AN IMPROVED TEST OF POSITIVE ACCOUNTING THEORY: EXAMINATION OF THE CHANGES IN THE AMOUNT OF ACCRUALS IN RESPONSE TO THE CHANGES IN CONTRACTING VARIABLES

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IN CONTRACTING VARIABLES

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To my parents: ABOLFAZL AND MEHRY POURJALALI

PREFACE

Positive accounting theory suggests that a firm's choices of accounting policies are derived from contracting processes and their related costs. Accounting numbers are usually used in contracts, and managers of companies have the ability to obtain different accounting numbers using different accounting methods which are within accepted accounting principles. As a consequence, one can hypothesize that accounting method choices are affected by firms' contractual arrangements. Three kinds of contracts between firms and others have been linked to accounting method choices: contracts between debtholders and management, owners and management, and management and political parties. As a result, three hypotheses have been suggested in the positive accounting literature to explain the differences among the accounting method choices: the debt hypothesis, the management compensation plan hypothesis, and the political cost hypothesis.

Given the above hypotheses, researchers have tried to empirically test the positive accounting theory. Studies of accounting choice tests provide evidence that bonus, debt, and political process variables are statistically significant. The explanatory power of these models, however, has tended to be quite low, reducing the overall credibility of the empirical evidence. Consequently, positive accounting theory and the related literature have been the subject of criticism. Watts and Zimmerman [1990] claim that the lack of strong support (power-of-test)

can be explained by weaknesses in research methodology. Watts and Zimmerman call for three avenues of future research. One of these avenues is concerned with improving the power of the model used to test the theory. They note that improvement in specifying both dependent and explanatory variables, controlling for omitted variables, and appropriate model specification are critical for an increase in test power.

This study addresses "power-of-test" issue as mentioned above. To test the effect of the improvement of the dependent variable measurement on the test power, a model of the dependent variable that is free of many of the criticisms is developed. The model not only separates the amount of discretionary and non-discretionary accruals, but also allows the researcher to measure the manipulated part of the discretionary accruals. The tests results provide evidence that when the measurement of the dependent variable improves the degree of fit (stated as adjusted R^2) improves. The sample for this study was randomly chosen from the general population of firms. Then, the sample was divided into large and small companies. The measurement of explanatory (independent) variables were improved, the lagged variables, and those variables that have theoretical justification for affecting the accounting method choices (however, were mostly ignored in previous studies of positive accounting theory) were included in the model (for example, the degree of financial distress measured as Z and ZETA® can be mentioned). This resulted in including 27 improved and new variables in addition to the traditional variables that were used previously for the test of positive accounting theory.

Interestingly enough, the results of the study agrees with Watts

and Zimmerman's claims. First, the improvement in the measurement of explanatory variables and inclusion of new variables as explanatory variables result in the improvement of the power of test (R^2), second, partitioning the data into large and small companies shows that managers of small and large companies have different motives in their accounting method choices. Managers of large companies consider compensation and political-power related variables as the main variables for their accounting method choices. However, the debt, manager-political power, and financial distress variables are those that have main effect in the choices of accounting policies for managers of small companies. The results also show that the R^2 increases when interaction between and among explanatory variables are included.

I wish to express my sincere gratitude to the individuals who assisted me in this project and during my coursework at Oklahoma State University. In particular, I wish to thank my Ph.D. committee members, Dr. Janet Kimbrell, Dr. Don Hansen, Dr. Amy Lau, and Dr. warde for their intelligent guidance, inspiration, and invaluable aid. I know that if it were not for their helps and encouragements, I could have never finished this project. Special thank to Ms. Frances Griffin for her wonderful friendship, help in editing of the proposal and dissertation, and emotional support during the course of this work. I am also thankful to Mr. Robert Haldeman, Jr. from Zeta Services Inc. who provided part of the data utilized in this project.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION AND STATEMENT OF PROBLEM

Positive accounting theory suggests that a firm's choices of accounting policies are derived from contracting processes and their related costs. Accounting numbers are usually used in contracts, and managers of companies have the ability to obtain different accounting numbers using different accounting methods which are within accepted accounting principles. As a consequence, one can hypothesize that accounting method choices are affected by firms' contractual arrangements. Three kinds of contracts between firms and others have been linked to accounting method choices: contracts between debtholders and management, owners and management, and management and political parties. As a result, three hypotheses have been suggested in the positive accounting literature to explain the differences among the accounting method choices: the debt hypothesis, the management compensation plan hypothesis, and the political cost hypothesis.

Given the above hypotheses, researchers have tried to empirically test the positive accounting theory of Watts and Zimmerman. Holthausen and Leftwich [1983] and Watts and Zimmerman [1986] have reviewed the related literature. Appendix A also presents a summary of some of these studies. Studies of accounting choice tests provide evidence that bonus, debt, and political process variables are statistically

significant. The explanatory power of these models, however, has tended to be quite low, reducing the overall credibility of the empirical evidence.

Consequently, positive accounting theory and the related literature have been the subject of criticism. Watts and Zimmerman [1990] claim that the lack of strong support can be explained by weaknesses in research methodology. There are two major research issues: the lack of power of the tests and alternative explanations for the empirical regularities. Concerning these issues, Watts and Zimmerman [1990, p. 143] make the following observation:

> The research method issues are important and future research must attempt to address them. However, it is unlikely that the positive accounting literature. . . will ever totally eliminate such issues.

In their concluding remarks, Watts and Zimmerman call for three avenues of future research. One of these avenues is concerned with improving the power of the model used to test the theory. They note that improvement in specifying both dependent and explanatory variables, controlling for omitted variables, and appropriate model specification are critical for an increase in test power.

Watts and Zimmerman claim that the accounting choice variable (the dependent variable) has not yet been adequately specified. Net accruals is the most promising measure (since it reflects the relative effects on earnings of various accounting choices)--yet this measure includes a non-discretionary component, and is, therefore, a noisy measure of the amount of net accruals that can be manipulated by managers. Watts and

Zimmerman [1990, p. 144] identify the following need (emphasis added):

> Ideally, net accruals should be measured relative to what they would be without manipulation, so these variations are excluded from the left-hand-side [dependent] variable. This requires a model of accruals that currently does not exist.

Criticism of the explanatory variables also is relevant. For example, use of a zero-one variable to measure a bonus plan is simplistic. Further, firm size may be a totally inadequate measure of political sensitivity. Use of the debt-to-equity ratio may not capture the closeness to the debt covenant itself (Watts and Zimmerman [1990]). Models have also ignored the possible interaction effects of the explanatory variables. Additionally, omitted variables can cause biased coefficients for the explanatory variables and hamper their interpretation.

This study addresses these "power-of-test" issues and develops a model that is free of many of the criticisms. The study's proposed model for the dependent variable shows an improvement in the power-of-test. Also, when the measurement of explanatory variables is improved and new explanatory variables are included in the model, the explanatory power (stated in degrees of fit--R^2) shows a significant increase over that of prior research. So, the weak explanatory power found in previous studies can be attributed to research methods and not to a deficiency in the theory itself. The test results of the proposed model, therefore, represent a significant contribution to the accounting choice literature.

The following chapter presents a review of the literature.

Chapter Three examines the theory of accounting choice in further detail. Chapter Four describes how this study deals with these power-of-test issues while outlining the methodology used to calculate the variables in the model. A description of the data selection is presented in Chapter Five, followed by the discussion of the test results in Chapter Six. The last chapter (seven) presents the summary, contributions and limitations of the study, and suggestions for further research.

CHAPTER II

LITERATURE REVIEW

The "information perspective," the notion that the purpose of accounting data is to provide information to investors, creditors, and other interested persons, has been the subject of extensive studies. Ball and Brown [1968] and Beaver [1968] for example, showed that accounting data play an informational role in setting stock prices. As a result of early studies of the effect of accounting data on the market price of securities (like ones mentioned above), accounting research began to focus more on how accounting information is used and what kind of information is needed, given the decision-makers' utility functions and their decision-making models (e.g. Libby [1981]).

The information perspective views accounting information as the input for valuation models. It suggests that accounting numbers supply information for investment decisions and assumes both that information is costless and that there are no transaction costs. Information that does not inform the market should be useless, and the degree to which the information does inform the market can be measured by the degree of market reaction to the release of that information. The "better" the input (the accounting information) is, the "better" the output (usually measured by the market's reaction to the release of the information).

This information perspective further resulted in the adoption of

the "mechanistic" and the "no-effect" perspectives. The mechanistic perspective suggests that corporate managers change accounting procedures to inflate reported earnings and their corporation's stock price (Watts and Zimmerman [1986]). However, early tests of the market reaction to changes in accounting techniques (e.g. Ball [1972]) provide no evidence for an association between abnormal market returns and changes in accounting techniques unless a tax effect was associated with the change(s). Consequently, the mechanistic view of accounting choices was rejected (Watts and Zimmerman [1986]) and the "no-effect" theory was adopted. Under the "no-effect theory," changes in accounting numbers resulting from the changes in accounting methods per se do not affect the market. However, companies were changing their accounting procedures, and it appeared that no explanation existed for these changes and their choices of accounting methods.

The failure of the information perspective to explain why companies were choosing certain accounting methods resulted in the introduction of another perspective, the "contracting perspective" that would presumably explain and predict accounting method choices. The contracting perspective considers a firm as a nexus of contracts. A firm, or the parties that constitute it, can have explicit and/or implicit contracts with several parties, such as stockholders, debtholders, management, employees, customers, government, politicians, and environmentalists. This perspective recognizes the information and/or transaction costs that were ignored in the tests of the information perspective.

Accounting numbers may be used directly or indirectly in any of

these contracts. For example, it is well documented that accounting numbers are used in debt covenants. Also, very often labor unions have used these numbers to indicate that firms are able to improve workers' compensation packages. Thus, employees' compensation contracts are also affected by accounting numbers. Since the different accounting methods available for firms and their managers yield different accounting numbers, it is logical to conclude that the choices of accounting methods are biased toward firms' explicit and implicit contracts.

Positive accounting theory suggests that choices of accounting methods are driven by contracting variables. Usually, three sets of contracting variables are proposed for accounting-method decisions. The sets of variables, which can be both explicit and implicit, are related to managers' compensation, debt covenants, and political processes. Watts and Zimmerman [1986] hypothesized the following relationship between the accounting method choices and the above sets of variables:

> Bonus plan hypothesis. Managers of firms with bonus plans are more likely to choose accounting procedures that shift reported earnings from future periods to the current period (p. 208).
>
> Debt/equity hypothesis. The larger a firm's debt/equity ratio, the more likely the firm's manager is to select accounting procedures that shift reported earnings from future periods to the current period (p. 216).
>
> Size hypothesis. The larger the firm, the more likely the manager is to choose accounting procedures that defer reported earnings from current to future periods (p. 235).

The bonus plan hypothesis, debt/equity hypothesis, and size hypothesis are related to managers' compensation, debt covenants, and political processes, respectively. Given the above hypotheses, the

studies of positive accounting theory have been designed either to explain and predict (in-use) accounting-methods (e.g., Hagerman and Zmijewski [1979]) or to find the effect on accounting-method choice of changes in the explanatory variables (e.g., change in bonus plan in Healy [1985]). To facilitate the review of the related literature, the following format has been chosen[1]:

1- Studies that explain in-use accounting methods.

2- Studies that predict changes in accounting methods as a result of changes in contracting variables.

2.1 Studies that explain in-use accounting methods

The most frequently mentioned studies that explain in-use accounting methods are Hagerman and Zmijewski [1979] and Zmijewski and Hagerman [1981] (hereafter HZ and ZH respectively). HZ, using probit analysis, investigated the association between the choice of a single-accounting method (the dependent variable) and the concentration ratio, profit sharing, risk, capital intensity, net sales, and total assets (explanatory variables). They chose four single-accounting methods (Depreciation, Inventory, Investment tax credit, and Pension costs amortization), resulting in four different models which shared the same explanatory variables (except in the inventory model, which also included effective tax rate) but different dependent variables. Accounting methods for each model were divided into an income-increasing and an income-decreasing choice, and then a value of one or zero was

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[1] A summary of some of these studies is presented in Appendix A.

assigned to the dependent variable (with income increasing being equal to one). For example, for the depreciation model, the straight-line method (income increasing) resulted in a value of one, whereas the accelerating method (income decreasing) resulted in a value of zero for the dependent variable.

HZ found that the theory was able to explain some of the managers' choices of accounting methods (e.g., in the case of the depreciation method). All models predicted the choice of accounting methods better than did a model that randomly assigned firms to each method (at levels of .10, .05, .10, and .10 for depreciation, inventory, investment tax credit, and pension costs amortization methods, respectively). The estimated R^2s for depreciation, inventory, investment tax credit, and pension costs amortization models were .43, .23, .06, and .06 respectively. HZ found that larger firms tend to use accounting procedures that reduce reported earnings, an indication that the size of a company has explanatory power for the choices of accounting methods.

Although the results for the most part agreed with the theory, the study was criticized for not including any variables for debt contracts. Also, HZ's models could not predict significantly better than would the strategy of predicting that all firms follow the most common method. For example, the depreciation method chosen by 255 out of the 300 firms (85 percent) was straight-line depreciation. If all firms were predicted to use straight line, 85.00 percent of the firms would be correctly predicted. HZ's model is correct 85.33 percent of the time (Watts and Zimmerman [1986] p. 270). The study also ignored the fact that managers' decisions relating to accounting methods could be based

on a portfolio of accounting methods and not just on a single method.

ZH used the same sample as HZ to investigate firms' portfolios of four accounting procedures. The same accounting methods as HZ were employed to construct the dependent variable in the models (resulting in 16 possible portfolios; four accounting methods, each having two different income effects: $2^4 = 16$). They made three different assumptions about the magnitude of the effect of each method on firms' income:

1- All four procedures have the same impact on reported earnings (resulting in five strategies for 16 portfolios).

2- The pension cost and investment tax credit alternatives have exactly one-half of the effect of the inventory and depreciation alternatives (resulting in seven strategies for 16 portfolios).

3- The effects of pension costs and tax credits are equal but less than one-half of the effect of inventory and deprecation alternatives on reported income (resulting in nine strategies for 16 portfolios).

ZH also added two new variables (risk and debt-to-total assets) to the set of explanatory variables in HZ. The results of the probit analysis of accounting strategies indicated that all estimated coefficients had their predicted signs. ZH found that the size effect (measured as total assets) is driven by large firms. Although results of the study supported positive accounting theory, the low explanatory power of the study (R^2 for five-, seven-, and nine-strategy cases was .090, .090, and .089 respectively) and problems with the arbitrary measurement of the dependent variable necessitated further study of managers' accounting-method decisions.

Press and Weintrop [1990] used a five-strategy methodology similar

to ZH's for calculating the value of the dependent variable. For the explanatory variables, however, Press and Weintrop changed the measurement of the debt-related variable in that they incorporated the leverage constraint obtained from SEC filings, annual reports, and Moody's Industrial Manuals. Also, they replaced ZH's "debt-to-total assets" explanatory variable with four different measurements. Results of their study (which is subject to small sample size criticism) show improvement in the R^2 compared to that of ZH (e.g., .23 compared to .090). The degree of fit (R^2) is further increased when the constraints defined in the debt covenants are included (to a maximum of .30 in Table 10, Case 4, p. 90). Their results suggest that the power of positive accounting theory in explaining accounting method choices increases when the measurement of the explanatory variable is improved.

The following section presents studies which examined a specific set of companies sharing a particular situation. These studies <u>predict</u> an income-increasing or decreasing change in accounting methods as a result of the change(s) in contracting variables.

2.2 Studies that predict changes in accounting methods as a result of changes in contracting variables

If the choice of accounting policies results from conditions relating to contracting variables, then it is logical that material changes in the contracting variables should cause a follow-up change in the accounting policies. The direction of the change in the accounting policies (income-increasing or income-decreasing) depends on the direction of the change(s) in the contracting variables. For example,

if the debt-to-equity ratio (as surrogate for debt covenants) increases, according to the debt/equity hypothesis, the researcher looks for changes in accounting policies that result in an increase in the amount of earnings. The studies in this category do not usually construct a model for choices of accounting methods. As a result, they do not usually include any particular dependent variable (except the condition which is shared among the companies). Since the prediction of the choices is only "income-increasing" or "income-decreasing" behavior in a particular situation, the results of these studies are not easily generalizable outside a specific set of conditions.

Usually three sets of changes and/or differences in independent variables have interested researchers: changes in the managers' compensation or their interests (e.g., their job), changes in the political environment, and changes in debt and debt covenants. An example for the first set is Healy [1985]. Healy partitioned the data according to the details of the management compensation plan and found that choices of accounting procedures corresponded to the maximization of the present value of the management compensation. His study reveals that when the upper and lower limits in the managers' compensation bonus plans change, managers choose a set of accounting methods that will increase their compensation.

Healy used Proxy statements to find the upper and lower boundaries of bonus plans. Then, he divided each company-year into three portfolios. Since the upper and lower limits of managers' compensation plans might be different from one year to another, one company could be assigned to different portfolios in different years (hence the term

company-year). The portfolios were UPP, LOW, and MID. Portfolio UPP comprised those company-year observations for which the bonus contract upper limit was binding and the cash flow from operations exceeded the upper bound defined in the bonus plan. Portfolio LOW comprised observations for which the bonus plan's lower bound was binding. Company-years were assigned to this portfolio if earnings were less than the lower bound specified in the bonus plan. Portfolio MID contained observations where neither the upper nor lower bound was binding (pp. 95 and 96).

