIZE variable was significant, it has the wrong sign. These results support the debt covenant, bonus plan, and political action committee hypotheses. Support is not provided for the political cost, ownership control, and capital intensity hypotheses.

Based on these findings, the profile of a tax avoiding firm is a large firm as measured by total assets, with a high debt to equity ratio, a bonus plan based on after-tax accounting earnings, and a tendency to contribute a large share of earnings to political action committees that are specifically established to give funds to members of the tax writing committees of Congress. The ownership percentage of voting stock held by directors and officers shows no relationship to tax avoidance behavior, providing empirical evidence to support Fama's labor market efficiency theory. Finally, capital intensity does not explain tax avoidance. This result

failed to support the theory behind the investment tax credit. The result, however, is consistent with the 1986 CTJ report.

During the later years of this study Congress was concerned that U.S. firms were reducing their tax burdens and, in particular, that some of the largest corporations were paying little or no federal taxes. Public outrage over this inequity moved Congress to establish the Tax Reform Act of 1986 (TRA of 1986). To create a barrier prohibiting profitable corporations from escaping federal income tax altogether, the alternative minimum tax (AMT) was expanded to include one-half of accounting earnings to be added to taxable income. Such a requirement effectively eliminates companies from reporting profits to shareholders while not paying a fair share of federal income tax. Critics of tax policy contend that further changes should be made to acheive a fair and equitable income tax system. The results of this study suggest that tax avoidance is related to firm specific variables. These results have implications for future changes in our national tax policy.

First, controversy has existed for some time between the tax implications of capital structure, debt, and equity financing. While firms are allowed to deduct interest payments on borrowed capital from taxable income, there is no corresponding deduction for dividends paid out to shareholders in return for the use of equity capital. The results of this study shows that higher financially leveraged firms are avoiding taxes while lower leveraged firms pay their fair share. Assumming tax policy makers are interested in making the U.S. federal taxation system more equitable, there are several options available. First, dividends could

be given a tax deductible status, thereby creating identical subsidies to equity financing that currently exists for debt financing. Although this would eliminate the double taxation on dividends, it would also reduce the tax receipts to finance government activities. Another consideration could limit the amount of interest on debt a firm could deduct for tax purposes. The TRA of 1986 drastically reduced the deductibility of interest on the calculation of individual's taxable income, and the crossover to the determination of corporate taxable income makes sense. An interest limitation policy may be welcomed by the business community because its effect could result in lower leveraged firms, which could reverse the trend of increasing leverage used by U.S. firms since the 1930's. Currently, junk bonds, leveraged buyouts, and reorganizations have unsettled the credit markets by turning industrial bonds into industrial bombs. Investors in corporate debt instruments have seen the credit ratings of their investments deteriorate due to these financial restructurings. An interest limitation policy may result in more economic stability in the credit markets and allow firms to operate on equal economic footings, instead of letting tax regulations determine the financing methods used.

Contributions from Political Action Committees to tax policy committee members were statistically significant for tax avoiders during the 1982-1985 period. This may suggest that firms are buying favorable tax legislation. It seems hypocritical that some members of Congress would allow themselves to be financially influenced at a time when they are questioning the integrity of the self-regulatory procedures of other professional groups. Recent articles in business oriented publications have touted the elimination of PACs so that government activities and

decisions would become less self-serving. Congress could eliminate the PAC mechanism so that this vehicle for influencing tax legislation would not exist. Recently, President Bush presented a plan to eliminate business and union PAC's, but he failed to find a House sponsor for this program. It would appear that Congress does not want to lose this payoff. Alternatively, the PAC contributions from corporations could be disallowed as a tax deduction to discourage this form of lobbying.

The findings of this study show bonus plans based on after-tax earnings encourage corporate income tax avoidance. Firms with such bonus plans appear to avoid tax more than other firms. Tax policy makers could encourage other means of rewarding performance by changing the deductibility rules for corporate bonus payouts. Instead of firms having bonus plans structured on an after-tax incentive, it may be more productive to encourage goals based on product quality, research and development, and efficiency measures that would propel U.S. firms and the U.S. economy into a more advantageous position on a global scale.

