1991

An Empirical Investigation of a Choice of Accounting Method for Investments by Colleges and Universities: Positive Accounting Theory Applied in a Not-For-Profit Environment

Bruce W. Chase

www.manaraa.com

School of Business
Virginia Commonwealth University

This is to certify that the dissertation prepared by <u>Bruce W. Chase</u> entitled <u>An Empirical Investigation of a Choice of Accounting Method for Investments by Colleges and Universities: Positive Accounting Theory Applied in a Not-For-Profit Environment</u> has been approved by his committee as satisfactory completion of the dissertation requirement for the degree of Doctor of Philosophy in Business.

Dr. Edward N. Coffman, Director

Dr. Glenn H. Gilbreath, Committee Member

Dr. Charles L. Holley, Committee Member

Dr. Tai S. Shin, Committee Member

Dr. Rasoul H. Tondkar, Committee Member

Dr. Robert R. Trumble
Dean, School of Business

April 4, 1991
Date

AN EMPIRICAL INVESTIGATION OF A CHOICE OF ACCOUNTING METHOD
FOR INVESTMENTS BY COLLEGES AND UNIVERSITIES:
POSITIVE ACCOUNTING THEORY APPLIED
IN A NOT-FOR-PROFIT ENVIRONMENT

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy
at Virginia Commonwealth University

By:

Bruce W. Chase
B.S., M.B.A.
Virginia Commonwealth University

Director: Edward N. Coffman, D.B.A.
Professor
Department of Accounting

Virginia Commonwealth University
Richmond, Virginia
April 3, 1991

ACKNOWLEDGEMENT

Developing and producing this dissertation has been a long and challenging process, which would not have been completed without the assistance and support of many people. I would especially like to thank the members of the dissertation committee, Dr. Edward Coffman (Chairman), Dr. Glenn Gilbreath, Dr. Charles Holley, Dr. Tai Shin, and Dr. Rasoul Tondkar for their professional guidance, personal support, and commitment of time and energy to this project. I am also indebted to Dr. Joyce O. Davis, President of Southern Seminary College, for her encouragement and support throughout my program. Finally, I acknowledge with appreciation the support of Ms. Robin Jenkins of the National Association of College and University Business Officers in providing information and assistance with this study.

DEDICATION

To my wife, Debra, and our two children, Joey, and Abbey. I am indebted for all their sacrifices and deeply appreciative of their support and patience.

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

LIST OF TABLES

LIST OF TABLES (continued)

ABSTRACT

AN EMPIRICAL INVESTIGATION OF A CHOICE OF ACCOUNTING METHOD
FOR INVESTMENTS BY COLLEGES AND UNIVERSITIES:
POSITIVE ACCOUNTING THEORY APPLIED
IN A NOT-FOR-PROFIT ENVIRONMENT

Bruce W. Chase
Virginia Commonwealth University
Major Director: Dr. Edward N. Coffman

The reasons why managers make certain accounting method choices have been explored by accounting researchers for some time. For over ten years, much of this research has been driven by positive accounting theory, which is based on the underlying assumption that managers act rationally to maximize their own personal wealth when making accounting method choices. This study is an initial attempt to extend positive accounting theory research to a not-for-profit setting; specifically, the choice of accounting method for endowment investments by colleges and universities is examined.

The three objectives of this study are: 1) to determine if the findings of previous research in positive accounting theory hold in the college and university industry, 2) to determine if other institutional characteristics are associated with the accounting method used for endowment investments, and 3) to provide information to policymakers regarding the accounting for long-term investment by not-for-profit organizations.

Data were obtained from 162 four-year colleges and universities. Two regression models were developed to explain the variation in the accounting method used for investments. The first model contained five variables related to positive accounting theory and the second model contained five variables related to other institutional characteristics.

The results of the first model indicate that the choice of accounting method for endowment investments is related to the factors suggested by positive accounting theory. Government regulations and bonus plan provisions factors were significant and of the expected sign. The political costs factor was also significant but not of the expected sign. The debt covenants factor was not significant.

The results of the second model indicate that the choice of accounting method for endowment investments is related to other institutional characteristics. Specifically, the model found that location, asset allocation in equity investments, and the institution's auditor had a statistically significant influence on the choice of accounting method.

The research indicates that there are systematic differences in the choice of accounting method for not-for-profit organizations similar to those explained by positive accounting theory for for-profit organizations. Additional institutional characteristics were also found to influence accounting choice, which warrant further research.

CHAPTER 1

INTRODUCTION

Managers make choices among alternatives in accounting methods in preparing external financial statements. The reasons why managers make certain accounting method choices have been explored by accounting researchers for some time. In an early work, Gordon (1964) explored the economic motives behind the decisions managers make in selecting accounting methods. He concluded that managers select procedures that will smooth reported income to satisfy shareholders' expectations. His conclusion predated the research connected with the efficient market hypothesis. Ball and Brown (1968) and others now suggest that annual earnings numbers provide little unanticipated information to the market. In contrast, Watts (1978) has found quarterly earnings announcements can provide information to the market which can produce abnormal returns. Also, Ball (1972), Kaplan and Roll (1972), Sunder (1973), Hong, Kaplan, and Mandelker (1978), and others suggest that the market is efficient and can discern differences between earnings numbers that use different accounting methods.

Watts and Zimmerman (1978) are credited with establishing what is called a positive accounting theory that examines managers' economic incentives in selecting among accounting methods. The theory is based on the underlying assumption that managers act rationally to maximize their own personal wealth. The theory also considers the contracting and monitoring costs associated with the contractual arrangements among the interested parties of the organization. Since the 1978 article, many attempts have been made to empirically test positive accounting theory, and these attempts have produced several results consistent with the theory; however, there have been some inconsistencies in the findings as many of the propositions of the theory are difficult to operationalize for empirical testing.

In a recent article, Watts and Zimmerman (1990) discussed a ten-year perspective of positive accounting theory. They believe that the research has produced many supportive findings; however, they feel there are many opportunities to improve research undertaken in positive accounting theory. Among the specific suggestions to improve the research were the need to improve the linkage between the theory and empirical tests, and the investigation of intra-industry variations in accounting methods.

One research opportunity is to extend positive accounting theory beyond its typical focus on the for-profit business community to a not-for-profit environment by examining choice of accounting method for endowment investments by colleges and

universities. This study explores how the findings from research on for-profit organizations can be extended to not-for-profit institutions.

Institutions of higher education represent a large industry group that have many operating objectives different from those of corporations; however, managers of colleges and universities, like those of for-profit corporations, must present financial performance results. In measuring those results, managers of colleges and universities must make certain accounting method choices. If positive accounting theory is robust, then the theory's predictions of management behavior should hold in this not-for-profit environment, as in the for-profit environment.

When a theory is applied to a new environment, modifications are usually required in research methods. This research requires modifications to the variables used in previous research. It does, however, provide an opportunity to test several aspects of positive accounting theory from a different perspective.

This research provides additional insight into positive accounting theory. Furthermore, accounting for investments by not-for-profit organizations is likely to be addressed by the Financial Accounting Standards Board (FASB) as part of the financial instruments project [McLaughlin and Farley (1989)]. As part of this project, <u>Statement of Financial Accounting Standards (SFAS) Number 105</u> issued in March of 1990 and an Exposure Draft issued in December 1990 have been released by

the FASB dealing with disclosure of financial instruments. Another phase of the FASB project will address recognition and measurement issues related to financial instruments. This study provides some insight into current practice that should be helpful to the FASB in their review related to this phase of their project.

Background

Colleges and universities may carry endowment investments at cost or at fair market value (FMV) in their balance sheet. The provision of <u>Statement of Financial Accounting Standards (SFAS) Number 12</u>, "Accounting for Certain Marketable Securities," requiring that securities be valued at the lower of aggregate cost or market value, does not apply to colleges and universities.

Many colleges and universities have large amounts of investments in their endowment funds, thus providing an important source of financial support for these institutions. For financial reporting purposes, endowment funds are reported as a separate fund group. Typically endowment investments consist of, in order of concentration, stocks, bonds, cash, real estate, and other investment instruments. Investments in other fund groups (e.g., current funds and plant funds) are usually not significant when compared to endowment holdings; thus, the decision as to which accounting procedure to use for investments is primarily related to the reporting of endowment assets.

Peat Marwick Mitchell & Company (1985) (now KPMG Peat Marwick), in a review of accounting practices of 889 colleges and universities, found that seventy-eight percent used the cost method for valuing investments and sixteen percent used the FMV method. The remaining six percent indicated the use of some other method.

Financial results reported using the cost method may be quite different from those using the FMV method. Under both methods, the financial statements will reflect income from investments and gains and losses from investment transactions. The difference is that under the FMV method, unrealized gains and losses will also be reflected. The change in market value for investments held on the report date will be reflected in the unrealized amount.

Managers employing the cost method of accounting can influence the reported numbers by deciding the timing of certain investment transactions. If management wishes to report lower profits, investments that have appreciated in value can be held and investments that have declined in value can be sold. On the other hand, under the FMV method of accounting all changes in market value would be reflected in the financial statements.

The Peat Marwick Mitchell & Company study also revealed that many colleges and universities did not disclose complete investment performance results. The study found that of those institutions using the cost method of accounting for investments, seventy-one percent of the public institutions

and thirty percent of the private institutions did not disclose market value data in the financial statements. In addition, eighty-one percent of the respondents surveyed did not disclose the investment portfolio performance in the notes to the financial statements.

Because of the lack of disclosure, readers of the financial statements, in many cases, will be unable to accurately compare performance results between institutions. The typical readers of college and university financial statements include governing boards, governmental organizations, creditors, donors, foundations, and employees. The accounting method used for endowment investments may impact the way the user of the financial statements interprets an institution's investment performance.