Healy used the value of accruals[2] for each company-year and tested for statistically significant differences among the means of the accruals for the three portfolios. His results demonstrated a strong association between the amount of accruals and the upper and lower limits of managers' compensation bonus plans. He further studied the association between accrual subcomponents (e.g., change in inventory) and bonus plan parameters. Again, his results confirmed the bonus plan hypothesis.

Among those studies that test positive accounting theory in different political environments are Liberty and Zimmerman [1986] and DeAngelo [1988]. Liberty and Zimmerman looked for an association between reduced reported earnings and labor union contract negotiations. Theoretically, during a labor union contract negotiation, lower earnings indicates that firms are unable (or less able) to increase labor

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[2] Healy calculated the amount of accruals by totaling depreciation expense, extraordinary items, change in accounts receivable, change in inventory, change in accounts payable, change in taxes payable, and deferred income tax expense. The amount was further adjusted for bonus plan earnings definitions.

compensation packages. Liberty and Zimmerman used a random-walk model to predict the expected amount of earnings, and the difference between the expected and actual earnings was assumed to be the amount of manipulation in income. The results of the study, however, did not indicate that managers chose income-decreasing accounting methods when labor union contract negotiations were in progress.

DeAngelo [1988] examined a political environment in which stockholders who disagree with managerial policies seek election to the firm's board of directors (proxy contests). She hypothesized that incumbent managers exercise their accounting discretion to portray a favorable picture of their own performance to voting stockholders. To test this hypothesis, she used a random walk model to find the unexpected amount of accruals for the period in the study. The expected amount of accruals was calculated by subtracting operating cash flow from the amount of net income in the period prior to the proxy contests. Then, the unexpected (abnormal) amount of accruals was estimated by taking the difference between the expected and actual amounts of accruals. Results of DeAngelo's study confirmed her hypothesis. Also, the results showed that new managers who have won their way in a proxy contest take a "bath" to decrease earnings and blame the decreases on the previous management.

Although DeAngelo improved the measurement of the dependent variable by considering only unexpected accruals (as opposed to the unexpected amount of earnings in Liberty and Zimmerman [1986]), she was unable to separate the discretionary and non-discretionary parts of accruals. It is appropriate to judge the manipulation of the accounting

numbers by analyzing the unexpected amount of the discretionary part of accruals, but not the unexpected amount of total accruals (which also includes the non-discretionary component).

The relationship between the choice of accounting methods and debt covenants has also been the subject of extensive studies (e.g. Daley and Vigeland [1983], and Healy and Palepu [1990]). Daley and Vigeland [1983] investigated the choice between capitalization and expensing for research and development (R&D) costs prior to 1974. Their investigation showed an association between the R&D accounting method and size (as a proxy for the political cost), degree of leverage, and dividend restrictions. Since their methodology compared two different groups of firms (those who adopted R&D capitalization and those who did not), they did not produce an expected amount for the amount of accruals or earnings. Results of their study indicated that smaller firms capitalized the R&D costs relatively more often than larger firms, which resulted in higher net income for the smaller firms during periods of capitalization. Their results also revealed that firms who chose to capitalize R&D costs were more highly leveraged, used more public debt, and were closer to dividend restrictions.

Healy and Palepu [1990] compared the firms' accounting and dividend responses to an increase in the tightness of dividend constraints. They hypothesized that firms that were subject to dividend restrictions would, to circumvent the covenants, choose accounting methods that resulted in a higher net income. To test the hypothesis, they used changes in single-accounting method choices to find the possible association between the changes in accounting policies and the

dividend restrictions. Their results showed that firms cut dividends and do not appear to make accounting changes to bypass the restrictions. The results suggested that accounting-based covenants are effective means by which bondholders can restrict firms' dividend policies (p. 97). Although Healy and Palepu's [1990] results conflict with other studies (see Christie [1990] for a review of relevant studies), they provide no sufficient explanations for the differences. This study is subject to other criticism, too. For example, in testing their hypothesis, the authors fail to consider the total discretionary amount of accruals. Also, they considered only a restricted environment, as did other studies in this category, which limits the generalizeability of results. All of the above studies (in both sections 2.1 and 2.2) have been the subject of extensive criticism. Using the results of previous studies, Christie [1990] showed that the following six variables have significant explanatory power in managers' accounting-method decisions: managerial compensation, leverage, size, risk, interest coverage, and dividend constraints. Consequently, excluding any of these variables from models constructed for a test of positive accounting theory may produce erroneous results. Also, as discussed in the following section, the measurement of some of the variables in these models is questionable. This is of particular importance in evaluating the empirical evidence for positive accounting theory, since the lack of power (R^2) can be blamed on difficulties in specifying and measuring dependent and explanatory variables.

The following section discusses in more detail the criticism of studies related to positive accounting theory. The criticisms are

limited to those that this study addresses.

2.3 A review of the methodology criticism

The following research methodology points have been the focus of criticism in discussions of previous empirical tests of positive accounting theory (Watts and Zimmerman [1990]):

a) Dependent (left-hand-side) variable problems
b) Sample selection problems
c) Explanatory (right-hand-side) variables problems
d) Model mis-specification problems
e) Omitted variables problems

2.3.1 Dependent (left-hand-side) variable problems

The problems with the left-hand-side (dependent) variable have resulted from the assumptions used in specifying it (Watts and Zimmerman [1990]). For example, some researchers test the changes in a single-method choice, assuming that other method choices are constant (e.g., Hagerman and Zmijewski [1979]). In other words, these researchers assume that changes in a single accounting method can be separated from other method choices for the purpose of their study. However, companies actually use a combination of accounting method choices, rather than a single method (e.g., Zmijewski and Hagerman [1981]).

Another questionable assumption could be reflected in the way in which the effects of accounting choices have been measured. Some studies assume that choices of different accounting methods have a similar income effect. For example, Zmijewski and Hagerman [1981] and Press and Weintrop [1990] assume that both income-decreasing choices of

inventory method (e.g., LIFO) and depreciation method (e.g., accelerated) reduce income equally. If this assumption is not correct (and it likely is not), then the model for the test of accounting-method-choice will not properly explain the methods chosen by companies simply because the value of the dependent variable is mis-specified. Figures 2-1 and 2-2 depict these situations.

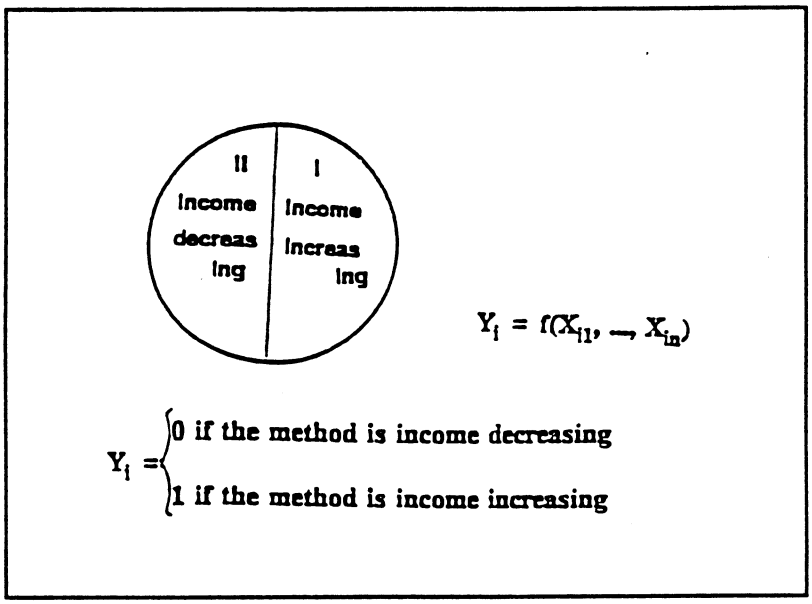

Figure 2-1: Single method choice tests

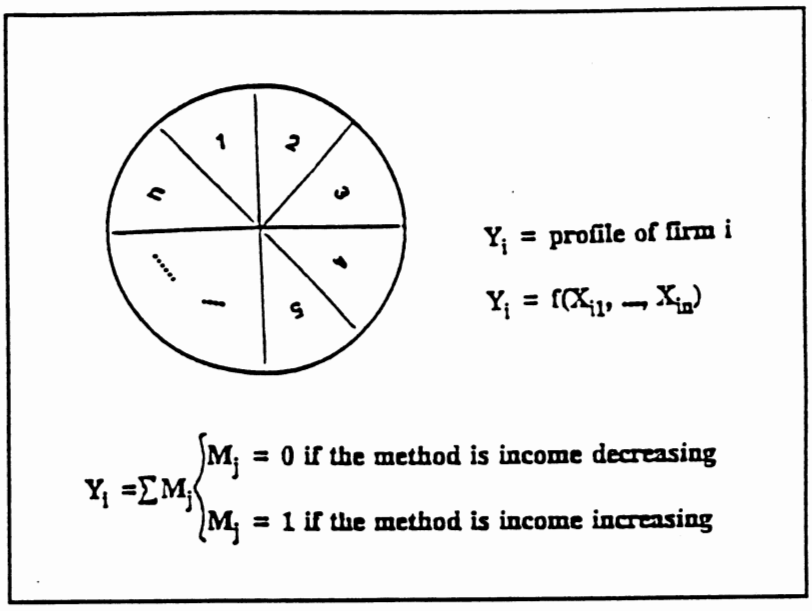

Figure 2-2: Multiple methods choice tests

Using accruals, however, may resolve the difficulties with single and multiple methods choice tests. For example, the total effect of the choices of accounting methods is captured in accruals and no specific assumption is necessary to calculate the value of the dependent variable. Figure 2-3 represents a situation in which the unexpected amount of accruals is used as the left-hand-side variable[3].

[3] Hereafter, accruals stands for both "deferrals" and "accruals." "Deferrals" refers to the revenues (expenses) for which recognition is deferred to future period(s) although the cash transactions (receipts or payments) have occurred. "Accruals" refers to the revenues (expenses) that are being recognized although no cash has been received (paid).

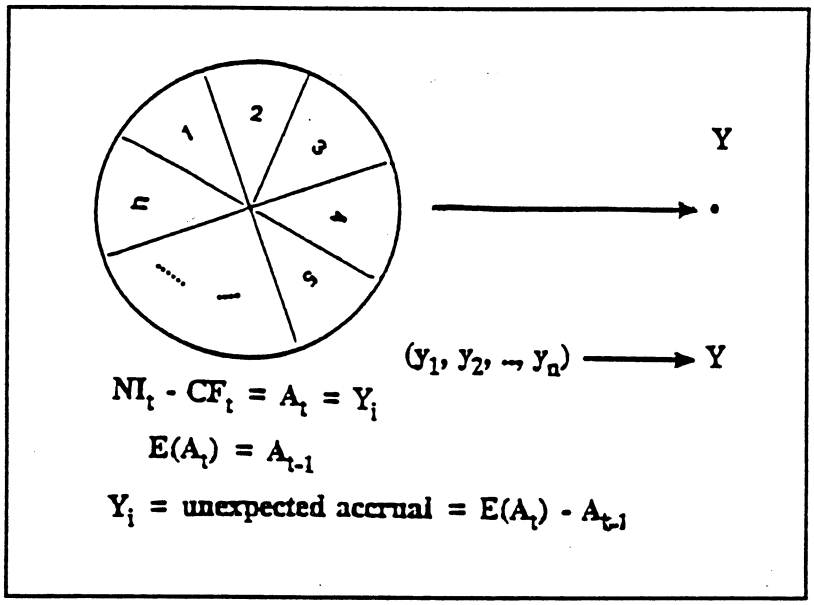

Figure 2-3: Accruals test: Total unexpected amount of accruals for the period

Unfortunately, when the amount of accruals is considered, another problem surfaces. Managers do not necessarily have discretion over the total amount of the accruals. In other words, the amount of accruals has two different components: one over which a manager has discretion, and one over which a manager cannot exercise any discretion. Including the non-discretionary component produces an erroneous value for the dependent variable and decreases the power of the test. This problem is addressed in this study. The model constructed in Section 4.1 is able to detect the manipulated amount of accruals (hereafter MAC).

2.3.2 Sample selection problems

Studies mentioned in Section 2.2 have a similar problem: their

results came from a set of companies that shared a (set) of specific condition(s). As a consequence, the results of those studies are not easily generalizable to companies who do not share these condition(s). So, these studies do not result in a comprehensive test of the theory (limited sample problem). On the other hand, studies reviewed in Section 2.1 are not able to explain the choices of accounting procedures, since either the R^2 is very low or the research designs have been the subject of significant criticism.

One of the problems with most studies of positive accounting theory is that they ignore possible differences between small and large firms. Previous studies suggest that small firms choose different accounting policies from large firms mainly because of the difference in size (e.g., Daley and Vigeland [1983] showed that smaller firms capitalized R&D costs more often than larger firms). Ignoring this difference and combining small and large firms to test the theory can result in lower R^2s and erroneous models for the accounting-method choices.

The research design of this study avoids the above problems in two ways. First, it links the sets of studies mentioned previously (Sections 2.1 and 2.2). No study, yet, has investigated the relationship between the change in the amount of discretionary accruals (dependent variable)--in a sample drawn from the general population--and change(s) in the independent variables (as defined by positive accounting theory). In addition, the sample in this study has been partitioned into large and small companies, thus avoiding the problem of ignoring differences between the two groups.

2.3.3 Explanatory (right-hand-side) variables problems

The problems related to right-hand-side variables are mostly those of measurement difficulties. For example, using a dummy variable for the bonus plan assumes that the model can capture the effects of the components of the bonus plans. However, Healy [1985] shows that the components of the bonus plans have a stronger explanatory power than merely the presence of the bonus plans. Also, the use of size as a proxy for the political cost may not capture the full effect of political activity. Some studies even use the size as an independent hypothesis--size hypothesis--to avoid problems in the interpretation of the results found for the size variable (e.g., Christie [1990] and Watts and Zimmerman [1986]). A more direct measure of political sensitivity is needed. Finally, the debt-to-equity variable may not reflect the closeness to the debt covenant that may actually induce a manager to select income-increasing methods.

This study avoids the above problems by improving the measurement of explanatory variables. In addition, some new explanatory variables were included--as will be discussed in Section 2.3.5 below. For example, the lower limit values of the management compensation plans are included in the models in this study (Section 4.2.2). Also, a direct measurement of the political environment effect has been used (Section 4.2.3). For the debt covenant variable, not only is the lag of the variable in previous periods included in the model, but the relationship of the firm's debt to that of related industries is also explored.

2.3.4 Model mis-specification problems

Two model mis-specifications have been mentioned in positive accounting research. The first one deals with the underlying assumption regarding managers' choices of accounting methods: they choose the methods because of opportunistic and/or efficiency motives. Researchers have tested the theory assuming a constant investment opportunity set and constant contracts. If choices of accounting procedures depend on firms' opportunity sets and contracts in addition to the managers' opportunistic behavior (for example), then the model is mis-specified. Another model mis-specification originates from possible interactions among the explanatory variables. Almost all studies have treated the right-hand-side variables as additive and ignored the possible interactions (Watts and Zimmerman [1990]).

Another inherent assumption in previous tests of positive accounting theory is that the choice of accounting methods results from the contracting variables that were present when the accounting methods were chosen, ignoring the possibility that a manager's decision may be based on a combination of present and past contracting conditions. For example, Zmijewski and Hagerman [1981] use the debt-to-equity ratio (as an explanatory variable) only for the year that the accounting methods are being studied. If the manager's decision is partially based on the trend of the ratio during the last several years, then the model is mis-specified because the relevant variables are not included in it.

To avoid the above problems, the interactions between and among some of the independent variables are included in this study. Also, the

lag values of the explanatory variables are included in the models.

2.3.5 Omitted variables problems

As implied, the problems mentioned in the two previous sections could result in missing variables. The following are some of the variables that have been ignored, or not controlled for, in previous research:

1) Accepted set of accounting methods
2) Implicit set of contracts
3) Firms' financial distress
4) Corporate and labor market control
5) Stock option plans
6) Firms' subjection to take-over efforts
7) Other long-term compensatory plans

For example, "the accepted set of accounting methods" is important when accounting method choices are studied across companies. A manager of a company has only a limited set of accounting methods from which to select and which is not necessarily identical to that of another company (Watts and Zimmerman [1990]). Obviously, the manager may choose a different set of accounting methods if he has different available choices.

The implicit set of contracts can also be considered to provide incentives for management's accounting choices. These implicit claims are unwritten agreements between the firm and "stakeholders" (e.g. customers and employees) and include promises such as continuing service to customers and job security for employees. Bowen, DuCharme, and Shores [1990] provide support for the above statement.

It has also been shown that firms who face financial problems,

e.g., bankruptcy, choose income-increasing accounting methods. Schwartz [1982] shows that a financially distressed group of firms, when compared to a financially healthy group of firms, chose more income-increasing accounting methods (p. 41). He suggests that firms do so to improve their financial appearance. Consequently, one of the variables that can have explanatory power for choices of accounting methods may be the firm's degree of financial distress.

Eliminating these variables results in lower explanatory power in the tests of the theory, a situation which could be avoided by either introducing these variables into the models or controlling for them. To address the problems related to omitted variables, this study incorporates some of the mentioned variables into the model. Section 4.2.4 discusses the variables that are included for the test of theory in this study.