Additionally, if tax policy treated business investments more uniformly then types of bonus plans would create indifferent tax behavior due to the neutrality of tax policy.

Finally, larger firms were classified as tax avoiders in this study, suggesting firms with more resources were able to effectively reduce taxes. Implicity, this sends a signal that the tax code is too complex, and only those with ample resources can use it to their advantage. A simpler system may reduce the distinction between tax avoiders and non-tax avoiders and perhaps increase overall compliance at reduced costs to society.

A more detailed discussion of all tests along with specific results appears in Chapter 4.

5.2 LIMITATIONS

There are several limitations of this study. The profile of the firms selected during the 1982-1985 time period shows that they all had profitable years. Since the firms and tax code were all related to the 1982-1985 time period, there may have been unique events occurring on the economic scene; thus, there is no assurance that similar results would be obtained in any other time period.

Another limitation of this research project concerned the determination of tax avoiders based upon the amount of U.S. federal income taxes paid. If consideration had been given to include other taxes (e.g. state income tax or foreign taxes), different results could have been obtained.

Missing data is a problem related to most studies. Reasonable efforts were made to obtain data; however, if information was obtained for all firms in the original sample, the results might have been different. This is especially critical to the capital intensity ratio where only one quarter of all firms had the desired information on the COMPUSTAT files.

One variable, bonus plans, was based on whether a firm's plan was before or after tax earnings. A review of 250 proxy statements revealed many variations of compensation plans, with interpretations sometimes being required due to the way the plan was described or because of the absence of a detailed description. Other interpretations may have resulted in different findings.

Finally, the model may have been incomplete, with other variables providing more explanatory power.

5.3 CONTRIBUTIONS

The contributions of this study are threefold. First, the findings offer a partial explanation of characteristics of firms that systematically avoided federal income taxes. Understanding the interrelationships between tax avoidance behavior and firm characteristics may show how various contracting arrangements affect managerial decisions.

The second contribution of this research is to make available to the tax policy makers new information on profiles of tax avoiding firms. This information could lead to revisions in national policy resulting in a more fair and equitable policy.

The last contribution of this study is that its findings lend support to the positive theory of accounting by addressing an accounting issue net yet examined in the literature. These findings could spark other research efforts that would investigate these variables in a different setting or from a different vantage point.

NOTES

1
Firms will be classified as tax avoiders or non-avoiders depending on their corporate effective tax rates. The calculations of effective tax rates and several classification methods are provided in detail in the Sample/Methodology section.

2
Governmental agencies implement certain social and economic policies through tax policy. Joseph Pechman, senior fellow at the Brookings Institution, asserts that tax policy is generally regarded as a legitimate tool for promoting economic growth and stability, provided the particular measures chosen can accomplish their objectives and do not permit individuals and corporations to escape tax entirely (1987). Within the broad areas of tax policy acceptance, there will always be controversy about the relative emphasis that should be placed on efficiency and equity.

A continuing debate concentrates on the role of the tax policy and efficiency. As Stickney and McGee (1982) point out, debates on tax policy oppose neutrality with a regulated marketplace. The neutrality or laissez-faire position argues that the free market system can allocate capital more efficiently than the politically influenced governmental system. Special incentives such as investment tax credits, depletion allowances, and accelerated depreciation are not needed, and tax preferences may direct capital towards inefficient firms or industries.

Those favoring non-neutrality argue that certain industries need capital allocations to best serve our national interest, e.g. energy resources and national defense.