For several reasons, the choice of accounting method for endowment investments provides different research opportunities to empirically test positive accounting theory. 1) This study provides a not-for-profit setting for this research. 2) It considers accounting valuation method in only the college and university industry. Intra-industry studies allow for better control over extraneous variables that often arise due to differences among industries. 3) Reported numbers in a business setting represent the combination of several different accounting method choices. Because managers in a business setting make accounting method choice decisions from a portfolio of alternatives, the effect of one decision may be difficult to evaluate. Endowment returns are reported

as a separate fund and, therefore, the effects of an accounting valuation method choice can be isolated from other endogenous variables. 4) This study also provides an opportunity to examine a choice of accounting method that impacts a key financial performance indicator, investment performance.

Objectives of the Study

The purpose of this study is to examine the relationship between a choice of accounting method in a college and university environment and managers' self-interest as suggested by positive accounting theory. Specifically, the objectives of this research can be stated as follows:

1. To determine if the findings of previous research in positive accounting theory hold true for the choice of accounting by not-for-profit colleges and universities. Previous research in positive accounting theory has concentrated on the influence of several factors on a manager's self-interest in a business environment, specifically, government regulations, political actions, bonus plan provisions, and debt covenants. The study will examine these factors in a not-for-profit environment.

2. To determine if certain other institutional characteristics are associated with the choice of accounting method used for endowment investments.

3. To provide policymakers information regarding the accounting for long-term investment by not-for-profit organizations.

This study represents an initial effort to apply positive accounting theory research methodology to a not-for-profit setting and therefore, adds another dimension to the positive accounting theory literature.

Statement of Problem and Hypotheses

Positive accounting theory had its beginning in contracting and agency theory. Contracting theory assumes that contracts are used by the various factors of production within an organization. Individuals within the organization are motivated by self-interest and these contracts are necessary to minimize the cost from shirking and to reduce the conflict of interest among the various parties. Agency theory examines the relationship between a principal and agent in an organization. Assuming rational expectations, the principal will reduce the price (price protect) paid the agent for anticipated non-optimal behavior of the agent. The agent bears these costs and may contract with the principal not to take these non-optimal actions. Similarly, the agent may incur monitoring costs to demonstrate to the principal that these contracts are being followed.

Positive accounting theory considers a broad range of contracting costs. Watts and Zimmerman (1990) use the term contracting costs to include transaction, agency, information, renegotiation, and bankruptcy costs, and consider these costs

on both the internal parties of a firm and the external parties, such as suppliers, claim holders, and customers. Accounting information is used in many of these contracts and plays an important role in the systems used to measure, reward, and punish management's performance. The effect of a choice of accounting method on each contracting party's wealth depends on the relative magnitudes of the contracting costs.

When managers have discretion over the reporting of accounting numbers, they are motivated to take action that either increases the wealth of all contracting parties or increases their own wealth at the expense of some other party or parties. Contracts are often used to limit the amount of discretion that managers have over reported numbers; however, some discretion usually exists to allow the manager flexibility in maximizing the value of the firm. Watts and Zimmerman (1990) refer to this discretion as the "accepted set" of accounting procedures, which will vary across firms and industries.

The contracting parties may price protect themselves from opportunistic behavior by the manager within the "accepted set" of accounting procedures, but this will not prevent the manager from taking such actions. Managers are constrained by contracts and their opportunistic behavior within these constraints will depend on the relative effects of the various contracting costs.

Positive accounting theory assumes that managers act rationally and seek to maximize their own personal wealth.

Personal wealth can be seen as a function of current and future compensation. Components of current compensation include salary, cash incentives, and stock bonus plans. Future compensation includes increased value in stock holdings and managerial human resources. Fama (1980) suggested that the labor market acts to set the value for managerial human resources. If managers are able to improve a firm's value, then the labor market will reward such actions with higher future compensation.

In a college and university environment, it may be contended that managers may be less motivated by personal wealth considerations than in for-profit organizations. Large salaries and cash incentives and stock bonus plans are not part of the normal compensation package of managers of colleges and universities. Managers may be motivated by other factors. For instance, it can be contended that these managers are motivated by their concern for the institution and its ability to meet its mission. These other motives, however, may be consistent with wealth maximization of the manager. It appears reasonable to assume that the more successful and prestigious an institution becomes, the more its managers will be paid and the more its managers will be demanded by other institutions, much the same way an increase in market value affects managers of for-profit institutions.

In business, managers can increase their wealth by taking actions to either improve their compensation (salary or bonus plan) or enhance market value of the firm (which increases

their managerial human resources and the value of their stocks or options). Managers of colleges and universities can increase their wealth primarily through increases in salary and managerial human resources. Watts and Zimmerman (1986) suggest that a number of factors can influence a manager's wealth, specifically, government regulations, political actions, bonus plan provisions, and debt covenants. These factors can affect the market value of a firm and management compensation directly.

A firm's reported earnings can have an impact on all of the factors suggested by Watts and Zimmerman. Different accounting methods will produce different reported earnings. Some accounting methods will produce lower earnings, while others will have the opposite effect. For college and university endowment investments, the fair market value method will generally produce higher earnings and assets values than the cost method. This is especially true in a rising stock market, which the United States has experienced for four of the last five years ending June 30, 1989 (measured by the Standard and Poor's 500 index).

If managers act rationally, they will select a set of accounting procedures that will report earnings that maximize their wealth. There is no reason to believe that managers of not-for-profit organizations would act differently. Understanding how reported earnings interact with the above factors will give insight into why managers select accounting

procedures that either increase or decrease reported income. Each of these factors will be discussed below.

Government Regulations

Government regulations may impose costs on an organization; managers of course would want to avoid such costs. Accounting numbers are sometimes used by regulators in establishing policy; for example, most utilities are subject to rate of return regulations based on reported accounting earnings. Watts and Zimmerman (1978), Deakin (1989), and Wong (1988) found evidence to indicate that firms facing regulation preferred accounting procedures that reduced reported earnings.

Colleges and universities may also be subject to government regulations. For example, public colleges receive a significant amount of their financial support from state appropriations. In the appropriation process, legislators often face resource allocation decisions among needs from many different types of organizations. If an organization receives a significant amount of support from outside the state's appropriation, such as from an endowment, it appears reasonable to assume that state legislators might consider this other support in making their resource allocation decisions. The existence of the possibility of reduction in state funding may be one of the reasons that many public colleges and universities use outside foundations to hold endowment funds. Peat Marwick Mitchell & Company (1985) found that for the colleges and universities surveyed, thirty-two

percent of the public institutions had fund raising foundations compared to only six percent of the private institutions. It would then appear to be in the best interest of public colleges to report lower endowment returns and asset values. Private institutions would not be affected by the state legislative process and would not have the same incentive to report lower endowment returns.

The cost method of accounting for endowments would provide managers with flexibility to report lower asset values and earnings. As described earlier, under the cost method the financial statements would reflect asset values at cost and only realized gains and losses would be reported. This leads to the following hypothesis:

> **H1:** Public institutions are more likely to use cost method accounting for endowment investments than are private institutions.

This not-for-profit setting provides a new approach to test the influence of government regulations on a choice of accounting method. The public versus private comparison should provide additional support for the contention that government regulations may influence a choice of accounting method.

Political Actions

Managers need to be aware of the costs that the political process may impose on their organizations. In a for-profit setting, increased taxes and antitrust actions are two

possible political actions that would increase costs to an organization. Watts and Zimmerman (1986) suggested that reported earnings influence the threat of political actions. Firms earning higher than normal returns may be more susceptible to review by the political process.

Many factors can influence a firm's political costs exposure. Size and industry characteristics are some of the factors that have been investigated. Watts and Zimmerman (1978), Hagerman and Zmijewski (1979), Zmijewski and Hagerman (1981), Bowen, Noreen, and Lacey (1981), Daley and Vigeland (1983), Ayres (1986), and Wong (1988) all found support for the size hypothesis. In addition, Bowen, Noreen, and Lacey (1981) and Zmijewski and Hagerman (1981) found support for certain industry characteristics.

Colleges and universities may also be susceptible to political costs. For example, a recent article by Jaschik (1990) describes the year-long Justice Department's antitrust investigation of several prestigious institutions that were sharing students' financial aid and other information.

Another example of political costs is related to taxes. Currently, colleges and universities are tax exempt; however, several times in the past Congress has discussed the concept of a tax on endowment earnings. In his annual address to the National Association of College and University Business Officers (NACUBO), Caspa Harris, president of NACUBO, discussed the possibility of Congress imposing a tax on endowment earnings (Harris [1990]).

As stated above, size has been used in many previous studies to suggest political costs exposure. It seems reasonable to assume that size may also be relevant in the not-for-profit setting. One measurement of size is the asset value of the endowment fund. Most prestigious, highly visible institutions have significant endowment funds; this may increase their exposure to political costs since an endowment tax would likely have a greater impact on institutions with larger endowment holdings.

Reporting lower asset values and returns in financial statements may reduce the threat of political action. Again, the cost method would provide management with more flexibility to accomplish this goal. This leads to the following hypothesis:

> **H2:** Institutions with larger endowment holdings are more likely to use cost method accounting for endowment investments than are institutions with smaller endowment holdings.

Another measurement of size for colleges and universities is full-time equivalent students (FTE). Dividing the endowment by the number of FTE would yield endowment-per-FTE. It seems reasonable to assume that institutions with a large endowment-per-FTE would have more political exposure than institutions with a smaller endowment-per-FTE. These institutions would normally generate more funds per students from the endowment and therefore are more visible. This leads to the following hypothesis:

H3: Institutions with larger endowment-per-FTE are more likely to use cost method accounting for endowment investments than are institutions with smaller endowment-per-FTE.

Bonus Plan Provisions

Watts and Zimmerman (1986) suggested that a manager's choice of accounting method may be influenced by the existence of an earnings-based compensation bonus plan. Managers who have such plans are more likely to select accounting procedures that will increase reported earnings, as such increases will enhance their compensation and wealth. Several tests of this proposition have been made. Zmijewski and Hagerman (1981), Dhaliwal, Salamon, and Smith (1982), Healy (1985), Ayres (1986), and Deakin (1989) all found evidence that management bonus compensation plans, in certain instances, are positively correlated to accounting methods that increase reported earnings.