CHAPTER III

THEORETICAL FRAMEWORK FOR ACCOUNTING CHOICES

Using utility maximization of owner and manager (principal and agent), Jensen and Meckling [1976] prove that managers (when they do not own the firm's total shares) make sub-optimal decisions. These decisions result in a reduction of the firm's value which could have been avoided if the manager owned the firm completely. Jensen and Meckling [1976] add another dimension to their analysis when they include the effect of debt on the manager's decision-making behavior. Given a set of assumptions, they prove that managers make sub-optimal decisions to transfer risk from themselves and principals (shareholders) to debtholders. This agency problem originates from the fact that the agent does not have the same incentives as the stockholders to maximize the firms' value.

If the managers were able to benefit from the firm's total output, they would perform their best and would avoid sub-optimal decisions. Three sources of agency problems are mentioned: informational asymmetry, the existence of debt financing under limited liability, and partial ownership of the firm by an owner/manager (Barnea et al. [1985], p. 596). Asymmetry of information among individuals is known as the source of the moral hazard problem. A practical way to solve this problem is to invest resources into monitoring actions and to use this information

in the contracts. Accounting is one of many monitoring systems that may serve to reduce agency problems (e.g., Barnea et. al. [1981] and Holmstrom [1979]). As Smith and Warner [1979] mention, covenants used for restricting dividends, financing, and production/investment policy are frequently specified in terms of income or balance sheet numbers (this is also true in compensation contracts between the firm and its management). Since there are usually no restrictions on the computation of the accounting numbers except to be consistent with generally accepted accounting principles (GAAP), management can manipulate the accounting numbers which define the constraints contained in the contracts (Smith and Warner [1979], p. 202).

Managers can manipulate accounting numbers to different degrees and because of opposing incentives. For example, for some debt covenants, the higher the amount of net income, the more easily the firm can avoid the pressures resulting from the covenant conditions, while for other contracts (e.g., labor contracts) the opposite may be true. So, different sets of accounting methods may be suitable, depending on the kind of contract. For the sake of clarity in this discussion, parties that could have implicit or explicit contracts with a firm (and, as a result may influence choices of accounting methods) and the effect of the simultaneous presence of several contracting parties are addressed separately. The contracting parties are discussed in the following order:

1) Management
2) Debtholders
3) Political parties (e.g. government agencies, labor unions, and environmentalists)

4) Others (e.g. customers and employees)
5) The simultaneous presence of different contracting parties

3.1 Management

Agency theory suggests that managers (agents) of firms, in an effort to maximize their expected utility, make sub-optimal investment strategy decisions (Jensen and Meckling [1976]). For example, if a manager is compensated by a fixed amount of money, and is not sharing the firm's output, then there is no incentive for him to maximize the firm's market value or output. For this reason, management compensation is often calculated in a way that allows managers to share in the firms' output. In many compensation plans, accounting income is used as the contracting variable (Healy [1985]).

It is logical to assume that if the compensation of managers depends on accounting income, then they have incentives to choose income-increasing accounting methods in an effort to increase the level of their current compensation (e.g. Watts and Zimmerman [1986]). Moreover, management compensation is likely to be implicitly linked to firm performance as this is reflected in accounting numbers, even if the compensation contracts are not explicitly tied to reported accounting numbers (e.g. Ayers [1986]). It is expected that managers' incentives for choices of income-increasing accounting methods will be higher when their total compensation for one period is relatively lower than for other periods (all else being equal). Therefore, changes in the managers' total compensation from one year to another may also provide different degrees of incentive for choosing particular accounting

procedures.

In general, the "managers of firms with bonus plans are more likely to choose accounting procedures that shift reported earnings from future periods to the current period" (Watts and Zimmerman [1986] p.208). However, since Healy [1985] showed that the degree of the shift is related to the terms contained in the bonus plans and the manager's revenue in each period, bonus terms are important and should be incorporated in the definition of a bonus variable.

3.2 Debtholders

It is intuitively reasonable that investments with relatively lower risk have a higher market value than other investments (ceteris paribus). Consequently, any decrease in the risk involved in investments should be followed by a positive market reaction. Using this notion, Jensen and Meckling [1976] demonstrate that managers try to decrease the investment risk of shareholders by increasing the investment risk of debtholders. If managers are successful in transfering part of the risk from the stockholders to the debtholders, then the value of the stock will increase.

Rational debtholders, of course, will either adjust the value of the purchased debt or impose restrictions upon management actions to avoid the risk transfer because they are aware of the manager's ability to transfer risk. Results of several studies on debt covenants show that the degree of the restriction on management's actions increases with the degree of leverage (e.g. Smith and Warner [1979], and Daley and Vigeland [1983]).

The restriction on management's actions, in most cases, is monitored by way of accounting figures--mostly earnings--that are calculated using the FASB/SEC guidelines (Smith and Warner [1979] and Duke and Hunt [1990]). Since the FASB allows companies to choose their accounting methods from a set of accepted procedures and a default on a debt contract is costly, it is argued that managers choose accounting methods that increase assets and revenues and decrease liabilities and expenses (Duke and Hunt [1990] p. 47). Or, the higher the degree of leverage, the more managers will try to choose income-increasing accounting methods (ceteris paribus) in an effort to avoid the consequences of debt-covenant defaults.

Generally, two reasons are suggested for the above income-increasing behavior. First, stockholders (the party that compensates the manager) reimburse, by increasing the manager's future compensation, those actions that will increase the value of their investment. Second, the manager may reduce his risk of debt covenant violations by choosing accounting methods that result in a decrease in the probability of defaults in debt covenants.

Thus, it appears tenable that a direct relationship exists between the degree of leverage and the choice of income-increasing accounting methods. In general, managers of firms with a higher degree of leverage are more likely to choose accounting procedures that shift reported earnings from future periods to the current period.

3.3 Political parties

A firm is not an isolated unit in society. Either it must interact with other political units (as in the case of governmental subsidies) or it is subject to the interactive needs of political parties (as in the case of labor union disputes). The interaction between the firm and political parties logically results in explicit or implicit negotiation processes. In any negotiation process, the parties involved try to maximize the present value of their wealth. If the maximization of the wealth for one party results in a cost (reduction in the wealth) to another party, then a conflict of interest arises. In the case of labor unions, this is obvious. Firms try to avoid increases in labor compensation while the unions negotiate for such increases.

Political parties include the government, labor unions, environmentalists, and other companies. The government has an interest in firms because it is supposed to act on behalf of society as a whole. For example, Congress can pass laws that regulate companies, as it did in establishing the Security and Exchange Commission (SEC) in 1934. The SEC has the legal authority to prescribe accounting principles and procedures for companies under its jurisdiction and to prescribe the form and content of financial reports filed with it. The labor union is one of the most powerful political parties. Unions represent the employees of corporations and use regulatory means (e.g. the court system) to acquire more benefits, as seen in the conflict between the airlines and the unions who represent the pilots.

Accounting numbers can be used in at least two ways in negotiation

processes: first, as signals to the political parties that there are reasons for those parties to start negotiations with the firm, and second, as means in the negotiation process itself. In the first case, managers of firms are able to send positive or negative signals to outsiders by using different accounting procedures. Also, if managers are anticipating future negotiations between the firm and political parties, they can adopt an appropriate set of accounting methods for the expected situations.

Variability in accounting earnings is a signal for political parties. Hagerman and Zmijewski [1979] suggest that a higher variability in returns may signal that firms from time to time earn abnormal returns, which may subject them to political costs. Since returns are highly correlated with the accounting earnings, firms may (in an attempt to reduce political pressures) try to reduce the variability in accounting earnings. Consequently, Hagerman and Zmijewski [1979] hypothesize that higher risk firms "choose income deflating alternatives" (p. 143).

Accounting earnings signals for larger firms and those with relatively greater monopoly power have comparatively more weight, since these firms are more closely examined by the political parties. As a result, managers of these firms may have more incentive to avoid undesirable (sizable earnings) signals. Thus, firm size and the degree of monopoly power may affect accounting methods choices.

Positive accounting theory assumes that managers choose income-decreasing methods to avoid political costs (e.g. Christie [1990]). Relatively substantial accounting earnings may reveal the ability of the

firm to pay more wages and may also signal the possibility that the firm has a monopoly in the market; consequently, it is logical to expect that the pressure of political parties can affect the choice of accounting procedures.

3.4 Others (e.g. customers and employees)

A set of contracts that has not been closely studied in the existing positive accounting literature is the implicit set of contracts between a firm and its customers, employees, suppliers, and so on. For example, Macaulay [1963] provides evidence, based on interviews and reviews of court cases, that many firms rely on implicit agreements in business decisions (quoted in Bowen, DuCharme, and Shores [1990]). A firm implicitly promises that it will continue to service customers, provide jobs for its employees, and offer business to its suppliers.

Those who enter into implicit agreements assess the probability that a firm will default on its initial promises. On the other hand, implicit contracts have little legal standing should the default occur; they are enforced by the market mechanism imposing concessions on the firm with respect to the price of future implicit claims, for example, through lower prices to customers, higher prices to suppliers, and/or higher wages to employees (Bowen, DuCharme, and Shores [1990] p.2, and Klein, Crawford, and Alchian [1978]). Thus a firm's value depends in part on the expected cost of concessions (imposed by parties like customers) relating to implicit contracts.

Many of these parties have limited incentive to become well informed about a firm's reputation or financial position as it is

reflected in the market and is known to others (for example, stockholders). Consequently, it is argued that these parties may rely on accounting numbers as a low-cost monitoring device to assess the probability of default on implicit contracts. The higher the assessed probability, the more costly it will be for the firm. If a set of accounting methods results in a lower "assessed probability of default," then the manager has an incentive to choose that set of methods, in an attempt to maximize the market value of his firm. A low amount of accounting income may lead the assessors to feel that the company is in trouble and assign it a high probability for default. As a result, it is suggested that implicit contracts stimulate managers to choose income-increasing accounting procedures (Bowen, DuCharme, and Shores [1990]).

3.5 The simultaneous presence of different contracting parties

Undoubtedly, a firm is involved with more than one contracting party at any point in time. If these contracts motivate the managers differently in their choice of accounting methods, then the simultaneous presence of contracts will result in an interactively-derived set of accounting procedures. For example, higher earnings impose political costs, so managers are motivated to select more income-decreasing accounting methods. At the same time, however, lower earnings may decrease a manager's bonus compensation. As a result, two different and opposite motives may drive managers in their accounting-method decisions. A manager's choice can be different depending on the

magnitude of each motive. Ignoring the interactive effect in the descriptive models for accounting method choices limits the ability of the models to explain choices of accounting methods among companies.

The direction of interactions between/among variables can be predicted only if variables involved in the interaction have the same predicted direction for the choice of accounting methods (income-increasing or -decreasing). For example, the following directions for the bonus plan variable can be predicted:

a) Income-increasing behavior for the interaction of the debt variable and bonus plan variable when the income is higher than the lower boundary but lower than the upper boundary of the bonus plans.

b) Income-decreasing behavior for the interaction of the political cost variable and the bonus plan variable when income is very much lower than the lower boundary of the bonus plan.

However, the direction of the interaction between the debt and the political cost variables depends on their relative importance in any firm and cannot be predicted. This, of course, does not mean that the interaction of these variables does not have explanatory power and should not be included in the models. A summary of the predicted effects of contracting parties on accounting numbers is shown in Table 3-1 below[4]. A more comprehensive discussion of the individual variables and their predicted and observed signs is also presented in Tables 6-7 and 6-8.

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[4] Since the net amount of accruals reduces the net income for the period, predicted effects of contracting parties on accounting-method choices for net income and accruals are opposite.

TABLE 3-1

THE PREDICTED EFFECTS OF CONTRACTING VARIABLES ON A FIRM'S INCOME AND THE AMOUNT OF ACCRUALS

CONTRACTING PARTY/EXPLANATORY VARIABLE	PREDICTED EFFECT OF THE ACCOUNTING-METHOD CHOICES ON THE INCOME(1)	PREDICTED EFFECT OF THE ACCOUNTING-METHOD CHOICES ON THE ACCRUALS(1)
Management compensation	Increasing	Decreasing
Debtholders	Increasing	Decreasing
Political parties like government, labor unions, environmentalists	Decreasing	Increasing
Customers and suppliers(2)	Increasing	Decreasing
Included missing variables: Firms' financial distress and firms' subjection to take-over efforts	Increasing	Decreasing

(1) The predicted signs are typical signs for the explanatory variables. The expected signs in the models, however, depend on how the explanatory variables are measured. For example, it is expected that the management compensation explanatory variable is directly related to the income-increasing accounting choices. However, when the upper and lower boundaries of management compensation plans are included in the model, the expected sign depends on the distance of these variables from the net income (before manipulation). Section 4.2.2 discusses this issue in more detail.

(2) Since no operational means exists to measure the implicit contracts between the firm and its customers and suppliers, these contracting parties are not included in the models of this study. However, including a proxy variable (financial distress) may capture the effect of implicit contracts on the choices of accounting policies. See Section 4.2.4 for further explanation.

Employing the above information, the following hypothesis is suggested to test the positive accounting theory:

H_a: The contracting parties do not affect managers' choices of accounting methods[5].

The methodology used in this paper to measure the dependent and explanatory variables is discussed in the following chapter.

[5] The (explanatory) variables related to the contracting parties are discussed in Chapter Five. Section 5.3 presents the operational version of the above hypothesis.

CHAPTER IV

RESEARCH DESIGN

The research design of this study is discussed in the following sections:

1) Calculation of the dependent variable

2) Definition of explanatory (independent) variables

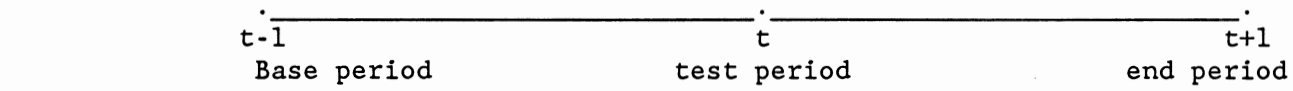
   2.1) The debt covenant variable
   2.2) The management compensation variable
   2.3) The political variable
   2.4) The omitted variables
   2.5) The interaction between and among variables

3) Test of the theory

4.1 Calculation of the dependent variable

Managers may sometimes adopt income-manipulation techniques that are less subject to detection by researchers (and outsiders in general). For example, changes in bad debt expense estimations cannot be detected by outsiders as easily as changes in the depreciation methods. DeAngelo [1986 and 1988] used the amount of accruals to reveal these subtle techniques because the effects of such changes will appear in net accruals. However, her model did not separate the discretionary (part that can be manipulated by the manager) and non-discretionary (part that can not be manipulated by the manager) components of accruals.

Therefore, a model of accruals that reflects the effects of income manipulation is developed within a three-period world, as below. This model segregates the discretionary and non-discretionary elements of accruals:



Period t is the period for which discretionary accruals will be measured. The following assumptions are used in the development of the accrual model:

1) The only significant manipulation of revenues is <u>revenue deferral</u>.

2) Accrued expenses can be categorized as variable and fixed (where the activity measure is sales revenue).

3) The only significant fixed accruals are depreciation and amortization.

4) If revenues are deferred, they are deferred from the end of one period to the beginning of a subsequent period and are collected (or written off) by the end of the subsequent period.

5) If manipulated accrued expenses have an income-increasing (decreasing) effect in the test period, so will the deferred revenue.

6) The ratio of "true" accounts receivable to "true" sales revenue is constant over the three periods. "True" means the amount that would be reported without discretionary changes.

7) Any significant change in fixed accruals and the income effect are disclosed in the financial statements (APB Opinion No. 20 is effective[6]).

The above assumptions are sufficient to allow the calculation of the discretionary component of net accruals (A_t). This component is the sum of three sub-components:

$$A_t = A_{ft} + A_{vt} + R_{dt}$$

Where A_{ft} = the fixed accrual effect
A_{vt} = the variable accrual effect
R_{dt} = the revenue deferral effect

By assumptions two, three, and seven, A_{ft} can be directly assessed. Only manipulative change will be assigned, e.g., an increase in depreciation because of asset acquisition will not count. The variable effect is obtained by the following calculation. Let $E_{vt} = E_{at} - F_{at}$ for all t, where

E_{vt} = variable accrued expenses
E_{at} = total accrued expenses
F_{at} = fixed accrued expenses

Next we can calculate the variable cost ratio for accrued expenses in periods t-1 and t:

$$V_{t-1} = E_{v(t-1)}/R_{t-1}$$

$$V_t = E_{vt} / R_t$$

where R_{t-1} and R_t are reported revenues for the two periods.

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[6] In practice, firms are required to follow the APB Opinion No. 20. Results of data collection confirmed this assumption.

The change in the variable cost ratio, $\Delta V = V_{t-1} - V_t$, reflects the manipulation of variable accrued expenses that occurred in period t. If ΔV is positive (negative) then the manipulation is income-increasing (decreasing). The calculation of the dollar effect, A_{vt}, will be addressed with revenue deferral.

The revenue deferral effect is calculated using assumptions one, four, five, and six. If the accrued expenses reflect income-increasing behavior, then revenue is being deferred from period t-1 to period t (by assumption five). By assumption four, the ending Accounts Receivable balance is correctly specified for period t. Because of assumption five and the three-period world, the revenues and accounts receivable in period t+1 are correctly reported. Thus, $AR_{t+1}/R_{t+1} = K_{t+1} = K$ by assumption six. Using the receivables factor, K, the "true" revenues of period t can be computed[7]:

$$R_{Tt} = AR_t/K$$

The deferral effect on income, therefore, is computed as follows:

$$R_{dt} = (R_t - R_{Tt})(1-b)$$

where: b is the total variable cost ratio. Total variable cost consists of variable cash and variable accrued expenses.