With this policy conflict in mind, the Citizens for Tax Justice and the Institute on Taxation and Economic Policy jointly published a study in February, 1986, entitled "Money for Nothing - The Failure of Corporate Tax Incentives 1981-1984." The study supports a more neutral tax policy because certain tax incentives (e.g. investment tax credits and more liberal depreciation methods) did not create the investment in capital spending and job creation that the 1981 ERTA provisions intended. Those companies that took advantage of the new tax breaks did not increase their plant and equipment expenditures or increase employment at a higher than average rate. Clearly, these incentives were not an effective policy.

A second joint report from the same associations shows that the equity and fairness that should be included in tax policy has been diluted in favor of certain interest groups. The Citizens for Tax Justice (1986) reported that many of America's major corporations avoided paying federal income taxes even though these firms represent some of the most profitable companies in the U.S. For example, in a survey of 250 of the nation's largest companies, 42 companies earned $59.1 billion in pre-tax domestic profits between 1982 and 1985 yet received net tax refunds of $2.1 billion.

The findings of these studies were widely disseminated to various lobbying groups encouraging Congressional action. As a result, one of the major concerns of Congress was that U.S. corporations were reducing their tax burden and, in particular, that some of the largest corporations were paying little or no federal taxes. A Senate Finance Committee Report dated May 29, 1986, found it "unjustifiable for some corporations to report large earnings and pay significant dividends to their shareholders, yet pay little or no taxes on that income to the government." Public outrage over this inequity moved Congress to establish the Tax Reform Act of 1986 (TRA of 1986).

One of the underlying motivations of the TRA of 1986 was to transfer the tax burden from individuals to the corporations. The Tax Reform Act of 1986 represented the most comprehensive overhaul of the federal income tax code in several decades as well as a movement towards a more neutral tax policy which allows the marketplace to allocate capital more freely than the previous regulated or politically influenced environment. Examples to illustrate this change include the elimination of the investment tax credit and the increased recovery periods over which capital costs must be allocated.

To create a barrier prohibiting profitable corporations from escaping federal income tax altogether, the alternative minimum tax (AMT) was established. The AMT on corporations begins with taxable income, adds on certain preference items, and applies a 20 percent tax rate to arrive at the AMT. This is the minimum amount of tax a corporation must pay; in effect, a floor is established so that some taxes must be paid unless a firm is in a loss situation or has tax credits to offset the tax liability. One preference item that must be added to taxable income in 1987, 1988, and 1989 is one-half of book income (income as reported under financial reporting guidelines). Such a preference effectively eliminates companies from reporting profits to shareholders while not paying a fair share of federal income tax (See Note 3). For the tax years 1990 and after, the AMT calculation requires the inclusion of 75 percent of regular earnings and profits (including nontaxable income such as tax-exempt interest) (See Note 4).

3
The Citizens for Tax Justice (1988) reported that the TRA of 1986 has raised the overall effective tax rates of the firms in this study in 1987, resulting in a $9 billion increase in U.S. income taxes paid. Additionally, total corporate 1987 income tax payments increased $25 billion compared to the pre-reform laws, revealing a reassignment of the tax burden back to the corporations.

4
The impact of the AMT provision on individual firms is not known; however, it may affect a large number of corporations not usually considered tax avoiders. Tax researchers project that the preference for accelerated depreciation and book income will initiate the most significant changes.

As Doyle et al. (1986) point out, it is likely that AMT will have the greatest effect on growing firms rather than static or declining ones. Growing firms tend to invest more and thus would generate more preferences

(e.g. accelerated depreciation) and be subject to higher minimum taxes. Additionally, the AMT will affect new companies disproportionately because older firms generate a substantial share of their income from assets that have already been fully depreciated, at least for tax purposes. Thus, the AMT may produce an extra barrier to firms expanding their markets but exacts little penalty on slow-moving or declining companies.