The use of bonus compensation plans for college and university managers is not an orthodox practice; thus, a direct test of the influence of bonus plans on a choice of accounting method is not possible in this setting. However, even in the absence of a formal incentive compensation plan, managers' salaries can still be affected by the level of earnings in an organization. If above-average earnings are achieved over time, managers will be able to justify requests for higher salaries. The higher earnings will also increase managers' human resource capital. On the other hand, managers who consistently produce poor returns may face termination.

It seems reasonable to expect that managers would want to avoid reporting lower earnings. Trombley (1989) and Ayres (1986) found that managers of firms that experienced a decline or had a relatively smaller percent increase in earnings were more likely to elect early adoption of an income increasing accounting method.

Colleges and universities senior managers' performance evaluations and compensations are likely influenced by variables other than reported revenues and expenditures; however, endowment holdings can significantly impact the institution, and therefore the investing of these funds can be an important part of managers' responsibilities. Investment return is often seen as a good measure of management performance; thus, investment return may become a part of managers' performance evaluations. In addition, compensation for some lower level managers may be more directly linked to endowment earnings performance.

As described earlier, the cost method would allow managers more flexibility in recognizing investment gains and losses. While this flexibility may appeal to many managers, its effects would be more significant for managers who consistently produce marginal or poor investment returns. Managers consistently producing good investments results would benefit from using the FMV method. The financial statements under the FMV method would reflect this performance, and the manager would not have to be concerned with the timing of transactions.

A common measure of investment performance is a "total return" calculation, computed by adding income from the investments to any change in market value for the period and dividing the sum by the beginning market value. This measure is computed independently of the accounting method employed for endowment investments and thus can be used to compare performance among organizations.

The following hypothesis is based on this line of reasoning:

> **H4:** Institutions with lower investment total returns are more likely to use cost method accounting for endowment investments than are institutions with higher investment total returns.

The above hypothesis provides an indirect test of the bonus plan hypothesis. Managers with lower investment results have compensation incentives to elect an accounting method that provides flexibility in reporting results.

Debt Covenants

The existence of a potential conflict between the owners of a company and its bondholders has been addressed in the literature by Jensen and Meckling (1976), among others. Watts and Zimmerman (1986) and Smith and Warner (1979) suggested that managers can take certain actions that will transfer wealth from the bondholders to the owners of a company. Because of this conflict, bond covenants are used to protect bondholders by reducing management's ability to affect such changes.

Many debt covenants are based upon financial variables computed from the financial statements. Thus, a choice of accounting method by management can have an effect on bond covenant constraints. Managers may be less constrained by certain bond covenants by selecting accounting methods that increase reported income. For example, covenants based on debt-to-equity ratio and interest coverage ratio will be less restrictive as earnings increase.

In an early work, Dhaliwal (1980) suggested that the simple debt-to-equity ratio could be used to predict which firms would use accounting methods that increased earnings. Firms with larger debt-to-equity ratios would prefer accounting methods that increased earnings. Since the 1980 study, there have been many empirical tests related to a firm's debt structure and choice of accounting method. Zmijewski and Hagerman (1981) found support for the debt-to-equity ratio hypothesis. In addition, other studies have looked at the restrictive debt covenants and their relationship to choice of accounting method. Bowen, Noreen, and Lacey (1981), Dhaliwal, Salamon, and Smith (1982), Daley and Vigeland (1983), Ayres (1986), Wong (1988), Trombley (1989), and Deakin (1989) all found evidence that certain restrictive covenants were associated with procedures that increase earnings.

Colleges and universities often depend on their endowment assets holdings to demonstrate financial health. A debt-to-endowment asset holdings ratio is one measure used by lending

institutions to determine debt capacity. Endowment assets holdings are usually made up of high grade investment instruments that provide a steady source of income to an institution. The debt-to-endowment assets ratio may be comparable to the debt-to-equity ratio used in other studies.

Institutions that use FMV accounting for investments will normally report higher asset values in the endowment fund than would be reported under the cost method. Based on research done in the for-profit environment, it would appear that colleges and universities with larger debt-to-endowment assets ratios would prefer accounting methods that report larger asset values. The following hypothesis is based on this reasoning:

> **H5:** Institutions with larger debt-to-endowment assets ratios are more likely to use FMV method accounting for endowment investments than are institutions with lower debt-to-endowment assets ratios.

The above hypothesis modifies the debt-to-equity variables used in previous research to test the debt covenants hypothesis. The variable used, debt-to-endowment assets, serves as a proxy for the constraints of bond covenants.

Other Characteristics

In addition to the factors indicated above, there may be others that influence a manager's choice of accounting method for endowment investments. The author discussed this study with nine representatives of colleges and universities,

including a college president, a higher education consultant, a representative from the National Association of College and University Business Officers (NACUBO), and six chief business officers. Based on these discussions, the following institutional characteristics have been added as variables to the study: auditor, percent of endowment in equities, percent of endowment in real estate, spending rate formula, and location of the institution. The following hypotheses are based on the variables identified above:

> **H6-H10:** Certain other institutional characteristics, represented by the variables auditor, percent of endowment in equities, percent of endowment in real estate, spending rate formula, and location, respectively, have a influence on the choice of accounting method for endowment investments.

Summary of Objectives and Hypotheses

As described earlier, this study has three objectives. Table 1.1 summaries the specific hypotheses and variables developed for the first two objectives. These two objectives have a common purpose: to determine if certain institutional characteristics are related to the accounting method used for endowment investments. The findings from the data analysis for the first two objectives will provide information to policymakers regarding accounting for long-term investments by not-for-profit organizations; satisfying the third objective.

Description of Chapter Divisions

Chapter 1 consists of the introduction, background, objectives of the study, the statement of the problem and

hypotheses and a summary of objectives and hypotheses. Chapter 2 is a review of the major studies in positive accounting theory. It also describes the relationship of previous studies to the present study. Chapter 3 consists of a description of the sample design and the statistical methods used. Chapter 4 presents the results of the analysis of the data. Chapter 5 presents the summary, conclusions, and limitations of the study, as well as recommendations for future study.

TABLE 1.1

SUMMARY OF OBJECTIVES AND HYPOTHESES

Objective One	Relationship between the variables related to positive accounting theory and the choice of accounting method for endowment investments
H1:	Government regulations (type of institution)
H2:	Political actions (size of endowment)
H3:	Political actions (size of endowment-per-FTE)
H4:	Bonus plan provisions (total return on endowment)
H5:	Debt covenants (debt-to-endowment assets ratio)
Objective Two	Relationship between certain other institutional characteristics and the choice of accounting method for endowment investments
H6:	Institutional auditor
H7:	Percent of endowment in equities
H8:	Percent of endowment in real estate
H9:	Spending rate formula
H10:	Location

CHAPTER 2

LITERATURE REVIEW

This chapter reviews the major studies in positive accounting theory and thus provides a summary of the various approaches, procedures, and findings of this research paradigm. The positive accounting theory research paradigm was promoted by Watts and Zimmerman in 1978 and has since dominated the literature regarding choice of accounting method. The research in this area is primarily of two types; the first is concerned with management's voluntary choice of accounting method, and the second is focused upon management's reaction to proposed mandated accounting changes.

Studies are presented in chronological order of publication since many of the studies build upon the findings of earlier research. A summary of this literature review is presented in Table 3.1 at the end of this chapter.

Watts and Zimmerman Study

Watts and Zimmerman (1978) are credited with establishing the positive accounting theory research paradigm. They investigated the reasons why a corporate manager chose to either support or oppose a proposed accounting standard. Specifically, their research focused on firms that submitted

23

written comments to a 1974 FASB Discussion Memorandum, "Reporting the Effects of General Price-Level Changes in Financial Statements" (GPLA).

The Watts and Zimmerman study is based on the premise that managers seek to maximize their own wealth, and this wealth can be affected by the following factors: taxes, regulations, political costs, information costs, and management compensation plans. They proposed that political and regulation costs will dominate other factors. In other words, when a firm is subject to political pressure or regulation, managers will prefer accounting standards that report lower earnings; the political and regulatory considerations will outweigh any gain in incentive compensation.

Watts and Zimmerman used size as a proxy for political costs. They assumed the larger a firm, the more likely its managers will select accounting procedures that will reduce income. Their model incorporated size, industry concentration, bonus compensation, taxes, and regulation.

They sampled fifty-three firms that filed written comments to the Discussion Memorandum on GPLA, of which thirty-four opposed and eighteen supported the proposed accounting change (for one firm an opinion could not be determined). Their study required an estimate of the effects of GPLA on earnings. For the unregulated firms, twenty-six had lower earnings estimates and eight had higher estimates. Regulated firms were excluded from the initial test because it

was unclear how regulatory commissions would treat GPLA gains and losses.

Watts and Zimmerman predicted that managers' positions on the Discussion Memorandum were related to both size and the effect of the proposed regulation on earnings. Using a Mann-Whitney U-test, they found support for their hypothesis. Large firms whose earnings would be reduced favored the proposal. A discriminant analysis was then done based on bonus compensation plans, direct regulation, industry concentration, tax effect, and size. Firm size emerged as the dominant factor in predicting managers' preference.

Two major concerns with this study are the use of size as a proxy for political costs and the number of firms from the oil industry in the sample. Size could serve as a proxy for many other variables in addition to political costs. Also, many of the firms in the sample were from the oil industry, which, at the time of the study in 1974, was under close scrutiny by Congress and the public. The effects of the above concerns on the results are difficult to estimate.