Finally, the dollar value of the variable effect is computed as follows:

$$A_{vt} = \Delta V * R_{Tt}$$

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[7] If income decreasing actions are signaled, then K is computed in period t-1 and the manipulated amount of revenue is calculated at period t+1 for period t.

An example illustrating this model is contained in Appendix B.

4.2 Definition of explanatory (independent) variables

Chapter Three of this study presented the theoretical justification for the explanatory variables which influence the choices of accounting procedures. The explanatory variables that are considered in this study are:

1) The debt covenant variable
2) The management compensation variable
3) The political variable
4) The omitted variables
5) The interaction between and among these independent variables

The approach to calculating these variables is described in this section.

4.2.1 The debt covenant variable

Almost all positive accounting research has used the debt-to-equity ratio as a surrogate for a firm's closeness to debt covenant violations and concluded that the higher the debt-to-equity ratio, the more income-increasing accounting methods managers choose. This ratio has been the subject of criticism, primarily because the validity of the debt-to-equity ratio as a proxy for the closeness of firms to debt covenant restrictions and/or violations, has not been established. To address the above criticism, Duke and Hunt [1990] studied the ability of the debt-to-equity ratio to explain the closeness of firms to debt covenant restrictions. Results of their study suggest that for most

restrictions (over 60%) which relate to retained earnings, working capital, and net tangible assets, the debt-to-equity ratio is a good surrogate for the closeness to and/or existence of debt covenant restrictions (p. 56).

Also, the ratio may have an additional dimension that has been mostly ignored in previous studies. A company with a high degree of debt-to-equity ratio relative to other companies in its industry is more likely to have problems in obtaining debt financing in the market than a similar firm with a lower ratio (everything else being equal). Consequently, a firm with a higher debt-to-equity ratio, is more likely to choose income-increasing accounting procedures than a similar firm with a lower ratio even though it may not be close to the debt covenant restrictions. The distance of the firm's debt-to-equity ratio from that of the average of companies in its industry may also result in incentives for choices of income-increasing methods.

Consequently, two sets of variables are used to capture the effect of the debt covenants on the accounting method choices: the change in the firm's debt-to-equity ratio and the distance between the firm's debt-to-equity ratio and that of the industry average (starting with two years before the change in accounting procedures). Thus the variable (DEBT) represents two sets of variables that are calculated as follows:

Set One: change in the debt-to-equity ratio

$$CDE_i = DE_i - DE_{i-1}$$

Where DE_i is the debt-to-equity ratio for $t = i$ ($i = t, t-1,$ and $t-2$).

Set Two: the distance between the firm's debt-to-equity

ratio and the industry average debt-to-equity ratio

$$DDE_i = IDE_i - DE_i$$

Where IDE_i is the industry average of debt-to-equity ratio (for i = t, t-1, and t-2)[8].

4.2.2 The management compensation variable

Three sets of variables are used to capture the effect of the manager's compensation on the choices of accounting methods. These sets are described below:

Set One: compensation-plan related variables:

The values for upper and lower limits in the plans are determined by the compensation plan conditions. The following are possible situations:

a) The plan contains upper and lower limits
b) The plan contains only an upper limit
c) The plan contains only a lower limit
d) The plan has no condition for upper and lower limits
e) There is no compensation plan.

Upper (UPL) and lower (LWL) limits are assigned the following amounts (the letters correspond to the above situations):

	Upper limit (UPL)	Lower limit (LWL)
a)	As reflected in the plan	As reflected in the plan
b)	As reflected in the plan	0
c)	Very large number	As reflected in the plan
d)	Very large number	0
e)	Very large number	0

The final step to calculate values for upper and lower limits is as follows (UL and LL are the independent variables used in the model):

[8] Firms with the same three digit industry SIC code (as reflected in Compustat) are assumed to belong to the same industry.

$UL = [UPL - (NI_t - A_t)]$
$LL = [LWL - (NI_t - A_t)]$

Where: UL and LL are closeness of upper and lower limit values to net income for the period [without manipulation in accounting numbers ($NI_t - A_t$)]. If net income is defined differently in the plan, NI_t is adjusted to that of the plan.

To calculate UL and LL, the net income without manipulation in accounting numbers is used since the manager's decisions related to manipulation of accounting numbers is based on net income before manipulation. As will be discussed in Chapter Five, the value for UL cannot be obtained using the information in the Proxy statements. As a result, this variable was deleted from the model and analysis[9].

Set Two: the manager's salary:

$DSAL_i = (SAL_i - SAL_{i-1})$

Where: SAL_i is the total CEO's compensation for the period (as reflected in the Proxy statements) for i=t, t-1, and t-2.

Set Three: the manager's percentage share in the company's stocks (SHARE). Also, the changes in the management share for the periods t, t-1, and t-2 are included in the model.

The variables in Set Three are proposed here because Jensen and Meckling [1976] demonstrate that the degree of risk transfer to debtholders depends directly on the manager's share in the company. In the context of this study, the higher the manager's share in the firm,

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[9] The value of LL was obtained for 62 companies, which represents 319 missing variables for other companies. For more details about the sample selection see Chapter Five.

the more incentive he/she has in transferring the risk to debtholders using income-increasing accounting methods.

DeAngelo [1988] shows that new managers of companies who won their way in a proxy contest, choose to take a "bath" to decrease the earnings and blame it on the previous management. To capture any possible effect of the changes in management on the choices of accounting methods, the following set of variables is included in the model:

Set Four: Change in the company's CEO ($CCEO_i$)

Where: $CCEO_i$ is a change in the company's CEO for i (i = t-2, t-1, and t). $CCEO_i$ is a dummy variable which takes a value of one if the CEO changes in period of i.

The symbol MANGMT is used to represent the above-described variables (LL, $DSAL_i$, $CCEO_i$, and SHARE).

Including the above variables for the effect of the manager's compensation (in cases of $DSAL_i$ and LL) and his political influence in the firm (in cases of SHARE and $CCEO_i$) on the accounting method choices results in avoiding the related right-hand-side omitted variable problem, while representing a more comprehensive description of the manager's incentives in his/her choices of accounting methods. For example, no previous study has considered the degree of closeness of lower limits (of compensation plans) to the firm's income in explaining accounting method choices.

4.2.3 The political variable

Four variables will be used to capture the effect of political pressures on the choices of accounting methods. These variables are as follow:

1) The variability in accounting numbers
2) The size of the company
3) The market share of the firm (monopoly power)
4) "Bad" news (as reflected in the Wall Street Journal) which includes the following:

   a) Labor union problems
   b) Being subject to regulation
   d) Law suits
   e) Requests for special treatment from the government (e.g. subsidies)

Risk (variability in accounting numbers), size, and monopoly power are also assessed as "bad" news for firms. "Bad" is defined as news that exposes the firm to political costs. The related values for the above four categories are calculated as follow:

RISK = the variance in accounting earnings using ten periods of accounting earnings
SIZE = the company's total assets
MONOP = (the firm's total revenue at t=1)/(the total revenue of the industry to which the firm belongs at t=1)[10]
NEWS = total number of bad news items from t-1 to t, as reflected in the Wall Street Journal.

Since there is no existing theory of how the above variables should be included in a model constructed for explaining choices of accounting methods, these variables are used for the test of the theory

[10] The related industry's total revenue is the revenue of companies that share the same three-digit SIC code with the firm.

in two different ways:

a) Each of the four variables are included in the model separately.

b) An aggregate measure for political pressures is included in the model (all four variables will be combined and shown as one variable).

To calculate the aggregate value in (b) above, MONOP, SIZE, and RISK values are divided into five categories according to their values. The lowest value (reflecting the least degree of bad news) was assigned the number one and the largest value (reflecting the greatest degree of bad news) was assigned the number five and those values in between were given two, three, and four. The assigned numbers for each company were then aggregated and considered as the bad news number resulting from the firm's risk, size, monopoly power, and the number of bad news items. Then the following index was constructed:

$$INDEX = MONOP + SIZE + RISK + NEWS$$

It is plausible to expect that dissimilar bad news (political pressures) may influence accounting numbers differently. In this study, however, it was assumed that such items equally affect the choices of accounting methods. To remove this assumption, the researcher would need to find a practical method to measure the effect of each item of bad news on the accounting method choices. However, presently no such method is available and the effects of political pressure on accounting method choices is hardly known.

Methods suggested in this study extend the research to include

variables that have generally been ignored in prior research. Moreover, this study avoids including only the size of companies as a proxy for the political variable, which has been the subject of criticism.

4.2.4 The omitted variables

The following variables, which have generally been overlooked in previous positive accounting studies, are included in this study:

a) The firm's financial distress
b) The firm's subjection to take-over efforts

Firms with financial distress are those firms that are known to have financial problems which may result in future reorganizations and/or bankruptcies. Theoretically, these firms lean toward income-increasing choices of accounting methods to avoid the costs of reorganizations and bankruptcies. As suggested in Section 3.4, parties who have implicit contracts with the firm, have limited incentives to become well-informed about a firm's reputation or financial position as it is reflected in the market. These parties may use accounting numbers as a low-cost monitoring device to assess the probability of default on implicit contracts. Then, those financial distress measures that use reported accounting numbers (e.g., Z scores--see below) may be used as a proxy for the probability of default on implicit contracts.

Altman [1983] uses the financial information of the prior year (t-1) to estimate the degree of financial distress (named Z scores) for the subsequent year. However, here the Z scores are calculated for t-2, t-1, and t. This enables the model to capture the possible effect on

the accounting numbers of previous (and the anticipated future) periods of financial distress. Schwartz [1982] shows that firms with financial problems choose income-increasing accounting methods in both the year of bankruptcy and the year before. So, it is possible that a firm, in anticipation of future financial problems, may change its accounting policies at t. Altman's model is as follows:

$$Z_i = .717\ X_{i1} + .847\ X_{i2} + 3.107\ X_{i3} + .420\ X_{i4} + .998\ X_{i5}$$

Where:

X_{i1} = (current assets - current liabilities)/total assets
X_{i2} = retained earnings/total assets
X_{i3} = (earnings before interest and taxes)/total assets
X_{i4} = (the book value of preferred and common stock)/(book value of total liabilities)
X_{i5} = sales/total assets

for i = t, t-1, and t-2

He found that firms with Z values greater than 2.9 fit the non-bankrupt group, while firms with Z values less than 1.2 belonged to the bankrupt group. Firms with Z values between 1.2 and 2.9 belonged to a gray area for which no decision about the firms' bankruptcy position could be made. For the purpose of this study, the Z_i value for each firm is calculated and then 1.2 is subtracted from the calculated amount to predict a firm's closeness to reorganization and bankruptcy (here financial distress). The smaller the computed value ($DISTRS_i = Z_i - 1.2$), the closer the firm is to financial distress and the more the firm is motivated to choose income-increasing accounting methods.

Since the coefficients of Z scores were calculated using late 1970's financial information, the validity of these coefficients, when

used for late 1980's financial information, can be questioned. For this reason, in addition to the Z values, the ZETA® values as calculated by Zeta Services, Inc. for periods t-2, t-1, and t, are also included in the model. The model to calculate ZETA® values is not publicly available and the related values are obtained by soliciting them from Zeta Services, Inc.. Although ZETA® values have essentially the same use as the Z values, they are presumably a better estimate of financial distress since Zeta Services, Inc. updates its models every year. Another possible measure of financial distress can be the firm's bond rating by the market. Consequently, in addition, to Z and ZETA® values, the change in the bond rating of each firm (as reflected in the COMPUSTAT) for the three periods (t-2, t-1, t) is employed as another measure of financial distress.

A firm may be subjected to take-over efforts by outsiders. In this case, in order to avoid the take-over, the firm's manager may try to choose income-increasing accounting methods to signal that the firm is in a good financial position. Previous research has shown that managers of targeted firms choose more income-increasing accounting methods (Groff and Wright [1989]). As a consequence, the presence of a take-over effort may have explanatory power in choices of accounting methods. A dummy variable (T) is used to capture the possible explanatory power of take-over efforts. The presence of take-over efforts, which is detected through the Wall Street Journal, results in a value of one for the dummy variable, the absence, in a zero value for the variable.

These two variables (DISTRS and T) are the "omitted variables"

that have been considered in this study and are shown as OMIT in the model. Other omitted variables that are suggested by the critics of positive accounting theory (e.g., stock option plans) are not considered in this study. The main reason for omitting other variables is that methods are not yet known to estimate them.

4.2.5 The interaction between and among variables

As mentioned in Section 2.3.4, the omission of the possible explanatory power of interaction between and among explanatory variables may result in model mis-specification. No specific directions for the interactive variables are suggested, unless the variables involved in the interaction have the same income-decreasing (or -increasing) expected directions. In that case, the direction of the interactive variable will be the same as the directions of the individual variables. To facilitate the presentation of the interactive variables, they will be shown as INTERACTS in the model.

4.3 Test of the theory

The following models can be derived for A_t:

$$A_t = a_0 + a_1(DEBT) + a_2(MANGMT) + a_3(POLITC) + a_4(OMIT) + a_n INTERACTS + e$$

A_t is the total amount of manipulation in accounting numbers for period t and the dependent variable.

DEBT represents two sets of variables as follows:

$CDE_i = DE_i - DE_{i-1}$

DE_i is the debt to equity ratio for t=i (i=t, t-1, and t-2)

DDE_i = IDE_i - DE_i
IDE_i is the average debt-to-equity ratio for the firm's related industry (for i= t,t-1,and t-2).

MANGMT represents four sets of variables as follows:

LL = [LWL - (NI_t - A_t)]
LL is closeness of lower limit value to net income for the period [without manipulation in accounting numbers (NI_t - A_t)]. If net income is defined differently in the plan, NI_t is adjusted to that of the plan. LWL is assigned values as described in section 5.2.2.

$DSAL_i$ = (SAL_i - SAL_{i-1})
SAL_i is the total management revenue (as reflected in the Proxy statements) for i=t, t-1, and t-2.

SHARE is the manager's percentage share in the company's stocks and changes in his share for t-2, t-1, and t.

$CCEO_i$ is change in the company's CEO for i (i = t-2, t-1, and t). $CCEO_i$ is a dummy variable which takes a value of one if the CEO changes in period i.

POLITC represents <u>either</u> the following four variables:

RISK = the variance in accounting earnings.
SIZE = the company's total assets.
MONOP = (the firm's total revenue at t)/(the total revenue of the industry in which the firm belongs at t)
NEWS = total number of bad news items from t-1 to t.

<u>or</u> the following index:

INDEX = MONOP + SIZE + RISK + NEWS
NEWS is as defined above and MONOP, SIZE, and RISK are as defined above but adjusted as described in section 5.2.3.

OMIT represents two variables, $DISTRS_i$ and T:

$DISTRS_i$ is:

$DISTRS_i$ = Z_i - 1.2, (for i= t and t-1) and Z is calculated using the following formula:

$$Z_i = .717\ X_{i1} + .847\ X_{i2} + 3.107\ X_{i3} + .420\ X_{i4} + .998\ X_{i5}$$

where; X_{i1} = (current assets - current liabilities)/total assets

X_{i2} = retained earnings/total assets

X_{i3} = (earnings before interest and taxes)/total assets

X_{i4} = (the book value of preferred and common stock)/(book value of total liabilities)

X_{i5} = sales/total assets

for i = t, t-1, t-2.

and:

$DISTRS_i = ZETA_i$ for i = t, t-1, t-2.
where, ZETA® is a risk evaluation score from a model developed by Zeta Services Inc.

and:

$DISTRS_i = BOND\text{-}RATING_{i-1} - BOND\text{-}RATING_i$
for i = t, t-1, t-2.

T takes a value of one if the firm is the subject of a take-over effort; otherwise its value is zero.

INTERACTS is the interaction between or among independent variables.

The suggested direction for each of the above independent variables is as shown in Tables 6-13 and 6-14.

The following hypothesis (stated in alternative form) will be used to operationalize the hypothesis suggested for the test of positive accounting theory in Section 3.5:

H_a: The coefficients of variables DDE_i, CDE_i, $DISTRS_i$, $DSAL_i$, $CCEO_i$ (for i = t, t-1, and t-2), T, SHARE, LL, RISK, SIZE, MONOP, NEWS, and INDEX are equal to zero.

Since the number of independent variables is relatively sizable, and most probably not all independent variables contribute significantly to the choices of accounting policies, a step-wise regression analysis is applied in this study. The step-wise regression model enables the researcher to find the independent variables that significantly contribute in explaining the variation observed in the dependent variable at a pre-specified level of significance. For the purpose of this study the level is set for 0.1500. Also, to avoid problems with differences between large and small firms (as mentioned in Section 2.3.2), the sample is divided into sub-samples of large and small firms.

The methodology suggested in this study has improved the measurement of both the dependent and independent variables. One would expect that improvement in the variables would result in an improvement in the power of the test. This not only confirms Watts and Zimmerman's [1990] judgment that the weak results observed in prior studies are caused by deficiencies in the variables used, but it also demonstrates how and to what extent each improvement increases the power of the test. The sample and data collection information is presented in the following chapter.