5 Watts and Zimmerman (1986) have summarized the cross-sectional studies investigating the relationship between accounting changes and stock price effects. Studies conducted by Leftwich (1981), Collins, Rozeff and Dhaliwal (1981), and Lys (1984) have used variables which served as surrogates for wealth tranfers between bondholders and shareholders (i.e. contracting under debt agreements). These studies have found significant stock price changes associated with mandated accounting changes; however, the associations relating to debt-equity ratios are inconsistent across studies. Watts and Zimmerman (1986) argue that the mixed results are problems in the models themselves and not in the underlying theory, that theory being the market will react to the expectation of future cash flow resulting from political costs or changes in debt convenants.

6 For example, after a bond issue is placed, a tremendous wealth transfer could result if a liquidating dividend was paid to the owners. The bondholders would be at a disadvantage because of this financial transaction. To prevent these actions, bondholders have set up certain restrictions.

7 Smith and Warner (1979) and Leftwich (1983) have provided many examples of the types of restrictions found in debt agreements. These studies have used the American Bar Association's Commentaries on Indentures, which provides common restrictions found in lending agreements. The ratio of debt to net tangible assets is a commonly used measure of debt ratio restrictions.

8 Leftwich (1983) notes that the American Bar Association's Commentaries on Indentures advises that the deferred liability for future tax does not necessarily represent any claim on the firm, nor is their eventual payment determinable; thus deferred taxes are normally not included in debt ratio covenants. Deferred taxes will not be included in the measurement criteria for this hypothesis.

9 When companies avoid paying their fair share of federal income taxes, certain groups (e.g. Citizens for Tax Justice) will openly criticize these actions to bring about reform. The press coverage tends to concentrate on larger firms in order to capitalize on attention getting headlines. Since this news brings negative publicity to larger firms, and possibly greater political costs, there may be a resulting downward pressure on stock prices.

10

Additionally, a front page story in the July 18, 1988, issue of The Wall Street Journal describes how Congress is targeting large insurance firms for increased regulation and taxation. The attitude change of Congress results from the insurance crisis of the mid-1980s. The crisis was the result of increased premiums, reduced coverages, and sometimes even unavailability of insurance coverage in the face of rising profits in the insurance industry.

11

The rationale for using sales versus total assets as a proxy for political cost is not provided in the studies reviewed. However, Watts and Zimmerman (1986) suggest that sales is a surrogate for earnings. Therefore, if an income statement impact is expected the sales measurement may be an appropriate one. Likewise, the balance sheet impact could be captured by using total assets.

Since some accounting standards are mandated by asset size (e.g. replacement cost data), using assets is an appropriate measure. Additionally, some industries are regulated based upon amount of assets or sales to asset ratios; therefore, different measures may be more appropriate depending on expected findings and structure of the research design.

This study used both sales and total assets as a size proxy for political cost. It also used an interaction of sales times earnings growth.

12

Watts and Zimmerman (1986), in analyzing the works of Downs (1957), Stigler (1971), Peltzman (1976) and Alchran (1975), suggest that the incentive for information produced and used in the political process is less than in the normal marketplace due to individuals having less ability to capture the information's benefits.

13

See Holthausen and Leftwich (1983) for a more detailed review of contacting and monitoring cost relationships between owners and managers.

14

Dhaliwal et al. (1982) was one of the earlier studies in the accounting choice literature to incorporate measures of ownership structure. Their findings show MC firms selected depreciation methods which resulted in increasing earnings for the firm. Both Hunt (1985) and Niehaus (1985) found the Lifo inventory method (i.e. income decreasing method) to be associated with OC firms. Ayres [1986] found early adopters of SFAS No. 52 (assumed to be income increasing) to be associated with MC firms. Likewise, Dunne (1988) found OC firms reporting lower earnings by using the purchase method of accounting for business combinations.

Neuman (1988) found MC firms more likely to take advantage of changes in tax regulations (i.e. ITC). Additionally, these MC firms were more likely to have bonus plans based on after-tax earnings than before-tax earnings. In summary, MC firms tend to select income increasing strategies, while OC firms select income decreasing approaches.