Hagerman and Zmijewski Study

Hagerman and Zmijewski (1979) extended the research done by Watts and Zimmerman to choice of accounting method for four different areas. This study used the choice of accounting method for inventory (LIFO versus FIFO), depreciation (accelerated versus straight line), investment tax credit (flow through versus deferral), and the amortization of past service costs for pensions. The authors suggested that the

following factors influence a manager's choice of accounting method: political costs (size), industry concentration (sales of the eight largest firms/total industry sales), risk (beta coefficient), capital intensity (gross fixed assets/sales), and incentive compensation plans. They proposed that firms favoring methods that decrease income would be larger, riskier, more capital intensive, and part of a highly concentrated industry. Firms with incentive compensation plans would favor accounting methods that increase income.

Hagerman and Zmijewski sampled 300 randomly selected firms from 1975 that disclosed their choice of accounting methods. A multivariate procedure, probit, was used to determine the significance of variables for each of the four accounting method choices.

The results of probit analysis indicated that the model was significant only for the depreciation and inventory method choices. For the depreciation choice, risk and size were significant at the 0.05 level, and capital intensity and size were significant at the 0.10 level. The other variables were not significant. For the inventory choice, only two variables were significant at the 0.10 level, capital intensity and industry concentration.

As indicated, the Hagerman and Zmijewski study extended positive accounting theory to the selection of accounting methods for four different areas. The results, however, indicated that managers may be influenced by different factors for each choice of accounting method, which was troubling to

the authors. Two years later, they extended this research in an attempt to address this concern (Zmijewski and Hagerman [1981]).

Dhaliwal Study

Dhaliwal (1980) explored the concept of how a firm's leverage could influence a manager's preference in a choice of accounting method. He proposed that a highly leveraged firm would avoid accounting methods that either reduced or increased volatility in earnings, because highly leveraged firms want to avoid possible costly renegotiation or technical default on their loan agreement due to lower earnings.

The study examined firms engaged in oil and gas exploration in 1976. At that time, firms could account for exploration expense using either a "full cost" method or a "successful effort" method. It is likely that the "full cost" method would produce higher earnings because all exploration costs would be amortized. It was hypothesized that highly leveraged firms would be more likely to use the "full cost" method to account for exploration expense.

Dhaliwal selected firms that used the "full cost" method and then matched these firms, by sales revenue, with firms that used the "successful effort" method, to control for the size effect identified in the Watts and Zimmerman (1978) study. A sample of thirty-three matched pairs of firms was obtained. Using a matched-pair "t" test, the debt-to-equity ratio was compared for the two groups. The difference in the debt-to-equity ratios was statistically significant at the

0.09 level. Dhaliwal expanded positive accounting theory to include the influence of debt contracts. Although the study did not examine the actual debt contract covenants, it provided support for the influence of leverage on the choice of accounting method.

Zmijewski and Hagerman Study

In this study, Zmijewski and Hagerman (1981) re-examined their previous research (Hagerman and Zmijewski [1979]). In the 1979 study, they examined the influence of political costs, industry concentration, risk, capital intensity, and incentive compensation plans on a manager's choice of accounting method. In this study, the debt-to-equity factor identified in the Dhaliwal (1980) study was also examined. The four accounting method choices studied were inventory, depreciation, investment tax credit, and the amortization of past service costs for pensions.

In this study, they proposed that managers do not make decisions regarding choice of accounting methods independently; rather managers make such decisions as part of an overall financial reporting strategy. Managers act to achieve a long-term optimal income strategy.

Zmijewski and Hagerman developed a model that incorporated all four accounting method choices as part of an overall income strategy. Their study allowed for only two possible choices (either income increasing or income decreasing) for each choice of accounting method, which produced sixteen possible combinations. An individual company

could be at an extreme position by using all income increasing or decreasing methods, or the company can be somewhere between the two extreme positions. The authors further proposed three different variations of the model as follows:

1) Five-strategy model. All four accounting methods were assumed to impact earnings equally. For example, one extreme would be for all four choices to be income increasing.

2) Seven-strategy model. Pension costs and investment tax credit methods were assumed to have one-half the impact of depreciation and inventory methods.

3) Nine-strategy model. Pension costs and investment tax credit methods were assumed to have equal but less than one-half the impact of depreciation and inventory methods.

Zmijewski and Hagerman used the sample of 300 companies from their 1979 study plus the sample of thirty-four unregulated firms from the Watts and Zimmerman (1978) study. They compared the two groups and found that the firms in the Watts and Zimmerman sample were more likely to have an extreme income strategy. They considered this support for their notion that managers would be more likely to lobby on a proposed accounting change if they could not adjust their

income strategy to offset the change (e.g., they are already at an extreme position).

The authors used a probit analysis to test their hypothesis using a naive prediction that assumed an equal probability for each strategy. All three versions of the model were statistically significant at the 0.01 level. When this assumption was changed to a naive assumption that the firms used the strategy most commonly employed, the level of significance dropped to the 0.25 level.

Not all the independent variables were significant. For all three models, size was significant at the 0.01 level and industry concentration and incentive compensation were significant at the 0.05 level. Debt-to-equity was significant at the 0.10 level for the five-strategy model and at the 0.05 level for the other two models. Risk and capital intensity were not significant.

Zmijewski and Hagerman performed additional tests related to size. They divided the sample of firms into large and small firm subgroups. The model proved significant for the large group. They concluded that the model may not be appropriate for all types of organizations and there may exist a size threshold for their model.

In summary, this study demonstrated the merits of not considering a choice of accounting method in isolation. The findings indicated that managers make accounting method choices as part of an overall income strategy. Also, management compensation plans were shown to be significant in

this model. The main limitation of this study was that the model used a naive assumption of equal probability for each strategy. When this assumption was changed to the most commonly used strategy, the model did not perform well.

Bowen, Noreen, and Lacey Study

The study by Bowen, Noreen, and Lacey (1981) examined the choice by managers to capitalize or expense interest on assets not yet in service. Their study concentrated on the influence of debt contract constraints and political costs on a manager's choice of accounting method. They identified three variables related to debt contracts: 1) dividends paid/unrestricted retained earnings, 2) income/interest expense, and 3) net tangible assets/long-term debt. Political costs were examined by using a size variable and testing its significance within a politically sensitive industry (oil and gas) and then for all other industries. This study also incorporated a variable for the existence of a bonus compensation plan.

The authors selected firms from 1974 that capitalized interest and randomly matched these firms to non-capitalizing firms within the same industry. A sample of ninety-one matched pairs of firms was achieved. The authors hypothesized that firms would more likely select income reducing accounting procedures (non-capitalize) if they faced political costs, and select income increasing procedures (capitalize) for bonus compensation and debt contract reasons.

The study used "t" tests and multivariate probit analysis. For the "t" tests, the debt contract variables were all significant and bonus compensation was not. Size within the oil and gas industry was significant, and there was also evidence of a "threshold effect" similar to that found by Zmijewski and Hagerman (1981). Outside the oil and gas industry, the size effect had the opposite sign and was also significant. No explanation was offered for this unexpected finding. The probit analysis supported the findings of the "t" tests.

In summary, this study introduced more refined leverage variables and controlled for industry effect. The study also found an unexpected opposite effect for size outside the oil and gas industry.

Dhaliwal, Salamon, and Smith Study

The Dhaliwal, Salamon, and Smith (1982) study examined the relationship between the ownership control and the choice of depreciation methods for financial reporting. The authors hypothesized that firms that were controlled more by management (MC) would prefer income increasing accounting methods. Managers of such firms would want to keep current shareholders satisfied, reduce takeover threats, and maximize their bonus incentive plans. Closely held firms, referred to as owner controlled (OC), would have less incentive to report higher earnings. The authors proposed that OC firms were less likely to use bonus compensation plans and might wish to report lower earnings for labor negotiating reasons.

Dhaliwal et al. defined OC firms as having one party owning ten percent or more of the voting stock with membership on the board of directors, or one party owning twenty percent of the voting stock. MC firms were defined as no party owning more than five percent of the voting stock. A random sample of forty-two MC and forty-one OC firms was selected from 1962 for this study. Based on previous work, additional variables were added to control for size and debt-to-equity ratio.

The multivariate probit model was significant at the 0.01 level. The independent variables, control (0.03 level), debt-to-equity (0.01 level), and size (0.15 level) were all significant.

In summary, this study provided support for the control and debt-to-equity hypotheses and to a lesser degree for size. If MC firms are more likely to have bonus compensation plans, the results would also support the bonus plan hypothesis. The authors believed that this study also provided support against the theory suggested by Fama (1980), which proposed no difference between managers of MC and OC firms because of the efficient labor market.

Daley and Vigeland Study

The study by Daley and Vigeland (1983) examined the choice by managers to capitalize or expense research and development (R&D) costs. Their study, like Bowen et al. (1981), concentrated on the influence of debt contract constraints and political cost. They used variables from previous studies for debt contracts (i.e., interest coverage

and dividends to unrestricted retained earnings). Based on the assumption that public debt would be more costly to renegotiate, the authors divided the leverage ratio into public and non-public ratios. Political cost was examined by using a size variable.

From 1974, the authors randomly selected 135 firms that capitalized R&D costs and 178 firms that expensed these costs. They hypothesized that firms would more likely select an income increasing accounting method (capitalize R&D costs) if they were closer to debt constraints, had more public debt, or were smaller in size.

Using a Mann-Whitney U-test, all the independent variables were significant at the 0.01 level with the exception of dividend to unrestricted retained earnings. The authors discussed the merits of three different multivariate tests: probit, logit, and a jackknife procedure that used ordinary least squares. The jackknife approach was used because it required less restrictive assumptions (the authors reported that the three methods produced similar results). The multivariate model was significant at the 0.01 level with all independent variables being significant except interest coverage.

The authors also performed certain sensitivity analyses of their model. Of particular interest were the findings related to size. Previous studies had found that the effects of size were more important in explaining choice of accounting method for large firms. When the firms were partitioned into

large and small firm subgroups, size was only significant for the small firms. This suggested that the effect of size is not clearly understood.

In summary, this study expanded the research done on the influence of leverage by adding a variable to reflect public versus private debt. It also produced a result that conflicted with early findings in that size was only significant for small firms.