CHAPTER V

SAMPLE AND DATA

All companies that met the following criteria were considered as candidates for the sample of this study:

1) The company is included in the 1989 Compustat data set.
2) Ten years of accounting earnings numbers (from 1980 to 1989) for the company are available on the Compustat data set.
3) The company's fiscal year ends on December 31.

This search resulted in 998 companies. Table 5-1 contains the information collected for each company. Further, 465 companies (46.5% of the useable population) were randomly selected from the total sample of 998 available companies. With this reduction in the number of companies in the sample, additional data collection became more manageable while the necessary number of observations was provided for meaningful statistical inferences.

For the remaining companies, complete Proxy Statements for years 1987, 1988, and 1989 were collected from the LEXIS library. The search in proxy statements was conducted to collect information related to the lower and upper bounds of management compensation plans, the CEO's total share in the company and compensation for each year, and the changes in CEO position during the period of 1986 to 1989. At least one proxy statement was found for 408 companies (57 missing items) of the sample to allow checking for the presence of the defined bonus plan.

TABLE 5-1

INFORMATION COLLECTED FROM COMPUSTAT

DATA IN COMPUSTAT	DATA ADDRESS	COLLECTED FOR YEARS
TOTAL LIABILITIES	(6,2)	1986-1989
COMPANY NAME	-----	-----
DNUM	-----	-----
CNUM	-----	-----
TOTAL EQUITY	(41,2)	1986-1989
PRE-TAX INCOME	(170,1)	1980-1989
CURRENT ASSETS	(4,1)	1987-1989
CURRENT LIABILITIES	(5,1)	1987-1989
RETAINED EARNINGS	(36,1)	1987-1989
TOTAL ASSETS	(6,1)	1987-1989
INTEREST INCOME	(62,1)	1987-1989
NET SALES	(12,1)	1987-1990
PRIOR SERVICE COSTS	(122,2)	1987-1989
DEPRECIATION AND AMORTIZATION	(14,1)	1988 & 1989
ACCOUNTS RECEIVABLE	(151,1)	1988-1990
NET OPERATING CASH FLOW	(133,2)	1988 & 1989
ACCRUED INCOME TAX	(130,2)	1988 & 1989
NUMBER OF COMMON STOCKS	(25,1)	1989
S&P BOND RATING	(105,2)	1986-1989

Some information could not be collected using the LEXIS library (specially the CEO's total compensation for 1986). As a result, search for additional and missing information was conducted in DISCLOSURE data sets for 1986 to 1989. The following companies were dropped from the sample for the reasons mentioned:

# of companies	Reason for deletion
11	No information was found for the company in proxy statements or disclosure data sets.
3	Manager in the company is not an individual
3	The company had a merger in 1989. The financial information is not comparable.
17	

The above steps resulted in 448 companies that remained in the sample. The sample was further restricted to only manufacturing firms. Appendix C reports the SIC code of the industries that were deleted from the sample. As a result, a total of 381 companies remained in the sample which is the subject of the analysis shown in the next chapter.

The Wall Street Journal Index was used for the number of "Bad News" items issued during the year ending December 31, 1989. The news that was considered "Bad News" is indicated in Table 5-2 below.

TABLE 5-2

NEWS THAT WAS CONSIDERED "BAD NEWS"

BAD NEWS DESCRIPTION
a) News about further regulation for the company.
b) News about the reduction of the firm's market share.
c) News related to employee layoffs and labor safety violations.
d) News about the firm's being the subject of environmental concerns.
e) News about the sales of the company's stocks owned by the company's top management.
f) News of restructuring (or reorganization) of the company.
g) Bad news related to the quarterly profits.
h) News related to the company's selling its units or subsidiaries (e.g., for problems observed in the sold units).
i) News of sudden firing or reassignments of the CEO, top-level Executives, and/or the Board of Directors.
j) News about discontinuation of an operation and/or subsidiary in the firm.
k) News of labor problems (e.g., strikes and union talks).
l) News suggesting present or future law suits against the company (e.g., when resulting in the company's court involvement).
m) Bad forecasts for the company's future income.
n) News about deficiencies in the firm's products.

Since the formula for the Zeta® values is not available publicly, Zeta® values were solicited from Zeta® Services, Inc. Fortunately, Zeta® Services, Inc. agreed to provide the Zeta® values and these values were added to the data base. A summary of the number of companies remaining in the sample is provided in Table 5-3 below.

TABLE 5-3

SUMMARY OF THE NUMBER OF COMPANIES REMAINING IN THE SAMPLE.

Useable number of companies in the population		998
Random deletion of companies		(533)
Deletion of Service-related industry companies		(67)
Total number of companies for which the data was collected		398
Further adjustment for:		
Mergers	3	
Non-availability of data	11	
CEO not being an individual	3	
		(17)
Total companies in the sample[1]		381

[1] However, data was not available for all the variables for all 381 companies remaining in the sample. For example, LL was obtained for only 62 companies, which results in 319 missing values for this explanatory variable. SAS® deletes from analysis any observation for which any datum is missing. As a result, the number of companies included in each model (as discussed in Chapter 6) depends on the number of companies that do not have any missing values for the variables that are included in the model.

After the companies that remained in the sample were chosen, the financial statements of all the companies in the sample for the year ending December 31, 1989, were searched for the public announcement of the net effect that changes in accounting methods had on 1989's net income. The NAARS data base was used for this search and the search code was the company name and "CHANGE W/7 EFFECT W/10 NET INCOME." The amount of the effect resulting from the change in accounting methods that was found with the above procedure was finally added to the total amount of manipulation in accruals that was calculated according to the model described in Section 4.1. The following chapter presents the results of this study.

CHAPTER VI

RESULTS OF THE STUDY

As was mentioned in Chapter Four, the following are the research methodology issues that are addressed in this study:

a) Dependent (left-hand-side) variable problems.
b) Sample selection problems.
c) Explanatory (right-hand-side) variables problems.
d) Model mis-specification problems.
e) Omitted variables problems.

The model for this study, described in Chapter Four, was designed in such a way that each of the above problems could be addressed separately. The following sections point out the results observed relating to these issues.

6.1 Dependent (left-hand-side) variable problems

The problem of mis-measurement of the dependent variable is mentioned in Section 2.3.1. The model used in this study (MAC model) not only separated the amount of discretionary and non-discretionary accruals, but also allowed the researcher to measure the manipulated part of the discretionary accruals. There exists in the literature only one other model that has tried to predict the amount of the accruals: DeAngelo [1986 & 1988] used a random walk model to predict the expected amount of accruals.

Consequently, DeAngelo's model was the only previous model with a dependent variable to which the results of this study could be compared (regressions that have used the MAC model compared to regressions that have used DeAngelo's dependent variable model). The same test conditions and independent variables were used for the dependent variable in both models, and the best regression models for each were found using step-wise regression analysis.

The degree of fit for both models is compared in Panel A of Table 6-1. Furthermore, the firms in the sample were divided into two groups, large and small companies[11], and the same comparisons were made (Panels B and C in Table 6-1)[12].

As Table 6-1 shows, the degrees of fit in regressions (R^2) show that the MAC model outperforms the other model[13]. When some of the interactions between and among the independent variables were included as explanatory variables in the step-wise regression analysis, the results changed to those of Table 6-2.

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[11] To divide the sample into large and small, the highest and the lowest amounts of the total assets were found for the firms in the sample. The average of the two was then considered as the bench-mark (the average was $623 million). Those firms that have total assets larger than the bench-mark were assigned to the LARGE group and others were assigned to the SMALL group.

[12] The largest number of firms included in the step-wise regression analysis is 201 firms. Although the total number of firms for the sample is 381, missing variables results in the deletion of some firms from the analysis.

[13] The results remained the same even when the MAC model was regressed on the best independent variables for the random walk model--R^2 remained higher even though the independent variables were the same.

TABLE 6-1

A COMPARISON OF THE R^2 AND ADJUSTED R^2 FOR TWO MODELS NOT INCLUDING INTERACTIONS AMONG AND BETWEEN INDEPENDENT VARIABLES

		Results using the MAC model	Results using the random walk model
Panel A: All observations are included	Model includes management compensation lower limit variable	In* = 6 n** = 43 R^2 = .67 Adjusted R^2 = .61	In = 7 n = 43 R^2 = .50 Adjusted R^2 = .40
	Model without management compensation lower limit variable	In = 7 n = 201 R^2 = .43 Adjusted R^2 = .41	In = 4 n = 204 R^2 = .23 Adjusted R^2 = .22
Panel B: Only large companies are included	Model includes management compensation lower limit variable	In = 4 n = 35 R^2 = .62 Adjusted R^2 = .57	In = 4 n = 35 R^2 = .38 Adjusted R^2 = .30
	Model without management compensation lower limit variable	In = 8 n = 117 R^2 = .47 Adjusted R^2 = .43	In = 4 n = 117 R^2 = .25 Adjusted R^2 = .23
Panel C: Only small companies are included	Model includes management compensation lower limit variable	The model does not provide meaningful statistical inferences. The number of observations was only eight.	The model does not provide meaningful statistical inferences. The number of observations was only eight.
	Model without management compensation lower limit variable	In = 10 n = 84 R^2 = .83 Adjusted R^2 = .81	In = 8 n = 87 R^2 = .54 Adjusted R^2 = .50

* In = the number of independent variables in the model.
** n = the number of observations.

TABLE 6-2

A COMPARISON OF THE R^2 AND ADJUSTED R^2 FOR TWO MODELS INCLUDING INTERACTIONS AMONG AND BETWEEN VARIABLES[14]

		Results using the MAC model	Results using the random walk model
Panel A: All observations are included	Model includes management compensation lower limit variable	In* = 4 n** = 43 R^2 = .66 Adjusted R^2 = .62	In = 4 n = 43 R^2 = .45 Adjusted R^2 = .39
	Model without management compensation lower limit variable	In = 14 n = 201 R^2 = .74 Adjusted R^2 = .72	In = 17 n = 204 R^2 = .70 Adjusted R^2 = .67
Panel B: Only large companies are included	Model includes management compensation lower limit variable	In = 3 n = 35 R^2 = .63 Adjusted R^2 = .60	In = 3 n = 35 R^2 = .40 Adjusted R^2 = .34
	Model without management compensation lower limit variable	In = 11 n = 117 R^2 = .72 Adjusted R^2 = .69	In = 17 n = 117 R^2 = .72 Adjusted R^2 = .67
Panel C: Only small companies are included	Model includes management compensation lower limit variable	The model does not provide meaningful statistical inferences. The number of observations was only eight.	The model does not provide meaningful statistical inferences. The number of observations was only eight.
	Model without management compensation lower limit variable	In = 12 n = 84 R^2 = .88 Adjusted R^2 = .86	In = 12 n = 87 R^2 = .67 Adjusted R^2 = .61

* In = the number of independent variables in the model.
** n = the number of observations.

[14] Results of the random walk model in Panels A and B (for models that include the management compensation lower limit) are adjusted to facilitate comparison between the two models. Without adjustment, the numbers of independent variables in the model were 10 and 8 (with adjusted R^2 of .92 and .89 for sample sizes of 43 and 35 observations) for Panels A and B respectively.

As one can easily observe, degrees of fit (stated in R^2 and adjusted R^2) for the MAC model remained higher than those of the random walk model. This demonstrates that when the measurement problems associated with the dependent variable are reduced, the degree of fit (R^2) for the choices of accounting policies improves[15]. On the other hand, the values for R^2 (and adjusted R^2) are higher when interactive variables are included in the model. This implies that the improvement in the degree of fit results not only from the improvement in the explanatory variable but also from that in the independent variables. The discussion related to the explanatory variables problems follows in the next section.

6.2 Explanatory (right-hand-side) variables problems

Tables 6-3 and 6-4 illustrate the coefficients of the independent variables that remained in the models using step-wise regression analysis criteria. Different models were obtained depending on the number of independent variables and the number of observations available for the step-wise analysis.

Table 6-3 illustrates models in which no interactive variables were allowed. To estimate the best model for the test of the theory, all the independent variables that were introduced in Section 4.3 (also shown in Table 6-7 below) were included in the step-wise regression analysis.

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[15]Notice that the best fit models are predicted using the "step-wise regression methods." As a result, the R^2s shown in Tables 6-1 and 6-2 are the highest possible R^2s that can be obtained for the independent variables whose significant contribution level is at least at the level of 0.1500.

TABLE 6-3

BEST REGRESSION MODELS WHEN ALL INDEPENDENT VARIABLES, AND NO INTERACTIVE INDEPENDENT VARIABLES, ARE INCLUDED IN THE STEP-WISE REGRESSION ANALYSIS

Panel A. Estimated Model for "ALL" Companies.

R^2 = .6661
Adjusted R^2 = .6089
Number of observations: 43

Parameter *	Estimate	t-Statistic H0: Parameter = 0	Prob > | T |
Intercept	-32.759916	-0.330	0.7431
I19	-71.497202	-2.052	0.0477[a]
I2	-229.10501	-2.732	0.0098[a]
I7	-0.470840	-2.791	0.0085[a]
I26	-98.072078	-1.861	0.0712[b]
I16	-0.000123	-2.222	0.0329[a]

Panel B. Estimated Model for "LARGE" Companies.

R^2 = .6180
Adjusted R^2 = .5671
Number of observations: 35

Parameter *	Estimate	t-Statistic H0: Parameter = 0	Prob > | T |
Intercept	72.049525	0.639	0.5276
I19	-115.17026	-4.090	0.0003[a]
I2	-345.30970	-4.479	0.0001[a]
I7	-0.269686	-1.769	0.0870[b]
I26	-114.38787	-1.733	0.0933[b]
I10	180.360074	1.704	0.0973[b]

Panel C. Estimated Model for "SMALL" Companies.
No meaningful statistical inferences can be drawn; there are only eight observations available for the model.

a Significant at the 0.05 level (two-tailed).
b Significant at the 0.10 level (two-tailed).
* See Table 6-7 pages 76 & 77 for the description of the independent variables.

To facilitate the discussion of the results, "ALL," "LARGE," and "SMALL" will be used as abbreviations for models constructed using sample firms of all, large, and small companies. Following are the models for "ALL" and "LARGE" companies:

Model one; ALL:

A_t = -32.76 -71.50(I19) -229.11(I2) -0.47(I7) -98.07(I26) -.0001(I16)
prob > |T| (0.047) (0.010) (0.008) (0.071) (0.032)

Model two; LARGE:

A_t = +72.05 -115.17(I19) -345.31(I2) -0.27(I7) -114.39(I26) +180.36(I10)
prob > |T| (0.000) (0.000) (0.087) (0.093) (0.097)

Interestingly enough, I19 (bad news) and I16 (risk) as representatives of the Political hypothesis, I2 (change in debt-to-equity ratio) as representative of the Debt hypothesis, and I7 (closeness of management compensation plan's lower limit to net income) and I10 (change in management total compensation) as representatives of the Management compensation hypothesis, and finally, I16 (change in Z® values) as representative of one of the Omitted variables are included in the above models. Then, the following can be suggested from the above discussion:

$$A = a_0 + a_1 (DEBT) + a_2 (MANGMT) + a_3 (POLITC) + a_4 (OMIT)$$

which is exactly the general model suggested in the research design in Section 4.3.

Since one could criticize the results of the above models because the number of observations (43 and 35) seems to be insufficient for the inferences drawn, the models were tested by increasing the sample size. The most frequently missing variable (the closeness of the lower limit of the manager's bonus plan to the net income--I7) was deleted as an independent variable. Results of regressions without I7 are presented in Table 6-4.

As one can notice in Table 6-4, deleting I7 as one of the independent variables results in a substantial increase in the number of observations (from 43 to 201 in Panel A, from 35 to 118 in Panel B, and from 8 to 83 in Panel C). The increase in the number of observations in Panel C provides the opportunity to draw meaningful inferences for the sample of smaller firms. The following are the models for ALL, LARGE, and SMALL companies:

Model three; ALL:

A_t = +29.90 -60.30(I19) -0.01(I17) +272.04(I10) +18.69(I21) -253.89(I29)
prob > |T| (0.000) (0.000) (0.000) (0.006) (0.012)
+285.14(I9) -49.58(I24)
(0.036) (0.114)

Model four; LARGE:

A_t = +71.22 -61.56(I19) -0.01(I17) +275.05(I10) +31.79(I21) -452.60(I29)
prob > |T| (0.005) (0.000) (0.000) (0.003) (0.004)
+432.39(I9) -166.68(I25) -25.09(I6)
(0.035) (0.029) (0.120)

TABLE 6-4

BEST REGRESSION MODELS WHEN ALL INDEPENDENT VARIABLES (EXCEPT THE LOWER LIMIT BOUNDARY OF THE MANAGEMENT BONUS PLAN) AND NO INTERACTIVE INDEPENDENT VARIABLES ARE INCLUDED IN THE STEP-WISE REGRESSION ANALYSIS

Panel A. Estimated Model for "ALL" Companies.

R^2 = .4269
Adjusted R^2 = .4061
Number of observations: 201

		t-Statistic	
Parameter *	Estimate	H0: Parameter = 0	Prob > | T |
Intercept	+29.902829	+0.723	0.4708
I19	-60.299886	-3.906	0.0001[a]
I17	-0.011978	-6.055	0.0001[a]
I10	+272.03816	+4.939	0.0001[a]
I21	+18.686296	+2.745	0.0066[a]
I29	-253.88751	-2.539	0.0119[a]
I9	+285.14044	+2.109	0.0362[a]
I24	-49.582656	-1.588	0.1139

Panel B. Estimated Model for "LARGE" Companies.