15

The current portion of the federal income tax expense and domestic profits is not presented in the body of the financial statements; therefore, footnote disclosures were used to obtain this information.

16

Park (1966) noted that when confronted with heteroscedastic error terms it is often assumed that the variance of the error term is proportional to the square of the independent variable. A transformation could then be achieved by dividing by the independent variable before applying ordinary least squares. Park suggests that other transformations may be more appropriate. To operationalize the Park approach, the following procedures were performed.

Step 1 - Run the ordinary least squares regression obtaining the residuals and then squaring the residuals.

Step 2 - Take the log of the squared residuals and set this up as the dependent variable in a new regression. Take the logs of all the original independent variables and run a regression to see if any of the revised independent variables are significant. If none are significant, the model does not have a heteroscedasticity problem. If a variable is significant, Park suggests the following solution: using a weighted least square approach, divide the original dependent and independent variables by the significant variable raised to the power of the coefficient of the variable found in the second regression.

In 1982, the weighting factor was the ownership control variable raised to the .27 power, while in 1983 the same variable was raised to the second power as the weighting factor. No adjustments were needed in 1981, 1985, or in the combined models.

17

A non-parametric procedure for discriminant analysis is available in the SAS called Neighbor. This procedure can be used to classify observations when the groups do not have multivariate normal distributions. The Neighbor procedure can classify based on the closest neighbor, or classification rules can use the k-nearest neighbor rule with "k" being any desired integer. For example, using the lower one-third versus the top one-third, the following total correct classification rates were obtained.

	Discriminant (Parametric)	Neighbor (Non-Parametric)
1982	70%	67%
1983	71%	70%
1984	80%	74%
1985	67%	58%

Testing was performed using the Neighbor procedure which confirmed the results of the Discriminant procedure with the Discriminant procedure producing higher correct classification rates but not excessively higher. The results of the Neighbor procedure are not reported elsewhere in this study.

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Appendix A

Summary of Hypotheses (Variable Name)

Debt Covenant Hypothesis

H_1: Corporate tax avoiders have a higher debt to net tangible asset ratio than nonavoiders (LEV).

H_2: Corporate tax avoiders have higher levels of leverage (debt/equity ratio) in the capital structure than non-avoiders (CAS).

Political Cost Hypothesis

H_3: Tax avoiding corporations are smaller in size and earnings growth than nonavoiding corporations (SIZE).

Capital Intensity Hypothesis

H_4: Corporate tax avoiders have a higher degree of capital intensity than non-tax avoiding firms (CAI).

Bonus Plan Hypothesis

H_5: Corporate tax avoiders are more likely to have bonus plans based on earnings after income taxes than non-tax avoiders (BP).

Political Action Committee Contribution Hypothesis

H_6: Corporate tax avoiders have a higher PAC contribution to earnings ratio than non-avoiders (PAC).

Ownership Control Hypothesis

H_7: Corporate tax avoiders have a lower percentage of stock owned by directors and officers than non-tax avoiders (OC).

Appendix B

This section provides a summary of studies either supporting or not supporting the hypothesis used in this study.

DEBT COVENANT HYPOTHESIS

Studies Supporting Theory

Dhaliwal (1980) -Used 33 matched pairs of oil and gas firms using full cost versus successful efforts. Found firms using full costing (assumed to be income increasing) to have higher debt leverage.

Zmijewski and Hagerman (1981) - Used a portfolio of four different accounting procedures to support the conclusion that higher debt firms prefer income increasing accounting methods. Accounting methods included (1) Lifo vs. Fifo, (2) straight-line vs. accelerated depreciation, (3) period used to amortize pension cost, and (4) method to account for investment tax credit.

Bowen, Noreen, and Lacey (1981) - Interest capitalization methods used supported the conclusion that firms with more debt restrictions choose income increasing approach. Study supports interest coverage ratio and inventory of payable funds measurement approaches.

Stickney and McGee (1982) - Study supports inverse relationship between leverage and tax rates.