Ayres Study

The Ayres (1986) study extends previous research on choice of accounting method to a manager's decision to elect early adoption of an accounting standard. In 1981, the FASB issued Statement of Financial Accounting Standards (SFAS) Number 8 related to accounting for foreign currency translation. The statement allowed for a firm to adopt the guidelines in one of three years, 1981, 1982, or 1983. Generally, the impact in 1981 of this new statement was to increase earnings; therefore, the Ayres study focused on the decision to adopt an income increasing standard early as opposed to later (after 1981).

Several of the previously identified influences on a manager's choice of accounting method were used in this study. Variables for size, dividends, unrestricted retained earnings, and long-term debt/total assets were used. A variable was added for control of the firm (see Dhaliwal et al. [1982]) which reflected the percent of stock owned by directors and officers.

Ayres proposed that the interest coverage ratio used in other studies may be affected by a firm's level of debt. He divided the study group into high and low debt subgroups. A variable for the existence of an incentive compensation plan had also been used in several previous studies. The author suggested this approach may have limitations because most companies have some type of bonus plan and many plans are not based on a set formula that uses accounting earnings. Also many plans contained upper and lower bounds for computing the bonus. Based on the work done by Healy (1985), Ayres proposed that managers with lower pre-adoption earnings would be more likely to elect income increasing accounting methods for compensation reasons.

He hypothesized that firms choosing early adoption would be smaller in size, have a lower percentage of stock owned by directors and officers, have lower pre-adoption earnings, and be more constrained by debt covenants.

The sample was drawn from firms listed in the 1981-83 Accounting Trends and Techniques publications of the American Institute of Certified Public Accountants (AICPA). A usable sample of 103 early adopters and 129 later adopters was achieved. Early adopters were identified as firms that made the change in 1981. The results of the univariate Mann-Whitney U-test were that all variables except control and long-term debt to assets were significant at the 0.04 level or lower. A multivariate logistic model was conducted, and the overall model was significant at the 0.0001 level, with all

variables significant at the 0.05 level or lower. The test provided support for the hypothesis suggested by Ayres.

In summary, this study extended positive accounting theory to a decision for early election of an accounting method. It also expanded the research done on bonus compensation plans by examining the effects of earnings on a choice of accounting method.

Wong Study

The study by Wong (1988) extended the research done on political cost to a choice of accounting method that had no impact on the "bottom line," but could have economic consequences. The study examined the way listed New Zealand companies account for the New Zealand export tax credit. The export tax credit was based on export sales that contained domestic products.

New Zealand companies could account for the tax credit in one of two ways: as a reduction in income taxes (tax reduction method) or as a credit to sales (credit method). Both methods would result in the same "bottom line," but the credit method would report a higher tax rate. In the years 1980-85, there was strong public pressure in New Zealand to lower personal tax rates and increase corporate rates. Part of this public pressure was due to the low tax rates reported by firms using the tax reduction method.

The author selected three variables to measure the political influences on the manager's choice of accounting method: tax rate, the ratio of export tax credit to income,

and size. Wong hypothesized that large firms with low tax rates and large export tax credit to income ratios would select the credit method.

Interest coverage constraints could also be affected by this choice of accounting method. Many debt covenants require an interest coverage ratio computed by interest expense/pretax income. This variable was also included in the study.

Wong's study used the firms listed on the New Zealand Stock Exchange in 1984. A usable sample of twenty-nine "credit" firms and sixty-six "tax reduction" firms was obtained. A "t" test indicated that all the variables were significant at the 0.03 level or lower. A multivariate logit analysis was done with all variables being significant.

In summary, this study provided additional support for the political cost assumption in a special situation. It examined a choice of accounting method that was politically sensitive, but did not impact net income. One limitation of the study is that the author did not control for the industry effect which would have reduced the power of the other tests.

Deakin Study

The study by Deakin (1989) examined the decision by managers to lobby for a proposed change in accounting standards. The FASB proposed to eliminate the use of the "full cost" method of accounting for exploration costs by oil and gas companies and to require the use of the "successful effort" method. Companies that changed from the "full cost" method to the other method would likely have earnings reduced.

Deakin suggested that the following factors would influence a manager's decision to lobby: debt contract constraints, management incentive plans, rate regulations, and size of oil and gas exploration expenditures. Categorical variables were used for incentive plans and regulation factors. The author used a scoring variable to capture the effects of (1) the existence of accounting-based debt limits, (2) higher than average debt ratio, and (3) the existence of public debt. The dollar expenditure for oil and gas exploration was used as the remaining variable. Size, taxes, and ownership were not considered significant in this study.

Deakin only examined firms that used the "full cost" method, as they were the only ones to lobby on this issue. His sample method produced twenty-seven firms that lobbied and sixty-seven that did not.

Firms could have lobbied on three different events: the Discussion Memorandum, the Exposure Draft, or the Securities and Exchange Commission (SEC) appeal. Deakin developed a logistic regression model to test for all three events and found it significant at the 0.01 level for all events. The independent variables were all of the predicted sign and were significant for at least one event. No single variable was significant for all three events. Deakin suggested that correlation among the independent variables may explain this finding.

In summary, this study provided additional support for the findings of Watts and Zimmerman (1978) on the decision by

managers to lobby on an accounting issue. The study used firms from one industry and more specific variables than the earlier study by Watts and Zimmerman (1978).

Trombley Study

The study by Trombley (1989) also examined the decision by managers to adopt early a new accounting standard, but focused on a specialized industry, software development firms. In 1985, Statement of Financial Accounting Standards (SFAS) Number 86, "Accounting for the Costs of Computer Software to be Sold, Leased, or Otherwise Marketed," was issued that required the capitalization of certain costs related to the development of software for sale. Managers could elect to adopt this income increasing accounting procedure for their 1985 fiscal year. Beginning with the 1986 fiscal year, the procedure was required for all firms.

In this study, Trombley focused on the influence of size and the role of the auditor. Firms in this industry were relatively small and would not be exposed to much political cost due to size; however, the author proposed that size may still be an important influence. It was assumed that the smaller firms in this industry would rely more heavily on incentive plans and bank debt and would therefore favor income increasing accounting methods.

Trombley also proposed that because the average size of the firms in this industry was small, a firm's auditor might influence the choice of accounting methods. Most of the auditing firms filed comments on this accounting change, and

their preferences were determined from this source. It was proposed that firms that adopted early had auditors with a preference for software capitalization.

Based on previous research, the author added control variables for direction of pre-adoption earnings, ownership control, and debt constraints. The univariate "t" tests found all variables significant except ownership control. A multivariate test using ordinary least squares regression was also significant. Again, all independent variables were significant with the exception of ownership control.

In summary, this study extended positive accounting theory to an industry dominated by smaller firms. It found evidence that the size effect may be related to firm attributes other than political costs. It also found evidence that a smaller firm's auditor may influence a choice of accounting method.

Summary of Literature Review

The study by Watts and Zimmerman (1978) established the positive accounting theory research paradigm. The literature reviewed above captures the major subsequent research developments in this theory, including extension of the theory to managers' choice of accounting methods, refinement in the variables used to represent the factors that influence managers in choice of accounting method decisions, and better control of extraneous variables. These developments are discussed below. At the end of this chapter a summary of the literature review is provided in Table 3.1.

The Watts and Zimmerman study (1978) examined factors that influenced the decision by managers to lobby on a proposed accounting standard. Hagerman and Zmijewski (1979) extended this research to a manager's decision on the choice among accounting methods, which has since dominated the positive accounting theory literature. This research was further extended by Ayres (1986) who examined a decision to adopt early a new accounting standard.

Much of the research has been concerned with refinement of variables used to represent the factors that influence choice of accounting method decisions made by managers. The factors typically fall into four main categories: political costs, regulations, debt contracts, and incentive compensation plans. Several different variables were used in the studies and generally these variables were found to support the hypotheses tested. There were, however, inconsistences in these studies. Not all variables were significant in each study. The variable most often used for political cost (size) even had a sign that was opposite of that predicted for certain groups of firms. Often when a theory is in its early stages of development, the literature is more concerned with reporting regularities than investigating anomalies. This appears to be the case for positive accounting theory.

Control over extraneous variables has improved in the studies. Many of the earlier studies did not control for a possible industry effect. Latter studies used either firms from a single industry or used a matched-pair design to

achieve better control. Zmijewski and Hagerman (1981) tried to consider the effects of other accounting decisions in their study; however, most studies in positive accounting theory only examines the effects of one accounting decision.

In summary, the positive accounting theory literature reports findings that provide general support for the theory. In a ten-year review article, Watts and Zimmerman (1990) made several suggestions about the future research direction for this theory. Included in their suggestions were development of more precise proxy variables to represent political costs, intra-industry studies to achieve better control, and a method or model to deal with the relationships among the packages of accounting policy, financial policy, and organization structure. In examining colleges and universities in this study, an attempt has been made to incorporate the above suggestions in the research design.

Relationship of Previous Studies to This Study

The major difference between this study and previous studies in positive accounting theory is the types of organizations used in the research. This study is designed to determine whether the findings from studies done using for-profit organizations will hold for not-for-profit organizations of colleges and universities. The many differences between these two types of organizations require modifications to the research variables used in other studies. These differences also provide an opportunity to examine previous findings in new ways.

Previous studies in positive accounting theory have focused mostly on a single choice of accounting method decision; however, Zmijewski and Hagerman (1981) proposed that decisions regarding a particular choice of accounting method are not made independently of other accounting decisions. Instead, each decision regarding which accounting method to use is based on an overall financial reporting strategy. Financial statements, therefore, represent the overall effect of several interrelated decisions on accounting methods. The Zmijewski and Hagerman study used a model that incorporated the effects of several different accounting methods. Watts and Zimmerman (1990) suggested that choice of accounting method studies could be improved by considering the relationships among the various packages of accounting methods that affect the "bottom line."