R^2 = .4660
Adjusted R^2 = .4265
Number of observations: 117

		t-Statistic	
Parameter *	Estimate	H0: Parameter = 0	Prob > | T |
Intercept	+71.225224	+0.913	0.3631
I19	-61.557142	-2.869	0.0050[a]
I17	-0.010635	-4.163	0.0001[a]
I10	+275.04747	+3.737	0.0003[a]
I21	+31.787653	+3.007	0.0033[a]
I29	-452.59986	-2.955	0.0038[a]
I25	-166.67754	-2.212	0.0290[a]
I9	+432.39579	+2.130	0.0354[a]
I6	-25.088113	-1.568	0.1199

Panel C. Estimated Model for "SMALL" Companies.

R^2 = .8303
Adjusted R^2 = .8064
Number of observations: 84

		t-Statistic	
Parameter *	Estimate	H0: Parameter = 0	Prob > | T |
Intercept	+3.411385	+1.650	0.1035
I3	-2.339632	-6.576	0.0001[a]
I26	-1.787599	-1.623	0.1091
I24	-11.106567	-3.468	0.0009[a]
I6	+0.937865	+2.257	0.0271[a]
I21	+1.952585	+4.362	0.0001[a]
I110	+71.574470	+3.207	0.0020[a]
I14	-15.527726	-2.999	0.0037[a]
I27	+1.309766	+1.471	0.1456
I111	+46.421299	+2.307	0.0240[a]
I23	+8.704381	+2.374	0.0203[a]

a Significant at the 0.05 level (two-tailed).
* See Table 6-7 pages 76 & 77 for the description of the independent variables.

Model five; SMALL:

A_t = +3.41 -2.34(I3) -1.79(I26) +71.57(I110) +1.95(I21) -15.53(I14) +1.31(I27)

prob > |T| (0.000) (0.110) (0.002) (0.000) (0.004) (0.150)

+46.42(I111) +8.70(I23) -11.11(I24) +0.94(I6)

(0.024) (0.020) (0.000) (0.027)

The variables included in the above models can be summarized as follows[16]:

1) Those related to Political hypothesis: I17, and I19
2) Those related to Debt hypothesis: I3, and I6
3) Those related to Management interest (e.g., compensation) hypothesis: I8, I9, I10, I14, I110, and I111
4) Those related to Omitted variables: I21, I23, I24, I25, I26, I27, and I29

Again, the following general model (which was suggested in Section 4.3) can be observed:

$$A = a_0 + a_1 (DEBT) + a_2 (MANGMT) + a_3 (POLITC) + a_4 (OMIT)$$

Comparing the results in Tables 6-3 and 6-4 provides another very interesting observation[17]. A comparison of the R^2 and adjusted R^2 in Tables 6-3 and 6-4 shows that the degrees of fit (adjusted R^2) are reduced when I7 is deleted as an explanatory variable (e.g., from 0.61 to 0.41 for the sample of "ALL" companies). The fact that the only

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[16] For a more detailed discussion of variables included in the models of SMALL, LARGE, and ALL see Section 6.4 below.

[17] Table 6-4 also shows that the degrees of fit increase when the sample is divided into two groups "LARGE" and "SMALL." Not only does this confirm the conclusion drawn in Section 6.4 below, but also this can suggest that the variance in the dependent variable which is not explained (by the size of the company) may have resulted from the differences among the industries and other specific characteristics that separate individual firms from other firms within an industry.

difference between the variables in the models for Table 6-3 and Table 6-4 is the absence of the independent variable I7 suggests that the presence of the management compensation plan details has a noticeable effect on explaining the choices of accounting policies. This conclusion confirms that of Healy [1985].

6.3 Model mis-specification problems

The two model mis-specification problems that were mentioned in Section 2.3.4 were related to the underlying assumption regarding managers' choices of accounting methods and to treating explanatory variables as additive and ignoring the possible interactions (Watts and Zimmerman [1990]).

This study and its results do not suggest any alternative for the underlying assumption about managers' choices of accounting methods. To avoid the criticism of model mis-specification related to ignoring interactive variables, some interactive variables were included in the model (see Table 6-8 for a detailed list of these variables). Since one could have considered a large number of interactive variables, three criteria were used to limit the number finally included in the models and thus to avoid unnecessary complexity in the interpretation of the results.

First, the interactions of variables that had not significantly contributed to the choices of accounting policies (using the results of models without interactions) were assumed to be insignificant and were deleted (e.g., those interactions that may share I1 were deleted--see Table 6-7 pages 76 & 77). Second, interactions were limited to those

that had a logical basis for a possible effect on the choices of accounting policies (e.g., those of "management compensation" and "political pressures"). And third, interactions among the variables were limited to a maximum of three-member interactions.

The same modeling procedures used for Section 6.2 above were employed with the interactive variables. Results of this process are shown in Tables 6-5 and 6-6.

Interestingly enough, the R^2 improved in all the models, indicating that the interactions between and among independent variables improve the degree of fit. This argument suggests that Watts and Zimmerman's claim that the mis-specification problem resulted from the missing interactions is a valid claim. The following are the models for ALL and LARGE companies:

Model six; ALL:

A_t = -13.49 +233.83(IN1) -219.69(I2) +77.16(I4) -1284.82(IN7)
prob > |T| (0.000) (0.002) (0.033) (0.118)

Model seven; LARGE:

A_t = -71.34 +230.88(IN1) -194.68(I2) +86.52(I4)
prob > |T| (0.000) (0.014) (0.046)

TABLE 6-5

BEST REGRESSION MODELS WHEN ALL INDEPENDENT VARIABLES AND INTERACTIVE INDEPENDENT VARIABLES ARE INCLUDED IN THE STEP-WISE REGRESSION ANALYSIS

Panel A. Estimated Model for "ALL" companies.

R^2 = .6576
Adjusted R^2 = .6215
Number of observations: 43

Parameter *	Estimate	t-Statistic H0: Parameter = 0	Prob > | T |
Intercept	-13.493370	-0.190	0.8502
IN1	+233.833504	+5.587	0.0001[a]
I2	-219.697489	-3.296	0.0021[a]
I4	+77.159557	+2.213	0.0330[a]
IN7	-1284.82172	-1.601	0.1177

Panel B. Estimated Model for "LARGE" Companies.

R^2 = .6348
Adjusted R^2 = .5995
Number of observations: 35

Parameter *	Estimate	t-Statistic H0: Parameter = 0	Prob > | T |
Intercept	-71.340899	-0.856	0.3988
IN1	+230.881384	+4.859	0.0001[a]
I2	-194.681459	-2.611	0.0138[a]
I4	+86.519324	+2.078	0.0461[a]

Panel C. Estimated Model for "SMALL" Companies.
No meaningful statistical inferences can be drawn; there are only eight observations available for the model.

a Significant at the 0.05 level (two-tailed).
* See Tables 6-7 and 6-8 pages 76-78 for the description of the independent variables.

TABLE 6-6

BEST REGRESSION MODELS WHEN ALL INDEPENDENT VARIABLES (EXCEPT THE LOWER LIMIT BOUNDARY OF THE MANAGEMENT COMPENSATION PLAN) AND INTERACTIVE INDEPENDENT VARIABLES ARE INCLUDED IN THE STEP-WISE REGRESSION ANALYSIS

Panel A. Estimated Model for "ALL" companies.

R^2 = .7381
Adjusted R^2 = .7184
Number of observations: 201

Parameter *	Estimate	t-Statistic H0: Parameter = 0	Prob > | T |
Intercept	+12.884259	+0.560	0.5764
IN1	+176.839823	+5.359	0.0001[a]
IN12	-0.002803	-10.48	0.0001[a]
I19	-34.524552	-3.233	0.0014[a]
IN17	+0.004907	+8.040	0.0001[a]
IN18	-0.037031	-3.208	0.0028[a]
IN13	+0.013200	+8.105	0.0001[a]
IN4	+0.000362	+2.425	0.0163[a]
I18	-393.361950	-3.553	0.0005[a]
IN5	+1023.49565	+4.624	0.0001[a]
I26	-30.109710	-2.356	0.0195[a]
I21	-15.575593	-2.626	0.0094[a]
IN2	-39.809579	-1.781	0.0766[b]
I8	-201.197498	-2.078	0.0391[a]
I9	+149.367281	+1.543	0.1240

Panel B. Estimated Model for "LARGE" Companies.

R^2 = .7184
Adjusted R^2 = .6889
Number of observations: 117

Parameter *	Estimate	t-Statistic H0: Parameter = 0	Prob > | T |
Intercept	+17.767214	+0.375	0.7088
IN1	+149.017628	+3.997	0.0001[a]
IN20	-4193.74455	-8.031	0.0001[a]
IN9	+7457.75055	+6.118	0.0001[a]
I19	-36.262307	-2.303	0.0233[a]
IN18	-0.007124	-8.450	0.0001[a]
IN13	+0.010642	+7.660	0.0001[a]
IN2	+13.462418	+2.437	0.0165[a]
IN7	-1708.39383	-3.442	0.0008[a]
I18	-472.315068	-2.836	0.0055[a]
IN5	+1026.60398	+3.479	0.0007[a]
I21	-18.968804	-1.946	0.0543[b]

Panel C. Estimated Model for "SMALL" Companies.

R^2 = .8776
Adjusted R^2 = .8566
Number of observations: 84

Parameter *	Estimate	t-Statistic H0: Parameter = 0	Prob > | T |
Intercept	+3.271689	+1.775	0.0802
I3	-3.757964	-13.84	0.0001[a]
IN16	+0.023669	+7.194	0.0001[a]
I24	-14.528099	-6.925	0.0001[a]
I16	-0.001868	-3.793	0.0003[a]
I23	+12.779247	+5.606	0.0001[a]
I14	-8.4940481	-1.774	0.0805[b]
I111	+41.547813	+2.479	0.0156[a]
IN1	+38.134937	+2.067	0.0424[a]
I27	+1.289850	+1.704	0.0927[b]
I19	-3.611846	-2.183	0.0324[a]
I110	+30.262469	+1.901	0.0615[b]
IN3	+0.053855	+1.659	0.1015

a Significant at the 0.05 level (two-tailed).
b Significant at the 0.10 level (two-tailed).
* See Tables 6-7 and 6-8 pages 76-78 for the description of the independent variables.

The variables included in the above models can be summarized as follow[18]:

1) Those related to Political hypothesis: I19 (IN1 = I19 * I8)
2) Those related to Debt hypothesis: I2, and I4
3) Those related to Management compensation hypothesis: I8, and I10
4) Those related to Omitted variables: I29 (IN7 = I29 * I8)

Again, the following general model (as suggested in Section 4.3) can be observed:

$$A = a_0 + a_1 (DEBT) + a_2 (MANGMT) + a_3 (POLITC) + a_4 (OMIT)$$

When compared to models one and two in Section 6.2, the above two models display other interesting results. First, although the number of independent variables that have significantly contributed to the choices of accounting policies has decreased, the degree of fit (R^2) has increased. Second, the variable related to the "lower limit of the management's bonus plan" is not present. Since step-wise regression analysis was used to estimate the best model (using Prob = 0.15 as the cut-off point), this may suggest that the interactive variables can be capturing the details of the underlying covenants --including the bonus details.

To test this supposition, the same regressions without the presence of the lower limit as an explanatory variable were run. The results of the regressions are displayed in Table 6-6. Interestingly enough, not only did the degree of fit not decrease, but it increased

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[18] For a more detailed discussion of variables included in the models of LARGE, and ALL see Section 6.4 below.

(e.g., change in adjusted R^2 from 0.62 to 0.72 for "ALL"). Since the number of independent variables in the models reflected in Table 6-6 is relatively large, the independent variables in each model of Table 6-6 are not shown in model formats, as other models were. However, the information necessary to construct each model is present in the Table.

Another interesting point observable in Table 6-6 is that the value of the adjusted R^2 has again improved after dividing the sample into two groups, large and small companies. This is similar to the results that will be discussed in Section 6.4 below. One may conclude that managers of small firms choose accounting methods differently from managers of large firms.

One interactive variable is present in all models shown in Tables 6-5 and 6-6. The variable is IN1, which is the interaction of the management total compensation (the difference between years 1989 and 1988, to be precise) and the number of Bad News items for 1989 as published by the Wall Street Journal. This variable represents an interaction between the management and political pressures, which is one of the interactions that is suggested by Watts and Zimmerman [1990].

Tables 6-7 and 6-8 below provide detailed information about all explanatory variables (and their interactions) that were included in step-wise regression analyses. The predicted signs for independent variables are drawn from the predicted signs for contracting parties (as described in Table 3-1) after necessary adjustment for the measurement methods used for calculating each of the independent variables.

TABLE 6-7

DESCRIPTION OF THE INDEPENDENT VARIABLES INCLUDED IN STEP-WISE REGRESSION ANALYSIS

Vari-able	Predicted sign	Observed sign	Description of the independent variable
I1	(*)	(N)	$DE_t - DE_{t-1}$; where DE is the total debt to total equity ratio.
I2	(*)	(-)	$DE_{t-1} - DE_{t-2}$; where DE is the total debt to total equity ratio.
I3	(*)	(-)	$DE_{t-2} - DE_{t-3}$; where DE is the total debt to total equity ratio.
I4	(*)	(M) (+)	$IDE_t - DE_t$; where IDE is the firm's industry debt to equity ratio average.
I5	(*)	(N)	$IDE_{t-1} - DE_{t-1}$; where IDE is the firm's industry debt to equity ratio average.
I6	(*)	(**)	$IDE_{t-2} - DE_{t-3}$; where IDE is the firm's industry debt to equity ratio average.
I7	(-)	(-)	The closeness of lower limit values of the management compensation plans to the income (as defined in the plan) for the period.
I8	(*)	(M) (+)	$SAL_t - SAL_{t-1}$; where SAL is the total management revenue.
I9	(*)	(+)	$SAL_{t-1} - SAL_{t-2}$; where SAL is the total management revenue.
I10	(*)	(+)	$SAL_{t-2} - SAL_{t-3}$; where SAL is the total management revenue.
I11	(*)	(M) (-)	The manager's percentage share in the company's stocks.
I12	(+)	(M) (+)	= 1, if the CEO is changed in 1989.
I13	(*)	(N)	= 1, if the CEO is changed in 1988.
I14	(*)	(-)	= 1, if the CEO is changed in 1987.
I15	(*)	(M) (+)	= 1, if the CEO is changed in 1986.
I16	(-)	(-)	The variance in accounting earnings for the period of 1980-1989.
I17	(-)	(-)	The firm's total asset.
I18	(-)	(M) (-)	The ration of the firm's total revenue in 1989 to the total revenue of the firm's related industry. This variable measures the company's market share.
I19	(-)	(-)	Total number of bad news items from t-1 to t.
I20	(-)	(-)	Change in the firm's bond rating from t-1 to t.
I21	(-)	(+)	Change in the firm's bond rating from t-2 to t-1.
I22	(-)	(N)	Change in the firm's bond rating from t-3 to t-2.
I23	(-)	(+)	Degree of DISTRS stated as Z value at t.

TABLE 6-7 (Continued)

I24	(-)	(-)	Degree of DISTRS stated as Z value at t-1.
I25	(-)	(**)	Degree of DISTRS stated as Z value at t-2.
I26	(-)	(-)	Change in Zeta® value of the firm from t-1 to t.
I27	(-)	(+)	Change in Zeta® value of the firm from t-2 to t-1.
I28	(-)	(N)	Change in Zeta® value of the firm from t-3 to t-2.
I29	(+)	(-)	= 1 if the firm was the subject of a take over in 1989.
I110	(+)	(+)	CEO's share change in the firm from t-1 to t.
I111	(+)	(**)	CEO's share change in the firm from t-2 to t-1.

Note: subscripts t, t-1, t-2, and t-3 stand for years 1989, 1988, 1987, and 1986 respectively.

"I" = "independent variable." The number following "I" represents the number allocated to that specific independent variable.

(*) = The sign of the coefficient cannot be predicted.

(**) = Different signs were observed for the coefficient in different models.

(N) = The variable was not statistically significant enough to be included in any of the models tested throughout the study.

(M) = The variable is not statistically significant enough to be included in the primary models of the study; however, the sign of the variables can be abstracted from other models (see Section 6.6 below).

TABLE 6-8

DESCRIPTION OF THE INTERACTIONS AMONG AND BETWEEN INDEPENDENT VARIABLES INCLUDED IN STEP-WISE REGRESSION ANALYSIS

vari-able	Predicted sign	Observed sign	Description of the independent variable
IN1	(*)	(+)	Interaction between I19 and I8.
IN2	(*)	(**)	Interaction between I19 and I10.
IN3	(*)	(M) & (+)	Interaction between I17 and I10.
IN4	(*)	(+)	Interaction between I16 and I10.
IN5	(*)	(**)	Interaction between I18 and I10.
IN6	(*)	(N)	Interaction between I16 and I8.
IN7	(*)	(-)	Interaction between I29 and I10.
IN8	(-)	(M) & (-)	Interaction between I21 and I10.
IN9	(+)	(**)	Interaction between I29 and I8.
IN10	(*)	(M) & (-)	Interaction between I24 and I10.
IN11	(*)	(N)	Interaction between I16 and I21.
IN12	(*)	(-)	Interaction between I16 and I29.
IN13	(*)	(+)	Interaction between I17 and I21.
IN14	(*)	(M) & (+)	Interaction between I19 and I21.
IN15	(*)	(N)	Interaction between I19 and I29.
IN16	(*)	(**)	Interaction among I16, I21, and I8.
IN17	(*)	(**)	Interaction among I16, I29, and I8.
IN18	(*)	(-)	Interaction among I17, I21, and I10.
IN19	(*)	(M) & (-)	Interaction among I19, I21, and I10.
IN20	(*)	(-)	Interaction among I19, I29, and I8.