Dhaliwal, Salamon, and Smith (1982) - Firms with higher debt tend to use straight-line depreciation method for financial reporting. All firms in study used accelerated methods for tax purposes.

Lilien and Pastena (1982) - Supported Dhaliwal (1980) by extending research in oil and gas industry using full cost versus successful efforts methods of accounting.

Daley and Vigeland (1983) - Research and Development accounting methods support inventory of payable funds measurement but do not support interest coverage ratio measurement.

Hunt (1985) - Firms more likely to adopt the Lifo inventory method have lower levels of leverage. The decreasing earnings and asset impacts of Lifo do not offset the tax advantages for the higher leverage firms.

Ayres (1986) - Early adopters of SFAS #52 (assumed to be income increasing) were closer to debt restraints. Supported dividends to unrestricted retained earnings and interest coverage ratio measures. The interest coverage ratio was supported after segregating high-debt firms from low-debt firms.

Johnson and Dhaliwal (1987) - Firms abandoning Lifo were matched by industry to firms continuing to use Lifo. Results show Lifo abandoned firms had higher debt levels along with lower tax rates. The switch from Lifo resulted in higher earnings and thereby reduced potential of technical default on debt agreement.

Studies Not Supporting Theory

Holthausen (1981) - Using time series approach of switching from accelerated depreciation method to straight line method/this study found no significant relationship to inventory of funds restriction.

Daley and Vigeland (1983) - Research and Development accounting methods could not support interest coverage ratio measure, but did support inventory of funds restriction.

APPENDICES

POLITICAL COSTS HYPOTHESIS

STUDIES SUPPORTING THEORY

Watts and Zimmerman (1978) - Using firm responses to proposed standard on general price level restatement, it was found that larger firms oppose income increasing standards. Researchers hypothesized that larger firms want to reduce political costs by reducing political visibility.

U.S. Treasury (1978) - Results show larger firms pay higher effective tax rates, which is consistent with expected results of this study.

Bowen, Noreen, and Lacey (1981) - Using interest capitalization methods for oil and gas firms shows that larger firms used income decreasing approach. However, when all firms combined, results could not support political cost hypothesis.

Stickney and McGee (1982) - Hypothesized that size (both total assets and sales) would be inversely related to effective tax rate using 1980 data. However, results do not support their contention because larger firms had higher effective tax rates, thereby supporting expected results of this study.

Dhaliwal, Salamon, and Smith (1982) - Weakly supports political cost hypothesis by having larger firms select accelerated depreciation methods for financial reporting. All firms in study used accelerated methods for tax purposes.

Lilien and Pastena (1982) - Supported theory using full cost versus successful efforts in oil and gas industry.

Zimmerman (1983) - Research segregated firms by size, sales, and pre-tax income and calculated effective tax rates from financial statement data and IRS aggregated data. Results show larger firms had larger effective tax rates. Concluded that since income taxes are a proxy for political costs, larger firms are subjected to greater political scrutiny. Additionally, results show that firm size is an appropriate proxy for a firm's political costs.

Ayres (1986) - Early adopters of SFAS #52 (assumed to be income increasing) were smaller in total asset size.

Johnson and Dhaliwal (1987) - While not testing the political cost hypothesis directly, this study shows larger firms have higher marginal tax rates supporting the contention of this study. Firms were matched on SIC codes so industry differences were controlled. Study focused on firms abandoning Lifo.

Studies Not Supporting Theory

Siegfried (1972) - Results show larger firms had lower effective tax rates. The data used in study was from the late 1960's and may explain why results were different from U.S. Treasury (1978), Stickney and McGee (1982), Zimmerman (1983), and Johnson and Dhaliwal (1987).

Bowen, Noreen, and Lacey (1981) - Using capitalization of interest accounting methods could not support political cost theory when all firms were combined. Only considering oil and gas firms, support was provided.

Daley and Vigeland (1983) - Research and Development accounting choices did not support larger firms selecting an income decreasing method.