A somewhat different approach to this concern was used by Wong (1988). He examined the unique factors related to a specific choice of accounting method. Because the accounting method Wong examined did not affect the "bottom line," he could examine the factors that were unique to this choice of accounting method. In this manner, the choice of accounting method could be examined independently of the other accounting method decisions of the organization.

This study examines a choice of accounting method that affects the reporting of endowment funds. The performance of an endowment is reported separately from other funds and provides a separate indication of the effectiveness of an

organization's financial management. This aspect of not-for-profit financial reporting provides a unique opportunity to reasonably isolate the effects of this accounting method decision from other accounting methods decisions of the organization.

This study is similar to Deakin (1989) and Trombley (1989) in that it examines organizations from a single industry, a design which tends to limit the number of confounding effects that occur from differences across industries.

Previous studies have used several different variables to represent political costs, regulations, debt contracts, and incentive compensation plans. Several of these variables are not appropriate for colleges and universities, therefore, other variables were selected for this study. Endowment assets and endowment-per-FTE were used as variables for political costs. Most other studies used either sales or assets. A variable was added to reflect whether an organization was publicly or privately controlled. Other studies have added variables to reflect ownership control and regulations. A debt-to-endowment variable was used in this study, which is similar to the debt-to-equity variable used in other studies. Because incentive compensation plans are not used in colleges and universities, an indirect variable was used for this study. Ayres (1986) and Trombley (1989) used prior-year earnings as a variable to represent management compensation. This study will make use of a five-year average

total return on endowment assets to reflect management compensation.

In many ways, this study is similar to previous studies. Its major difference, the type of organizations examined, provides an advantage in isolating the effect of an accounting method decision; however, this requires some modifications to the independent variables used in other studies. Modifications are expected when an existing theory is extended to a new environment.

TABLE 3.1

SUMMARY OF LITERATURE REVIEW

Study	Accounting Method	Explanatory Variables	Results
Watts and Zimmerman [1978]	General price-level changes in financial statements	Size Incentive compensation Effects on earnings Regulation	Used discriminant analysis and found support for only the size variable. The sample used several firms from the oil industry that were under political pressure at the time. Also the proposed accounting standard did not affect the bottom line. This study introduced many of the ideas of positive accounting theory.
Hagerman and Zmijewski [1979]	Inventory Depreciation Investment tax credit Pension costs	Size Industry concentration Risk Capital intensity Incentive compensation	Used probit analysis for each accounting procedure. The model was significant only for depreciation (size, risk, and capital intensity) and inventory (capital intensity and industry concentration).
Dhaliwal [1980]	Exploration costs (full vs successful effort)	Debt-to-equity	Used matched pairs of firms to control for size. Debt-to-equity was significant using "t" tests.

TABLE 3.1 (continued)

SUMMARY OF LITERATURE REVIEW

Study	Accounting Method	Explanatory Variables	Results
Zmijewski and Hagerman [1981]	Inventory Depreciation Investment tax credit Pension costs	Size Industry concentration Risk Capital intensity Incentive compensation Debt-to-equity	Used a model that incorporated all four accounting procedures into an overall income strategy. The results for the probit analysis were significant for all three models (five, seven, and nine strategy cases). The significant explanatory variables were size, industry concentration, incentive compensation, and debt-to-equity. The model used an assumption of equal probability for each strategy; when this was changed, the results were much weaker.
Bowen, Noreen, and Lacey [1981]	Interest expense (expense vs capitalized)	Size Incentive compensation Limits on dividends Limits on interest coverage Limits on leverage	Used "t" tests and multivariate probit analysis. Variables related to debt contracts were significant. Size was significant only for the oil and gas industry and had the opposite sign for the other industries.

TABLE 3.1 (continued)

SUMMARY OF LITERATURE REVIEW

Study	Accounting Method	Explanatory Variables	Results
Dhaliwal, Salamon, and Smith [1982]	Depreciation	Size Debt-to-equity Ownership control	Used probit analysis and found that all variables were significant. Ownership control was either management controlled (MC) or owner controlled (OC), with MC firms preferring income increasing accounting methods.
Daley and Vigeland [1983]	Research and development costs (expense vs capitalized)	Size Limits on dividends Limits on interest coverage Type of debt (public vs private)	Used the Mann-Whitney U-test, with all variables except dividend limit being significant. A jackknife procedure that used ordinary least squares was also employed. The model as well as the explanatory variables were significant (except interest limits). When firms were divided into large and small groups, size was significant only for small firms.

TABLE 3.1 (continued)

SUMMARY OF LITERATURE REVIEW

Study	Accounting Method	Explanatory Variables	Results
Ayres [1986]	Early adopters of SFAS No. 8 on foreign currency translation	Size Limits on dividends Limits on leverage Ownership control Pre-adoption earnings	Used logistic regression and found that all variables were significant. Ownership control was based on per-cent of stock owned by directors and officers. Pre-adoption earnings were used to capture the effects of incen-tive compensations. Income increasing methods would be used if pre-adoption earnings were lower.
Wong [1988]	New Zealand export tax credit	Size Limits on interest Tax rate Tax credit to income	Used logistic regression and found all variables significant. Size, tax rate, and tax credit to income were proxy variables for political cost. Accounting choice did not effect the "bottom line," but had an influence on political costs and debt con-tracts.

TABLE 3.1 (continued)

SUMMARY OF LITERATURE REVIEW

Study	Accounting Method	Explanatory Variables	Results
Deakin [1989]	Elimination of "full cost" accounting treatment for exploration expenditures	Debt covenant constraints Incentive compensation Regulation Exploration expenditures	Used logistic regression to test the influence of the variables on three different events. The model was significant for all three events. The explanatory variables were significant at least in one of the three events. A scoring variable was used for debt constraints that incorporated accounting based debt limits, type and size of debt.
Trombley [1989]	Early adoption of SFAS No. 86 on cost of developing software for sale (expense vs capitalized)	Size Limits on leverage Ownership control Prior year earnings Auditor	Used ordinary least squares regression and found all variables except ownership to be significant. Auditor was included as a variable because of the possible influence of the auditor's preference. Because the average size of firms in this industry was small, the influence of size was not considered to be related to political costs. Smaller firms were found to be early adopters of this income increasing accounting method.

CHAPTER 3

METHODOLOGY

In this chapter, the sample design for this study is first described. The statistical methods for testing the research hypotheses developed in Chapter 1 are then discussed.

Sample Design

There are over 3,300 colleges and universities in the United States. Not all institutions have endowment funds, and those that are endowed have funds of varying amounts. This study is designed to determine the relationship of certain institutional characteristics and the choice of accounting method for endowment investments; therefore, institutions with little or no endowment funds are not included. Specifically, this study is limited to four-year colleges and universities with endowment investments larger than one million dollars.

Information on college and university endowments is available from only a few sources. A major source of financial information about colleges and universities is the United States Department of Education which collects data annually as part of its Integrated Postsecondary Education Data System (IPEDS). Another source of information is the 1989 NACUBO Endowment Study (NES) published by the National

Association of College and University Business Officers (NACUBO). The <u>NES</u>, compiled from data obtained directly from approximately 330 four-year colleges and universities with endowment investments larger than one million dollars, includes information necessary for this study related to endowment size, endowment-per-FTE, "total return," type of institution, investment allocations, spending rates, and location. Some of this information is coded in the <u>NES</u> to maintain confidentiality and is not available from other sources.

Preliminary discussions with NACUBO personnel indicated an interest in this study and a willingness to share information from their <u>NES</u>. The NACUBO data base used for their <u>NES</u> was the only known source for certain information needed for this study; therefore, the 330 colleges and universities listed in the <u>NES</u> became the initial sample for this study.

The <u>NES</u> does not include information related to the amount of institutional debt. This information is, however, gathered annually as part of the United States Department of Education's IPEDS project. The most current information distributed by the Department of Education is for the 1986-87 fiscal year. The National Data Service for Higher Education received an advance copy of the 1987-88 fiscal year IPEDS data tapes from the Department of Education; the information regarding institutional debt was obtained from this source for this study. Ideally, debt information for the 1988-89 fiscal

year would be desirable; however, this information was not available at the time of this study. The impact of using outstanding debt from 1987-88 should not have a major influence on this study because debt structures typically do not change significantly over a one-year period. For example, institutions in the study reported an increase in long-term debt of only 1.1 percent for fiscal year 1987-88. In addition, because this study excludes institutions that changed accounting methods during this time period, any institutions that changed accounting methods due to a change in debt structure in 1988-89 will not be included in the study.

Information on the accounting methods used for endowment investments and the identification of the institution's auditor was collected from a questionnaire since the information was not available from any other sources (see Appendix A). NACUBO sponsored the survey under its letterhead and mailed the questionnaire in September 1990.

The initial sample for this study was the 330 colleges and universities that participated in the NES. As described earlier, additional institutional information was obtained from the IPEDS report and from a separate questionnaire mailed to the same institutions. For an institution to be included in the final sample of this study, several requirements had to be met. The first requirement was that all information for an institution be available from the sources used. Several institutions were not reflected in the

IPEDS report and several others did not have complete information in the NES.

The second requirement for inclusion in this study was that the institution used a reporting date of June 30, 1989 for information submitted to NACUBO. Because the value of investments can change significantly from month to month, a common reporting date was considered necessary for the study.

The third requirement for inclusion in this study was that the institution had not changed its accounting method for investments during the last five years. This requirement was necessary in order to examine the five-year average total return on investments as one of the variables in this study.

The final requirement was that the institution return the questionnaire. As stated earlier, the questionnaire was mailed by NACUBO in September 1990. Telephone follow-ups were done the first two weeks of October 1990. The results of the above procedures are discussed in Chapter 4.

Statistical Methods

As an initial step in analyzing the data in this study, univariate significance tests are used to examine the importance of each variable on the choice of accounting method for endowment investments. A chi-square test of independence is used for the qualitative variables and a "t" test is used for the quantitative variables.