Note: subscripts t, t-1, t-2, and t-3 stand for years 1989, 1988, 1987, and 1986 respectively. For definitions of independent variables, see Table 6-7 pages 76 & 77.

"IN" = "interactive independent variable." The number following "IN" represents the number allocated to that specific interactive independent variable.

(*) = The sign of the coefficient cannot be predicted.

(**) = Different signs exist for the coefficient in different models.

(N) = The variable was not statistically significant enough to be included in any of the models tested throughout the study.

(M) = The variable is not statistically significant enough to be included in the primary models of the study; however, the sign of the variables can be abstracted from other models (see Section 6.6 below).

6.4 Sample selection problems

Two problems were mentioned in Section 2.3.2 about the sample selection for previous studies. One problem is related to the generalizeability of results when the sample in these studies was not chosen from the general population of firms. This problem has been avoided here since the only limitations for the sample selection are related to useability and availability of the data for the companies included in the sample.

The second problem is related to observed differences between large and small companies. Although previous studies have shown that large and small companies have chosen different accounting methods (see Section 2.3.2), studies of the positive accounting theory do not partition the sample into large and small companies. To avoid this problem, the sample of this study is divided into two groups: large and small companies. As one can observe in Tables 6-1 and 6-2, the sample in this study is analyzed in the following forms:

1) All companies and all variables are included in the analysis.
2) All companies and all variables, except the lower limit of the management compensation plan, are included in the analysis.
3) All companies, all variables, and some interactive variables are included in the analysis.
4) All companies, all variables (except the lower limit of the management compensation plan), and some interactive variables are included in the analysis.

After the sample was divided into large and small companies, the above analyses were performed for large and small groups. Since only 8

observations were available for small companies for the first and third analyses above, those analyses were deleted for small companies. As a result, for ALL, LARGE, and SMALL companies four, four, and two analyses were performed respectively. Tables 6-9 to 6-12 compare the results of "ALL" and "LARGE" analyses.

TABLE 6-9

COMPARISON OF "ALL" AND "LARGE" FIRMS WHEN ALL (EXCEPT NO INTERACTIVE) VARIABLES ARE INCLUDED IN THE MODEL

ALL		LARGE	
VARIABLE*	PARTIAL R^2	VARIABLE*	PARTIAL R^2
I19	.3360	I19	.3260
I2	.1978	I2	.2042
I7	.0520	I7	.0496
I26	.0297	I26	.0383
I16	.0232		
I10	.0280		
R^2	.6667	R^2	.6181

* See Table 6-7 pages 76 & 77 for the description of the independent variables.

TABLE 6-10

COMPARISON OF "ALL" AND "LARGE" FIRMS WHEN ALL (AND INTERACTIVE) VARIABLES ARE INCLUDED IN THE MODEL

ALL		LARGE	
VARIABLE*	PARTIAL R^2	VARIABLE*	PARTIAL R^2
IN1	.4969	IN1	.4945
I2	.0914	I2	.0895
I4	.0463	I4	.0508
IN7	.0231		
R^2	.6576	R^2	.6348

* See Tables 6-7 and 6-8 pages 76-78 for the description of the independent variables.

TABLE 6-11

COMPARISON OF "ALL" AND "LARGE" FIRMS WHEN ALL (EXCEPT I7 AND INTERACTIVE) VARIABLES ARE INCLUDED IN THE MODEL

ALL		LARGE	
VARIABLE*	PARTIAL R^2	VARIABLE*	PARTIAL R^2
I19	.2358	I19	.2249
I10	.0708	I17	.0670
I17	.0655	I10	.0666
I21	.0207	I21	.0276
I29	.0144	I25	.0243
I9	.0122	I29	.0220
I24	.0075	I9	.0214
		I6	.0122
R^2	.4269	R^2	.4660

* See Table 6-7 pages 76 & 77 for the description of the independent variables.

TABLE 6-12

COMPARISON OF "ALL" AND "LARGE" FIRMS WHEN ALL (EXCEPT I7) AND INTERACTIVE VARIABLES ARE INCLUDED IN THE MODEL

ALL		LARGE	
VARIABLE*	PARTIAL R^2	VARIABLE*	PARTIAL R^2
IN1	.2490	IN1	.2514
IN12	.1354	IN20	.1273
I19	.0884	IN9	.0785
IN17	.0872	I19	.0740
IN18	.0447	IN18	.0451
IN13	.0381	IN13	.0402
IN4	.0377	IN2	.0314
I18	.0184	IN7	.0288
IN5	.0118	I18	.0181
I26	.0080	IN5	.0132
I21	.0077	I21	.0102
IN2	.0043		
I8	.0041		
I9	.0034		
R^2	.7381	R^2	.7184

* See Tables 6-7 and 6-8 pages 76-78 for the description of the independent variables.

The comparison of "ALL" and "LARGE" in Tables 6-9 to 6-12 shows that although the sample of "LARGE" is a sub-sample of "ALL," the explanatory variables that were included in both models (by the step-wise regression analysis) are very similar. For example, those explanatory variables that contribute the largest partial R^2 in Tables 6-9 and 6-10 are the same. Also, a comparison of R^2s for "ALL" and "LARGE" reveals that the explanatory powers of the models are very close. The following shows the comparison:

TABLE #	ALL	LARGE
6-9	.6667	.6181
6-10	.6576	.6348
6-11	.4269	.4660
6-12	.7381	.7184

Interestingly enough, the results do not hold when the comparison is made between the "LARGE" and "SMALL" or "ALL" and "SMALL." Since the models for "LARGE" and "SMALL" are different (as will be discussed in more detail, shortly), this suggests that the results of "ALL" are mainly driven by the "LARGE" companies. Because the models for "ALL" and "LARGE" are basically the same, the comparisons between models of "ALL" and "SMALL" is not necessary; the comparison between models for "LARGE" and "SMALL" (as discussed below) will be applicable to "ALL" and "SMALL."

Tables 6-13 and 6-14 compare the explanatory variables that are included in models for "SMALL" and "LARGE."

TABLE 6-13

COMPARISON OF "LARGE" AND "SMALL" WHEN ALL (EXCEPT I7 AND INTERACTIVE) VARIABLES ARE INCLUDED IN THE MODEL

LARGE		SMALL	
VARIABLE*	PARTIAL R^2	VARIABLE*	PARTIAL R^2
I19	.2249	I3	.5974
I17	.0670	I26	.0718
I10	.0666	I6	.0390
I21	.0276	I24	.0303
I25	.0243	I21	.0233
I29	.0220	I110	.0183
I9	.0214	I14	.0150
I6	.0122	I27	.0131
		I23	.0129
		I111	.0073
R^2	.4660	R^2	.8284

* See Table 6-7 pages 76 & 77 for the description of the independent variables.

TABLE 6-14

COMPARISON OF "LARGE AND "SMALL" WHEN ALL (EXCEPT I7) AND INTERACTIVE VARIABLES ARE INCLUDED IN THE MODEL

LARGE		SMALL	
VARIABLE*	PARTIAL R^2	VARIABLE*	PARTIAL R^2
IN1	.2514	I3	.6036
IN20	.1273	IN16	.0917
IN9	.0785	I23	.0688
I19	.0740	I24	.0351
IN18	.0451	I16	.0340
IN13	.0402	I27	.0077
IN2	.0314	I14	.0075
IN7	.0288	I19	.0070
I18	.0181	I111	.0068
IN5	.0132	IN1	.0060
I21	.0102	IN3	.0048
		I110	.0045
R^2	.7184	R^2	.8775

* See Tables 6-7 and 6-8 pages 76-78 for the description of the independent variables.

As expected, large and small firms' decisions of accounting methods are based on different motives. I19 (bad news) has the largest partial R^2 for "LARGE." Its partial R^2 is 0.2249 and (part of) 0.2514 in Tables 6-13 and 6-14 respectively[19]. On the other hand, I3 (change in the debt-to-equity ratio from 1986 to 1987) has the largest partial R^2 for "SMALL." Its contribution in Tables 6-13 and 6-14 is 0.5974 and .6036, respectively. Interestingly enough, I19 (bad news) does not influence the choices of accounting policies in "SMALL" and I3 (change in the debt-to-equity ratio from 1986 to 1987) does not influence the choices of accounting policies in "LARGE."

One other observation in Table 6-14 is the difference between the number of interactive and non-interactive explanatory variables which are included in models of LARGE and SMALL. Among the first eight variables included in the model for LARGE (which explain 67.67% of variation observed in the dependent variable), there is only one non-interactive variable (I19--bad news). However, among the first eight variables included in the model for SMALL (which explain 85.54% of variation observed in the dependent variable), there is only one interactive variable (IN16--interaction among variables related to debt, financial-distress, and management compensation). This suggests that interactions between and among explanatory variables have more explanatory power for larger firms than for smaller firms.

Following is a more comprehensive comparison of the independent

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[19] Note that "IN1" is the interaction between "I19" and "I8." So, part of the partial R^2 explained in "IN1" (0.2514) results from the presence of "I8" in the interactive variable. "I8" is the change in the manager's salary from 1988 to 1989.

variables that are included for models "LARGE" and "SMALL" in Table 6-13:

	LARGE	SMALL
Debt variables:	I6	I3 & I6
Manager compensation:	I9 & I10	-
Manager's political power:	-	I14, I110, & I111
Political pressure:	I19, I17, & I29	-
Financial distress:	I21 & I25	I23, I24, I26, & I27

The interpretation of the results for "LARGE" and "SMALL," in Table 6-14, was more objective when the components of the interactive variables[20], rather than the interactive variables themselves, were used. Variables that showed a very small contribution in R^2 (as reflected in the partial R^2) were then deleted from the set of explanatory variables. The following variables remained for "LARGE" and "SMALL."

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[20] Following are the components of the interactive variables that are shown in Table 6-14:

IN1 = I19 * I8, IN2 = I19 * I10
IN3 = I17 * I10, IN5 = I18 * I10
IN7 = I29 * I10, IN9 = I29 * I8
IN13 = I17 * I21, IN16 = I16 * I21 * I8
IN18 = I17 * I21 * I10, IN20 = I19 * I29 * I8

	LARGE	SMALL
Debt variables:	-	I3
Manager compensation:	I8 & I10	I8
Manager's political power:	-	I14, I110, & I111
Political pressure:	I17, I18, I19, & I29	I16
Financial distress:	-	I21, I23, I24, & I27

The following interesting results can be drawn from the above comparisons:

1) Debt-related, Manager's political power, and Financial distress variables are the main variables being considered by managers of smaller firms when they make their decisions about accounting policies.

2) Manager-compensation related and political pressure variables are the main variables being considered by managers of large companies when they make their decisions about accounting policies.

The fact that debt-related and financial distress variables play a more significant role in accounting-methods choices of smaller firms may suggest that these firms have a more limited access to the financial market and/or that the debt covenants play a more restrictive role for them. It is logical to assume that the larger firms' requests (to debtholders) for additional financing are more acceptable than those of the smaller firms, since larger firms are likely stronger and more stable.

Another interesting difference between independent variables for the models of small and large firms can be observed in the management-

related variables. Managers of smaller firms consider effects of accounting methods on their political power while managers of larger firms appraise effects of accounting methods on their total compensation. One may suggest that this difference in behavior results from differences in the ability of managers of small and large firms to obtain political power in their companies.

Since the net worth (equity) of smaller firms is, obviously, smaller than that of larger firms, it is easier for managers of smaller firms to increase their political power (e.g., by investing in their firms' stocks--the large number of outstanding common stocks in larger firms requires considerable amount of investment for obtaining political power). Since managers of larger firms can not easily obtain political power in their firms, it is logical that they are more concerned about their total compensation than their political power.

Finally, managers of larger firms are more concerned about outside political pressures. As one expects, the larger a firm is, the more closely it is inspected by outsiders and the more news is disclosed about the firm's performance. As a result, managers of larger firms apparently consider political pressures more seriously than their counterparts in smaller firms. Results of this study confirm that political pressures affect accounting-method choices in larger firms more than they do in smaller firms.

The above results demonstrate that managers of small and large firms use different sets of variables to make decisions for accounting methods. This suggests that the low explanatory power observed in previous studies of positive accounting theory might have resulted

partially from ignoring the differences between large and small firms. The following section discusses results of the study for the omitted variables problems.

6.5 Omitted variables problems

The following independent variables that have for the most part been ignored (omitted variables) in the previous positive-accounting-theory literature were included in models for this study to test their effects on accounting method choices:

a) Zeta® values for years 1989, 1988, 1987, and 1986 (I26-I28).

b) Z values for years 1989, 1988, and 1987 (I23-I25).

c) The company's bond rating for years 1989, 1988, 1987, and 1986 (I20-I22).

d) Bad News as reflected in the Wall Street Journal (I19).

e) Firms' subjection to take-over efforts (I29--a dummy variable).

f) Existence of long-term compensation plans (a dummy variable).

g) Upper limit of management compensation plans.

h) Lower limit of management compensation plans (I7).

i) The management share in the company for years 1989, 1988, and 1987 (I11, I110,and I111).

j) Monopoly power (or market share) of the company (I18).

The variables "upper limit of management compensation plans" and the "existence of long-term compensation plans" were excluded from the analysis because the data were available in Proxy statements for only three firms and because almost all firms in the sample had a long-term

bonus plan.

All other variables were included in models for the test of the theory, and several show that they affect the managers' accounting policy choices. The most remarkable effects could be seen from the variables that measure degree of financial distress (Zeta®, Z, and Bond rating) and political pressure (Bad News). Also, the "firm's subjection to take-over efforts" contributes to the income-increasing choices of accounting policies (see Table 6-7 pages 76 & 77).

The above results support Watts and Zimmerman's [1990] claim about the effect of missing variables. When the above variables are included in models of this study, degrees of fit (R^2) increase.

6.6 Other issues

One of the problems in using regression analysis occurs when some of the independent variables are highly correlated among each other. This could be called either intercorrelation or multicollinearity, the latter term applying to a perfect or near-perfect relationship. As a result, any single independent variable can be dropped; others are closely enough related to overcome the loss. This study does not suggest any solution for the intercorrelation or multicollinearity problem; however, the study is designed in such a way that variables with high degrees of correlation cannot be included (or accepted) in models at the same time.

If one variable--for example "A"--is highly correlated with another variable--for example "B"--and if it contributes more than any other variable in the variation of the dependent variable, that variable

("A") will be chosen for the model. The other variable (i.e."B") cannot be included in the model since the part of the variation of the dependent variable that could have been explained by this variable (i.e. "B"), has already been explained by the first variable (i.e. "A"). A review of the intercorrelation of the variables remaining in the models after step-wise regression analysis proves this point.[21]

Another question was whether different methods for measuring some of the independent variables would improve the results of the analysis. For example, Section 5.3 suggests two measures for political variables. One measure includes politically-related variables without any adjustments to their values, and the other measure is a construction of a political INDEX. The suggested INDEX was constructed and all tests addressed previously were redone. The results of the regression (when compared in R^2) did not improve and in some cases weakened. Also, some of the independent variables (I7, I8, I9, I10--see Table 6-7 pages 76 & 77 for explanations) and the dependent variable were normalized by dividing them by the firm's total assets. Again, the results of the regressions did not show an improvement in R^2. Using step-wise regression analysis, however, different independent variables were included in the model. Some of the observed signs shown in Tables 6-7 and 6-8 were obtained from the new models (see items marked "M" in Tables 6-7 and 6-8).

As one may find in Tables 6-7 and 6-8, the observed signs of some independent variables were opposite to those predicted. These variables

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[21] There are very few independent variables that still indicate a high degree (above 0.5) of correlation between each other.

are:

1) Change in the firm's bond rating from t-2 to t-1, I21.
2) Degree of financial distress for t, stated as Z value, I23.
3) Change in Zeta® value of the firm from t-2 to t-1, I27.
4) Firm's subjection to take-over efforts, I29.

It is interesting to see that the time frame is similar for two of these variables (t-2 to t-1); they are all changes in the independent variable from 1987 to 1988. The observed sign for the first two variables is (+) whereas the predicted sign was (-). The results suggest that the decrease in bond rating and Zeta® value (both indicating a more financially distressed situation), do affect the accounting method choices in the opposite of expected direction after two years.

Further study is needed to determine the effects of changes in the firm's management and financial distress signals. The following chapter presents the summary, contributions and limitations, and suggestions for further research.

CHAPTER VII

SUMMARY, CONTRIBUTIONS AND LIMITATIONS, AND SUGGESTIONS FOR FURTHER RESEARCH

The purpose of this study was to address the "power-of-test" issues that Watts and Zimmerman [1990] considered as reasons for the lack of strong support for positive accounting theory. The "power-of-test" issues were related to the dependent (left-hand-side) variable, the sample selection, explanatory (right-hand-side) variables, model mis-specification, and omitted (missing) variables.

The methodology of this paper has improved the methodology of most previous studies of positive accounting theory in the following respects:

1) It outlines a model of accruals and shows how it controls for the non-discretionary part of accruals. Some accounting decisions that affect accruals have been made earlier and are probably beyond the managers' discretion at the time of the measurement. So, the amount of accruals should be adjusted for non-discretionary items.