CAPITAL INTENSITY HYPOTHESIS

Studies Supporting Theory

Siegfried (1974) - Used industry wide data to show that an inverse relationship was found between capital intensive industries and effective tax rates.

Stickney and McGee (1982) - Individual firms which had higher levels of capital assets versus labor components were found to have lower effective tax rates. The researchers concluded that highly capitalized firms had greater depreciation and investment tax credits to reduce tax rates. To measure capital intensity they used depreciation and amortization expense to number of employees.

BONUS PLAN HYPOTHESIS

Studies Supporting Theory

Dhaliwal, Salamon, and Smith (1982) - Since compensation plans were more important for manager controlled firms (assumed in study), the researchers found straight line depreciation (income increasing) more prevalent in manager controlled firms.

Studies Not Supporting Theory

Bowen, Noreen, and Lacey (1981) - Capitalization of interest based study does not support companies with bonus plans wanting to show earnings increase as early as possible. Watts and Zimmerman argue that interest is not included in most bonus plans and thereby study should not be considered as contribution towards the refinement of this proposed theory.

Hunt (1985) - The existence of a bonus plan tied to reported earnings statistically different for firms electing Lifo or staying with Fifo.

Note: Since Healy's (1985) findings some of the prior studies findings are questionable due to the crude methods used to evaluate bonus plans.

MANAGEMENT VERSUS OWNER CONTROLLED HYPOTHESIS

Studies Supporting Theory

Dhaliwal, Salamon, and Smith (1982) - See bonus plan section.

Hunt (1985) - Firms with more manager-controlled structures (less stock held by insiders) were not willing to switch to Lifo (assumed to be an income decreasing procedure).

Niehaus (1985) - Same findings as Hunt (1985)

Ayres (1986) - Early adopters of SFAS no. 52 (assumed to be income increasing) had manager-controlled ownership structure.

Dunne (1988) - OC firms would more likely to report lower earnings by using the purchase method of accounting for business combinations.

APPENDIX C

EXPLANATION OF ADJUSTMENT TO TAX RATES BY INDUSTRY

Studies have shown that the tax code is industry oriented. By focusing on unadjusted tax rates, studies would have a bias towards industry segregation. To eliminate this potential bias towards industry effect, an adjustment for industry classification was used in this study. Table one of this appendix shows the unadjusted tax rate by SIC range based upon statistics provided by the Internal Revenue Service. These represent unadjusted tax rates of all profitable firms in the U.S., not the averages of the firms used in this study. Table two of this appendix shows the relationship of each industry to all industries combined. For example, in 1982 all firms had a 41% tax rate, while the "Services" firms had an average rate of 33%, or were paying 81% (33% divided by 41%) of the average U.S. firm. To eliminate the bias towards the lower rates in the "Services" firms, each sample firm that had a SIC designation between 7000 and 8980 had its tax rate divided by 81%.

When all sample firms received similar treatment, the overall industry effect is eliminated, but not the within industry effect. Thus, tax avoiders within certain industries still maintain their initial relationship to other firms within the same industry.

APPENDIX C

TABLE ONE
Unadjusted Tax Rates By Industry*

INDUSTRY	SIC RANGE	1982	1983	1984	1985
		UNADJUSTED RATE			
ALL		41%	41%	41%	41%
AGRICULTURAL	000-0600	31	29	31	31
MINING	0601-1098	41	43	41	42
OIL & GAS	1300-1400	44	43	44	42
CONSTRUCTION	1499-1798	35	33	31	31
MANUFACTURING	1799-3998	44	44	44	43
TRANSPORTATION	3999-4800	40	39	41	39
COMMUNICATIONS	4801-4900	45	47	46	45
UTILITIES	4901-4900	45	45	45	44
WHOLESALE TRADE	4991-5190	38	38	39	40
RETAIL TRADE	5191-5999	37	38	35	38
FINANCE/ INSURANCE/ REAL EST.	6000-6749	38	37	37	38
SERVICES	7000-8980	33	31	32	32

* Information obtained from "Source Book 1982-85 - Statistics of Income, Department of Treasury, Internal Revenue Service - Publication No. 1053." Contains tax information from firms with net income.