In order to study the simultaneous, or joint, influence of several factors on the choice of accounting method, a multivariate approach is necessary. Previous research in

choice of accounting method has primarily used probabilistic regression (probit), logistic regression (logit), and ordinary least squares (OLS) regression.

In a recent article, Noreen (1988) explored the use of probit and OLS regression in accounting classification studies. OLS regression is based on certain assumptions; specifically, the model is assumed to be linear and the errors are assumed to be normally and independently distributed with zero expectation and a common variance. Accounting classification studies usually have a dichotomous dependent variable which violates certain of the assumptions underlying OLS regression; specifically, the assumptions of the normally distributed errors and constant variance are not met, which can create some statistical problems.

While probit and logit assumptions are not violated by a dichotomous variable, they are more difficult to use and interpret. Noreen compared the results of OLS regression with probit for a simulation model that used explanatory variables typical of those used in many accounting studies. The results indicate that for sample sizes of 50 and 100 the observed level of rejection of the null hypothesis was closer to the nominal level for OLS regression in most cases. The rejection region for the probit model was not well specified, and that OLS produced results at least equal to probit.

In a similar study, Stone and Rasp (1991) compare the choice between logit and OLS regression for accounting choice studies. Experimental results comparing nominal significance

levels with empirical significance levels for logit and OLS regression show that in most cases the empirical levels are closer to the nominal levels for OLS regression. The differences between nominal and empirical levels were not statistically significant for OLS regression with all sample sizes used (50, 100, and 200); however, for sample sizes of 50 and 100, the differences in nominal and empirical levels were significant for logit. One conclusion of this study is that OLS regression performs better than logit for sample sizes of 50 and 100. For sample sizes of 200, logit and OLS regression perform equally well.

Preliminary examination of the data in this research is consistent with other studies that used a dichotomous dependent variable. The standardized residuals (errors) were plotted against the independent variables, which revealed that the residuals were heteroscedastic and non-normal. Exploratory use of probit and logit on the data in this study indicated that these methods did not reveal any information beyond that produced using OLS regression. Based on Noreen's conclusions, the findings of Stone and Rasp, the consistent findings of this exploratory analysis, and the fact that OLS regression is understood by a wider audience, OLS regression was selected as the primary method for the analysis and the reporting of results for this study.

An additional assumption of the OLS regression model is that the explanatory variables should not be highly interrelated, or collinear. Collinearity analysis was

performed to validate this assumption. Results of the collinearity analysis are discussed in Chapter 4.

Objective One

The first objective of this study is to determine if the findings of previous research in positive accounting theory hold true for the choice of accounting method for endowment investments by colleges and universities, which are not-for-profit institutions. To meet this objective, five specific research hypotheses were identified in Chapter 1. Support, or lack of support, for each hypothesis requires determining the influence of certain institutional characteristics on the accounting method used for endowment investments. The accounting method used for investments (cost or FMV) was obtained from the questionnaire.

Hypothesis 1 tests the influence of type of institution on the accounting method used for endowment investments. A categorical variable (TYPE) was used to distinguish between public and private colleges and universities. This information was obtained from the NES.

Hypotheses 2 and 3 test the influence of the size of an institution's endowment and the size of the endowment-per-FTE on the accounting method used for endowment investments, respectively. Information on the size of an institution's endowment (SIZE) and endowment-per-FTE (EFTE) was obtained from the NES.

Hypothesis 4 tests for the influence of total return for an institution's endowment investments on the accounting

method used for endowment investments. The <u>NES</u> lists returns by years as well as cumulatively. This study used the average return (TRET) for the last five years (1985-1989), a time period believed to be sufficient to eliminate any short-term variation in returns due to market conditions. The effects of the 1987 "stock market crash" should also be minimized by using this time period.

Hypothesis 5 tests for the influence of the debt-to-endowment ratio of institutions on the accounting method used for endowment investments. Information related to outstanding debt and fair market value of endowment investments (DEBT/END) was obtained from the IPEDS information for 1987-88 and the <u>NES</u>, respectively.

The following is a summary of variables used to investigate Objective One.

Y = <u>METHOD</u> Accounting method for investments (coded: 0 = cost and 1 = FMV).

X_1 = <u>TYPE</u> An identifier for public and private institutions (coded: 0 = public and 1 = private).

X_2 = <u>SIZE</u> The fair market value of the endowment investments as of June 30, 1989.

X_3 = <u>EFTE</u> The fair market value of the endowment investments-per-FTE as of June 30, 1989.

X_4 = <u>TRET</u> The average total return of the endowment investments for the last five years (1985-1989).

X_5 = <u>DEBT/END</u> The ratio of total long-term debt (June 30, 1988) to the fair market value of the endowment investments (June 30, 1989).

A multiple regression model (Model 1) is used to investigate the first objective of the study. The general

null hypothesis for the first objective is that there is no significant relationship between the variables associated with positive accounting theory research and the choice of accounting method for endowment investments by colleges and universities. Model 1 is as follows:

Model 1

$$Y = A + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + E$$

where:

Dependent Variable

Y = METHOD

Independent Variables

X_1 = TYPE

X_2 = SIZE

X_3 = EFTE

X_4 = TRET

X_5 = DEBT/END

$B_1....B_5$ = coefficients

A = intercept

E = error term

Model 1 examines the joint influence of all variables together on the choice of accounting method. Hypotheses 1-5 focus on the significance of each independent variable in the multiple regression equation for Model 1. The specific null hypothesis for each of the independent variables X_1 - X_5 assumes that the regression coefficient for each variable is not significantly different from 0. Failure to reject the null hypothesis would indicate that the independent variable

is not significantly related to the choice of accounting method for investments.

If the study's findings are consistent with those of previous research on positive accounting theory, the null hypothesis should be rejected and the coefficients of the independent variables should be statistically significant, with the variables TYPE, TRET, and DEBT/END having positive signs, and the variables SIZE and EFTE having negative signs.

Objective Two

The second objective of this study is to determine if certain other institutional characteristics of colleges and universities are associated with the choice of accounting method for endowment investments. The other institutional characteristics included in this study were identified in Chapter 1 and are described below.

The institution's auditor may have an influence on the choice of accounting method for investments. Generally, an individual institution is relatively small when compared to the total group of colleges and universities, and therefore its choice of accounting method may be influenced by the preferences of outside organizations. Specifically, the institution's auditor may influence the choice of accounting method for investments. Two audit firms, KPMG Peat Marwick and Coopers & Lybrand, have a strong presence in the college and university environment. To a lesser extent, other "Big Six" firms also audit a significant number of institutions. A categorical variable was added for auditor (AUDITOR). The

variable has four categories, KPMG Peat Marwick, Coopers & Lybrand, other "Big Six," and all others. The information was obtained from the questionnaire sent to the institutions.

The composition of an institution's endowment investments may also have an influence on the choice of accounting method for investments. Investments in equity as well as in real estate may be more politically sensitive than other types of investments. These investments, which are usually considered more risky than traditional fixed income investments, produce higher returns on which the institutions pay no taxes. This condition may increase the threat of some political action, such as a tax on endowment investment earnings. Variables for the percent of funds invested in equity (% EQUITY) and real estate (% REAL) were used in this study. This information was obtained from the NES.

As part of an overall endowment management program, many institutions have adopted a "spending rate policy." Under such a policy, an institution sets the amount of funds that are available to be expended from the endowment each year, usually based on some function of the fair market value of the endowment investments. A decision to use a spending rate may also influence the decision regarding the choice of accounting method for investments. A variable (SPENDING) was added to the study to reflect the existence of a spending rate policy. This information was obtained from the NES.

Colleges and universities belong to several organizations and associations that are regional in focus. For example,

accreditation associations are organized on a regional basis, and business officers of most institutions generally belong to regional professional organizations. Typically, at these regional meetings, managers exchange ideas on institutional practices that may have an influence on an institution's operation. In addition, there may be some systematic differences in the culture and economic influences of the various regions. Therefore, an institution's location may have an influence on the choice of accounting method. A categorical variable (REGION) was added to the study to determine the effect of location, determined by region (northeast, southeast, midwest, and west), on the choice of accounting method.

The following is a summary of variables used to investigate Objective Two of the study:

Y = <u>METHOD</u> Accounting method for investments (coded: 0 = cost and 1 = FMV).

X_6 = <u>AUDITOR</u> A variable for auditor that reflects one of four groups as discussed earlier. Three dummy variables, <u>AUDITOR1</u>, <u>AUDITOR2</u>, and <u>AUDITOR3</u>, are used to reflect the four groups (coded: 1 0 0 = KPMG Peat Marwick, 0 1 0 = Coopers & Lybrand, 0 0 1 = other "Big Six," and 0 0 0 = all other).

X_7 = <u>% EQUITY</u> The percent of endowment funds placed in equity investments.

X_8 = <u>% REAL</u> The percent of endowment funds placed in real estate.

X_9 = <u>SPENDING</u> The existence of a spending rate policy. (coded: 1 = payout less than 5%, 2 = payout between 5% and 7%, 3 = payout greater than 7%, and 4 = payout of all income).

X_{10} = <u>REGION</u> A variable to reflect location in one of four regions. Three dummy variables, REGION1, REGION2, and REGION3, are used to reflect the four regions (coded: 1 0 0 = northeast, 0 1 0 = southeast, 0 0 1 = midwest, and 0 0 0 = west).

There are, of course, other variables in addition to the ones listed above that may have an influence on the choice of accounting method for investments by colleges and universities. These other variables are considered uncontrolled extraneous variables. The assumption is that all other variables will have no significant impact on the dependent variable. It is possible these variables may vary in a systematic way that will result in confounding effects on the variables under study; however, the research method used should reduce the risk of this occurring. The data selection and variable identification processes described above are designed for that purpose.