2) It suggests refined variables for the effects of debt covenants and management compensation on the choices of accounting methods. For example, the introduction of the closeness of the firm's debt-to-equity ratio to that of its industry as a whole as an explanatory variable is one such item.

3) It introduces a more comprehensive measure of political pressures and their effects on the choices of accounting procedures. Most studies have simply used "size" of a company as a proxy for the political contracts effects.

4) It considers the interaction between and among some explanatory variables. Previously the explanatory variables were considered additive only and interaction effects were ignored.

5) It includes lag variables that capture the effect of prior period changes in independent variables on the choices of accounting methods.

6) It separates the sample into two sub-samples: large and small companies. Results provided evidence that managers of small and large firms have different incentives in their accounting-method decision processes.

The results of this study suggest that when the measurement of the dependent (left-hand-side) variable is improved, powers-of-test (stated in degrees of fit) improve. Also, the analysis of the results shows that improving the measurement of the independent (left-hand-side) variables and including variables that have theoretical justification for being included in models explaining accounting method choices but have previously been missing, improve the power-of-test. When interaction between and among some of the independent variables was incorporated in the models, the power-of-test also improved. The models found by the step-wise regression analysis support the general model suggested by the positive accounting theory.

Results of this study support Watts and Zimmerman's claims that the weak explanatory power found in previous studies can be attributed to research methods and not to a deficiency in the theory of positive accounting. Therefore, the results of this study provide a significant contribution to the accounting choice literature.

As any other study, this one is subject to limitations. To construct the models in this study, two sets of assumptions were used

as:

a) Assumptions for the dependent variable
b) Assumptions for independent variables

The model for the discretionary amount of accruals was constructed by relying on a set of assumptions (mentioned in Section 4.1) that resulted in determination of the manipulated amount of income for the period in question. For example, the ratio of the non-discretionary amount of accruals to the firm's revenue was assumed to be constant from one period to the next. Also, it was assumed that the revenue is deferred from one period to another, and in the period to which the revenue is deferred, no revenue manipulation exists other than that which is deferred (a three-period world resulted in the above conclusion).

The assumptions related to the independent variables were mainly related to the political and missing variables. For example, it was assumed that each "bad news" item affects the manager (in his choices of accounting methods) equally. An implicit assumption for omitted variables (e.g., firm's set of investment opportunities, set of implicit contracts, accepted set of accounting methods) is that they remain constant during the test period. However, if the changes in accounting methods result solely or partly from omitted variables, the model for the test of theory is mis-specified. One extension of this study can be the relaxation of some of the above assumptions to find the effect(s) of these assumptions on the test results. For example, one can find the effects of different "bad news" items on the accounting method choices.

Another extension of the present study can be to apply the methodology introduced in this paper to service industries. This study deleted the service industries and only addressed the manufacturing industries. Obviously, the manager of a service company can, and has incentives to, manipulate accounting numbers.

One of the most interesting results of this study is that it shows that lags of independent variables have explanatory power for in-use accounting methods. Previous research of positive accounting theory has tried to find the relation between the in-use accounting methods at one point in time and values for a series of independent variables at the same point in time. The present study demonstrates that not only current values of independent variables, but their lag values have explanatory power.

Since in-use accounting methods are also related to the previous choices of accounting methods, one can also conclude that to explain and predict the choices of accounting policies, the researcher needs to consider the previously chosen methods as explanatory variables. Including this variable in the test of the theory can be another extension of the present study.

Since a new model for the measurement of the manipulated amount of accruals is introduced here, one which outperforms existing models in the literature, it can be applied to find the relation between the amount of manipulation in the accounting numbers and stock market reactions. The results of previous studies have been conflicting and further studies in this area are needed.

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APPENDICES

APPENDIX A

SELECTED STUDIES IN POSITIVE ACCOUNTING LITERATURE

AUTHOR(S)	DATA	METHODOLOGY	DEPENDENT VARIABLE	INDEPENDENT VARIABLE	RESULTS
Hagerman and Zmijewski (1978)	300 randomly chosen firms on CRSP tape	Multivariate test of the probit analysis.	Four accounting method choices	Size, risk, management profit-sharing plan, concentration ratio, capital intensity, effective tax rate.	Risk management, profit sharing, risk and capital intensity are significant. But, risk and management profit sharing have wrong direction (sign).
DeAngelo (1988)	86 proxy contests for board seats from weekly bulletins	"Random walk model" to analyze the unexpected amount of accruals (t test & Wilcoxon signed rank test).	------	------	Managers would exercise their accounting discretion pre-contests. (While the real profitability has not increased.) If they are elected by shareholders, dissidents tend to take an immediate earnings bath.
Liberty & Zimmerman (1986)	190 firms (376 contracts) that have had labor union contract negotiations	Earnings Expectation Models (time series and random walk models) and two control groups of firms.	------	------	The study is unable to document any managerial opportunistic behavior.
McNichols and Wilson (1988)	106 firms that have shown a material accounts receivable balance	The expected bad-debt expense is calculated using OLS regression and is compared to the amount reflected in the financial statements.	------	------	Firms performing unusually well or poorly exert discretion to decrease their income. (The study has been subject to extreme criticism. It uses one accrual amount instead of the total accruals and it ignores the management compensation plans.)
DeAngelo (1986)	64 firms whose managements proposed to purchase all publicly-held common stock	"Random-walk model" to analyze the unexpected portion of accruals (t test & Wilcoxon-signed rank test).	------	------	Managers do not exercise their accounting discretion to understate earnings in periods before a management buyout of public shareholders.
Healy (1985)	Total of 1527 company-year, for years 1964-80	Changes in the amount of accruals and their correspondence to the upper and lower boundaries of the management compensation plans.	------	------	Accrual policies of managers are related to income-reporting incentives of their bonus contracts and changes in accounting procedures by managers are associated with adoption or modification of their bonus plans.
Healy and Palepu (1990)	126 firms who experience an increase in the tightness of their dividend constraint	(Univariate regression of) analysis of the changes in accounting methods and accruals in correspondence with the changes in the debt-related dividend constraint.	Changes in net income and dividend paid.	Closeness to dividend constraint, changes in operating cash flow and changes in EPS.	It does not appear that firms make accounting changes to circumvent the dividend restriction. The magnitude of the dividend cut is proportional to the tightness of the dividend constraint.
Daley and Vigeland (1983)	313 firms (either capitalizers or expensers of R&D) for 1972	Univariate and multivariate tests of relationship between debt covenant constraints and political cost variables, and R&D accounting methods.	Capitalization of R&D (Cost)	Income, sales, dividend, and leverage variables.	Firms which capitalized R&D costs were more highly leveraged, used more public debt, were closer to dividend restrictions, and were smaller than firms which expensed R&D costs.
Zmijewski and Hagerman (1981)	313 firms used in previous study (1978)	Univariate model of relationship between accounting-method-strategy and independent variables.	Four accounting method choices.	Size, risk, management profit-sharing plan, concentration ratio, capital intensity, total debt/total assets, and industry concentration ratio.	Size, management compensation, concentration ratio, and the total asset ratio, have a significant association with the choice of the firms' income strategy.
Chen and Lee (1990)	23 oil companies switching to successful efforts and 66 non-switching oil companies	Combinations of financial statements analysis, univariate and multivariate regression tests.	Changes in the management compensation.	Changes resulting from the switch and management ownership percentage. Also, size, operation volatility, business concentration, exploration intensity, leverage, and dividend variables.	Executives of switching firms had a bonus plan that was strongly tied to reported income; the assets write down would have adversely affected the executive bonus. For the firms that opted for write-down, the executives' bonus was not affected by the write-down of assets.

Some of the selected studies in the positive accounting literature

APPENDIX B

EXAMPLE FOR THE DEPENDENT VARIABLE CALCULATION

The following is a hypothetical situation that has been provided for the model introduced in the study. The items are selected in a way that correspond to the terminology used in the study. The case has three succeeding periods of time ("t-1," "t," and "t+1") and the manipulation of accounting numbers has taken place at "t."

ACCOUNTING NUMBERS WITHOUT MANIPULATION

	"t-1"	"t"	"t+1"
Sales (.8 cash)	400	500	300
Cash ex (.5 sales)	(200)	(250)	(150)
	200	250	150
Accrued expenses:			
Dep. Ex.	50	50	50
Bad debt (.1 sales)	40	50	30
Other accruals (.2 sales)	80	100	60
Total accruals	(170)	(200)	(140)
Net Income	30	50	10
Account Receivable(.2 sale)	80	100	60

Assume that the manager manipulates the amount of sales, bad debts expense, and the depreciation expense for the period "t." The manager may decide to decrease or increase the net income of the period, depending on the firm's contracting situation. Also, assume that the changes in the depreciation expense are disclosed in the financial statements as "cumulative effect of the changes in accounting methods." As a result, it is not necessary that the researcher calculate the effect of the depreciation manipulation on the period's net income. The direction of the manipulation in net income can be predicted by the

direction of the "cumulative effect of the changes in accounting methods" (or by that of the effect of the manipulation of the variable accrued expenses) on net income. The following situation is a case of income-increasing behavior for period "t:"

MANAGER CHOOSES TO INCREASE THE NET INCOME FOR "t:"

Assume that the result of the manipulation is as follows:

	"t-1"	"t"	"t+1"
Sales	350	550	300
Cash ex	(175)	(275)	(150)
	175	275	150
Accruals:			
Dep. ex.	50	30	70
Bad debt	35	27.5	57.5
Other accruals	70	110	60
Total accruals	(155)	(167.5)	(187.5)
Net Income	20	107.5	(37.5)
Account Receivable	30	100	60

The dependent variable for the test of theory consists of three components as:

$A_t = A_{ft} + A_{vt} + R_{dt}$

Where A_{ft} = the fixed accrual effect
A_{vt} = the variable accrual effect
R_{dt} = the revenue deferral effect

According to the model suggested in the proposal, the following steps should be taken to calculate the dependent variable:

Step one: Find the disclosed amount of A_{ft}:

This amount should have been disclosed in the financial statement, and for this case, it is assumed that the effect of change in the depreciation expense has been disclosed as $20. Then, A_{ft} is "+20."

Step two: Calculate R_{dt} (assume R_t and R_{t+1} are reported revenues for the two periods t and t+1 and AR stands for accounts receivable):

$AR_{t+1}/R_{t+1} = K_{t+1} = K = 60/300 = .2$

$R_{Tt} = AR_t/K = 100/.2 = 500$ = expected revenue for t.

$R_{dt} = (R_t - R_{Tt})(1-b)$, where b is the total variable cost ratio.

$b = [(275/550) + ((27.5+110)/550)] = .75$

$R_{dt} = (R_t - R_{Tt})(1-b) = (550 - 500)(1-.75) = 12.5$

Step three: Calculate A_{vt}:

$$E_{vt} = E_{at} - F_{at}$$

where:
E_{at} = total accrued expenses
F_{at} = fixed accrued expenses
E_{vt} = variable accrued expenses

$$V_{t-1} = E_{v(t-1)}/R_{t-1} = ((155-50)/350) = .3$$

$$V_t = E_{vt} / R_t = ((167.5-30)/550) = .25$$

$$\Delta V = V_{t-1} - V_t = .3 - .25 = +.05$$

$$A_{vt} = \Delta V * R_{Tt} = .05 * 500 = 25$$

Test of calculation

$$A_t = A_{ft} + A_{vt} + R_{dt}$$

$$A_t = 20 + 12.5 + 25 = 57.5$$

Reported net income - True net income = Manipulated amount

107.5 - 50 = 57.5

As a consequence, given the assumptions constructed for the model, the model can capture 100% of the manipulation for period "t." DeAngelo's 1988 random walk model would result in $27.5 for the manipulation in the net income in period t. As is shown, the model of this study outperforms the random walk model.

APPENDIX C

LIST OF SERVICE INDUSTRIES THAT WERE DELETED FROM THE SAMPLE

SIC Code	Industry Name (by the Compustat)
700	AGRICULTURAL SERVICES
1382	OIL AND GAS FIELD EXPL SVCS
1389	OIL & GAS FIELD SERVICES,NEC
1400	MNG, QUARRY NONML MINERALS
2531	PUBLIC BLDG & REL FURNITURE
2711	NEWSPAPER:PUBG, PUBG & PRINT
2741	MISCELLANEOUS PUBLISHING
2750	COMMERCIAL PRINTING
2761	MANIFOLD BUSINESS FORMS
2771	GREETING CARDS
2790	SERVICE INDS FOR PRINT TRADE
2833	MEDICINAL CHEMS,BOTANICL PDS
2835	IN VITRO,IN VIVO DIAGNOSTICS
3470	COATING,ENGRAVING,ALLIED SVC
3532	MNG,MACHY,EQ, EX OIL FIELD
3555	PRINTING TRADES MACHY,EQUIP
3669	COMMUNICATIONS EQUIP,NEC
3822	AUTOMATIC REGULATING CONTROLS
3911	JEWELRY,PRECIOUS METAL
4011	RAILROADS,LINE-HAUL OPERATING
4100	TRANSIT & PASSENGER TRANS
4213	TRUCKING, EXCEPT LOCAL
4220	PUBLIC WAREHOUSING & STORAGE
4400	WATER TRANSPORTATION
4412	DEEP SEA FRN TRANS-FREIGHT
4512	AIR TRANSPORT, SCHEDULED
4513	AIR COURIER SERVICES
4522	AIR TRANSPORT, NONSCHEDULED
4581	AIRPORTS & TERMINAL SERVICES
4700	TRANSPORTATION SERVICES
4731	ARRANGE TRANS-FREIGHT, CARGO
4812	RADIO TELEPHONE COMMUNICATION
4813	PHONE COMM EX RADIOTELEPHONE
4822	TELEGRAPH & OTH MESSAGE COMM
4832	RADIO BROADCASTING STATION
4833	TELEVISION BROADCAST STATION
4841	CABLE AND OTHER PAY TV SVCS
4899	COMMUNICATIONS SERVICES,NEC
4911	ELECTRIC SERVICES
4924	NATURAL GAS DISTRIBUTION
4932	GAS & OTHER SERV COMBINED
4941	WATER SUPPLY
4950	SANITARY SERVICES
4953	REFUSE SYSTEMS
4991	CP GENERATN-SM POWER PRODUCER
5000	DURABLE GOODS-WHOLESALE
5013	MOTOR VEH SUPLY, NEW PTS-WHSL
5045	COMPUTERS & SOFTWARE-WHSL
5050	METALS, MINERALS,EX PETE-WHSL
5051	METALS SERVICE CENTERS-WHSL
5065	ELECTRONIC PARTS, EQ-WHSL,NEC
5070	HARDWR, PLUMB, HEAT EQ-WHSL
5072	HARDWARE-WHOLESALE
5084	INDUSTRIAL MACH & EQ-WHSL
5090	MISC DURABLE GOODS-WHLS
5140	GROCERIES & RELATED PDS-WHSL
5172	PETROLEUM,EX BULK STATN-WHSL
5271	MOBILE HOME DEALERS
5311	DEPARTMENT STORES
5399	MISC GENERAL MDSE STORES

5400	FOOD STORES
5411	GROCERY STORES
5412	CONVENIENCE STORES
5500	AUTO DEALERS,GAS STATION
5531	AUTO AND HOME SUPPLY STORES
5600	APPAREL AND ACCESSORY STORES
5712	FURNITURE STORES
5734	CMP & CMP SOFTWARE STORES
5812	EATING PLACES
5900	MISCELLANEOUS RETAIL
5944	JEWELRY STORES
5945	HOBBY,TOY & GAME SHOPS
5960	NONSTORE RETAILERS
5961	CATALOG, MAIL-ORDER HOUSES
6021	NATIONAL COMMERCIAL BANKS
6022	STATE COMMERCIAL BANKS
6029	COMMERCIAL BANKS
6035	SAVING INSTN,FED CHART
6036	SAVINGS INSTN, NOT FED CHART
6111	FEDERAL CREDIT AGENCIES
6141	PERSONAL CREDIT INSTN
6153	SHORT-TERM BUS CREDIT, EX AG
6159	MISC BUSINESS CREDIT INSTN
6162	MORTGAGE BANKERS & LOAN CORR
6163	LOAN BROKERS
6172	FINANCE LESSORS
7359	EQUIP RENTAL & LEASING, NEC

VITA

Hamid Pourjalali

Candidate for the Degree of

Doctor of Philosophy

Thesis: AN IMPROVED TEST OF POSITIVE ACCOUNTING THEORY: EXAMINATION OF THE CHANGES IN THE AMOUNT OF ACCRUALS IN RESPONSE TO THE CHANGES IN CONTRACTING VARIABLES

Major Field: Business Administration

Minor Field: Accounting

Biographical:

Personal Data: Born in Tehran, Iran, June 11, 1959, the son of Abolfazl and Mehry Pourjalali.

Education: Graduated from Merat High School, Tehran, Iran, in 1976; received Bachelor of Commerce Degree in Business Administration from University Complex of Administration and Commerce, Tehran, Iran, in 1982; received Master of Accounting Degree from Teacher Training University, Tehran, Iran, in 1986; completed requirements for the Doctor of Philosophy Degree at Oklahoma State University in July, 1992.

Professional Experience: Teaching and Research Assistant, School of Accounting, Oklahoma State University, September, 1988, to May, 1992. Financial Manager, Auditor, and Accountant, in various companies in Tehran, Iran, March, 1977, to August, 1986.