APPENDIX C

TABLE TWO
Adjustment Factors to Convert Unadjusted Tax Rates**

INDUSTRY	SIC RANGE	1982	1983	1984	1985
ALL		100%	100%	100%	100%
AGRICULTURAL	000-0600	76	71	76	76
MINING	0601-1098	100	105	100	103
OIL & GAS	1300-1400	107	105	107	103
CONSTRUCTION	1499-1798	85	81	76	76
MANUFACTURING	1799-3998	107	107	107	105
TRANSPORTATION	3999-4800	98	95	100	95
COMMUNICATIONS	4801-4900	109	115	112	109
UTILITIES	4901-4990	109	109	109	107
WHOLESALE TRADE	4991-5190	93	93	95	98
RETAIL TRADE	5191-5999	90	93	85	93
FINANCE/ INSURANCE/ REAL EST.	6000-6749	93	90	90	93
SERVICES	7000-8980	81	76	78	78

** Calculation equals industry tax rate divided by tax rate for all companies.

APPENDIX D

DATA COLLECTION

The data collection process was comprised of a number of separate stages. This appendix describes the different sources of data, some of the problems encountered, and the outcome of the effort. The subsections that follow are related to each data source.

REPORTS FROM CITIZENS FOR TAX JUSTICE (CTJ)

The information required for the dependent variable, current federal income tax expense, and domestic pre-tax profits is not available on the face of the financial statements but is included in footnote disclosures. This information was compiled by CTJ and was tested by referencing to annual reports of selected companies.

In order to adjust tax rates for industry differences, the Statistics of Income, as compiled by the Internal Revenue Service from annual tax returns of corporations, was used for each year tested. The Statistics of Income aggregates information by SIC codes and also by "companies with net income" or by "all companies." Since this sample contained all firms with net income, the statistics from the group titled "companies with net income" were used to be consistent with the sample.

COMPUSTAT FILES

The components of four of the seven independent variables (i.e. LEV, CAS, SIZE, and CAI) being examined in this study are generally found in the COMPUSTAT files.

The variable that was not available for all firms was CAI. Approximately 25% of the firms in the original sample had CAI data on the Compustat files. This resulted in testing two models, one with and one without the CAI variable.

PROXIES

Both Hypothesis 5 (management bonus plans) and Hypothesis 7 (the extent of management ownership of the firm) require information which is not usually disclosed anywhere in annual reports and often not in 10K reports. However, the information can normally be found in the proxy statements. For this reason, the proxy statement was chosen as the source to obtain the required information.

One problem was that the details of the compensation package were not always available in the current year proxy because the plan had been in existence and unchanged for several years. This required searching in prior year proxies for the last bonus plan revision to determine if the bonus arrangement was based on before or after tax considerations.

POLITICAL ACTION COMMITTEE CONTRIBUTIONS

The Federal Election Commission (FEC) in Washington, D.C., obtains information on the financial activity of Non-Party Political Committees who provide funds to candidates running for public office. These reports are required by law on a biannual basis. The information is provided to the FEC by the political fund-raising committees, who in turn enters the data into a computer bank and issue reports to various interested users. Tapes of financial activity were acquired covering 1981 to 1986.

Three tapes were needed because the election cycle reported on a 1981-82, 1983-84, and a 1985-86 basis. The information needed consisted of financial contributions made by corporate political action committees to members of the House Ways and Means and the Senate Finance Committees. Initially, members of these committees were identified, and computer programs were written to extract the necessary information. For 1982 and 1985, half of the dollar amount reported was assumed to have occurred in these years, since the reported information covered a two year cycle.

V I T A

VITA

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