A multiple regression model (Model 2) is used to investigate the second objective of the study. The general null hypothesis for the second objective is that there is no significant relationship between the variables representing certain other institutional characteristics and the choice of accounting method for endowment investments by colleges and universities. Model 2 is as follows:

<u>Model 2</u>

$$Y = A + B_6X_6 + B_7X_7 + B_8X_8 + B_9X_9 + B_{10}X_{10} + E$$

where:

<u>Dependent Variable</u>

Y   = METHOD

<u>Independent Variables</u>

X_6 = AUDITOR

X_7 = % EQUITY

X_8 = % REAL

X_9 = SPENDING

X_{10} = REGION

B_6....B_{10} = coefficients

A = intercept

E = error term

Model 2 examines the joint influence of all the variables together on the choice of accounting method. Hypotheses 6-10 focus on the significance of each independent variable in the multiple regression equation for Model 2. The specific null hypotheses for each of the independent variables X_6 - X_{10} assume that the regression coefficient for each variable is not significantly different from 0. Failure to reject the null hypothesis would indicate that the independent variable is not significantly related to the choice of accounting method for investments.

If the identified institutional characteristics are statistically significant, the null hypothesis should be rejected and the coefficients of the independent variables should be statistically significant with the variables % EQUITY and % REAL having negative signs. Specific signs for the coefficients of the variables AUDITOR, SPENDING, and REGION were not predicted.

Combined Model

Both Model 1 (variables X_1 - X_5) and Model 2 (variables X_6 - X_{10}) examine the relationship of certain institutional characteristics on the choice of accounting method for endowment investments. A third regression model (Combined Model), constructed by using all variables from the two models, is used as an exploratory study for this data. The joint influence of all ten variables on the choice of accounting method may reveal information that was not discovered in the two separate models. While the primary focus of this study is Model 1, an investigation into positive accounting theory, Model 2 provides additional information about the choice of accounting method for the institutions studied, colleges and universities. Therefore, it is logical to combine the variables from both models to see if the Combined Model reveals information that may be useful in understanding the influence of these variables on the choice of accounting method for investments.

CHAPTER 4

PRESENTATION AND ANALYSIS OF FINDINGS

The results of the data gathering process and a des-
cription of the data are presented in the earlier pages of
this chapter. These are followed by a presentation of the
hypotheses testing results of Model 1 for Objective One of the
study and then the hypotheses testing results of Model 2 for
Objective Two. Finally, the results of the Combined Model are
reported.

Data Gathering Results

A summary of the results of the data gathering process
used for the study is reported in Table 4.1. For an
institution to be included in the study, the following
requirements had to be met: complete information was
available, the reporting date of June 30, 1989 was used, the
questionnaire was returned, and there was no change in
accounting method for endowment investments in the last five
years. Of the 330 colleges and universities used in the NES,
137 institutions had to be eliminated: 102 because
insufficient data were available from either the IPEDS report
or from the NES; and 35 because the reporting date used to

submit information to NACUBO was other than June 30, 1989. This resulted in an adjusted sample size of 193 institutions.

A questionnaire was mailed to the 193 institutions in the adjusted sample. Responses were received from 136 of these institutions. To increase the response rate, telephone calls were placed to the 57 institutions that did not return the questionnaire. A total of 34 responses were obtained through telephone conversations. Typically, a telephone response could not be obtained because the person responsible for this area was not available at the time. The total number of responses obtained was 170, or 88% (170/193) of the institutions in the adjusted sample.

TABLE 4.1

DATA GATHERING RESULTS

Number of Institutions in the NES	330
Less: Institutions Eliminated Due to:	
Insufficient Data	102
Report Date Other Than June 30, 1989	35
Adjusted Sample Size	193
Number of Completed Questionnaires Returned	136
Plus: Number of Questionnaires Completed by Phone	34
Total Responses	170
Less: Institutions that Changed Accounting Method	8
Total Usable Sample	162

Eight institutions indicated on the questionnaire that their method of accounting for endowment investments had

changed in the last five years. All but one of these institutions changed from the cost method to the FMV method. These institutions were deleted from the sample, resulting in a usable sample of 162 institutions (see Appendix B for a list of institutions). In addition, nine other institutions indicated that they had considered changing their accounting method for investments in the last five years, but had not done so. All nine institutions were using the cost method but had considered the FMV method.

Data Description

In order to better understand the factors that influence the choice of accounting method for endowment investments, some characteristics of the institutions are examined. The data indicate that the 162 institutions in the sample represent a broad range of institutions. For example, Table 4.2 reports information related to an institution's size, measured by its endowment, number of full-time-equivalent (FTE) students, and the endowment-per-FTE.

TABLE 4.2

INSTITUTIONAL SIZE

Measure	Endowment ($000s)	FTE Students	Endowment-Per-FTE
Maximum	4,478,976	73,734	398,369
Third Quartile	185,227	10,579	60,805
Median	69,590	3,088	20,691
First Quartile	30,339	1,562	6,554
Minimum	3,394	419	381

Additional institutional characteristics are summarized in Table 4.3 and Table 4.4.   These tables also report the results of the hypotheses tests that are used to determine if each institutional characteristic is significantly related to the choice of accounting method.

TABLE 4.3

DESCRIPTIVE CHARACTERISTICS FOR QUALITATIVE VARIABLES

Variable: TYPE

Method	Public	Private	Total
Cost	30	99	129
FMV	3	30	33

Chi-square significance 0.071

Variable: AUDITOR

Method	KPMG Peat Marwick	Coopers & Lybrand	Other "Big Six"	All Others	Total
Cost	36	22	42	29	129
FMV	5	15	11	2	33

Chi-square significance 0.002

Variable: REGION

Method	Northeast	Southeast	Midwest	West	Total
Cost	46	30	36	17	129
FMV	21	5	7	0	33

Chi square significance 0.014

Table 4.3 summarizes the number of institutions that use the cost or FMV method according to three qualitative characteristics. The characteristic "type of institution" is identified by the variable TYPE which is used to distinguish

public and private institutions. A second characteristic, the institution's audit firm, is identified by the variable AUDITOR, and is used to classify the audit firm into one of four categories. The third qualitative characteristic, the location of the institution, is identified by the variable REGION, which classifies its location into one of four regional designations.

A chi-square test of independence is used to determine if the choice of method is independent of each of the qualitative characteristics, type of institution, audit firm, and regional location. The chi-square test is valid because all cells have expected frequencies of at least five, except one cell for the variables REGION and AUDITOR. But for these two variables, fewer than twenty percent of the expected frequencies are less than five, thereby validating the use of the chi-square test. The computed chi-square values for the data in Table 4.3 indicate that all three variables have a statistically significant influence on the choice of accounting method for endowment investments at less than the 0.10 level.

Table 4.4 presents descriptive statistics for the quantitative variables used in the study. The variables SIZE and EFTE are used to reflect the size of the endowment and the average endowment per full-time-equivalent student, respectively. The variable TRET is the institution's five-year average return on the endowment and DEBT/END is its debt-to-endowment ratio. The variables % EQUITY and % REAL are used to reflect the percent of the endowment invested in

TABLE 4.4

DESCRIPTIVE STATISTICS FOR QUANTITATIVE VARIABLES

Variables	(-----Cost (n=129)-----)		(-----FMV (n=33)-----)		Level of Signifi-cance for "t" test
	Mean/ Standard Deviation	Minimum/ Maximum	Mean/ Standard Deviation	Minimum/ Maximum	
SIZE *	148.14 290.83	3.39 2483.83	459.67 872.78	12.43 4478.98	0.008
EFTE **	41.12 58.57	0.38 398.37	65.67 71.07	0.81 264.08	0.042
TRET	15.20 3.00	0.40 20.90	16.45 3.24	4.10 20.50	0.038
DEBT/END	0.56 1.21	0.00 10.73	0.36 0.37	0.00 1.61	0.352
% EQUITY	49.42 16.29	0.00 87.80	56.07 7.73	37.40 70.10	0.024
% REAL	2.09 4.42	0.00 35.70	1.68 2.58	0.00 9.90	0.618
SPENDING	1.91 1.48	0.00 4.00	2.12 1.62	0.00 4.00	0.484

* Expressed in $\$10^{-6}$
** Expressed in $\$10^{-3}$

equity funds and real estate, respectively. SPENDING is used to reflect the institution's endowment spending rate policy. A "t" test is often used to determine if there is a significant difference between the means of two groups. A "t" test was performed on each of the variables in Table 4.4 to determine if there is a significant difference in the mean for institutions using FMV and the mean for institutions using the cost method. The results of the "t" test indicate that the means are significantly different at less than the 0.10 level for all variables except DEBT/END, % REAL, and SPENDING. This suggests that the variables SIZE, EFTE, TRET, and % EQUITY influence the choice of accounting method. The "t" test examines the influence of each variable on the choice of accounting method independent of the others. Ordinary least squares (OLS) regression is used in the next section to examine the joint influence of the variables used together.

Empirical Tests for Objective One

Objective One is evaluated by testing the null hypothesis that there is no significant relationship between the variables associated with positive accounting theory research and the choice of accounting method for endowment investments by colleges and universities. OLS regression is used to determine the variables that have an influence on the choice of accounting method for endowment investments. The regression assumption that the independent variables are not collinear is first validated, and then the results of the data analysis are reported.

Collinearity Analysis

An assumption of the regression model is that the explanatory variables are not highly interrelated. The independent variables used for this study represent several different institutional characteristics, and some of these characteristics may be related to others. Relationships among the independent variables is termed collinearity and is common with non-experimental social science data. When the degree of collinearity is large, the variance of the regression coefficients becomes large. This reduces the reliability of tests of significance and makes the regression coefficients unstable. Two measures are used to determine the level of collinearity: variance inflation factors and condition indexes.

The variance inflation factor indicates the degree of relationship between one independent variable (X_j) and all other independent variables. The variance inflation factor (VIF) is computed as follows:

$$VIF_j = 1 / (1 - R_j^2) \quad j = 1,2,...,k$$

where R_j^2 is the multiple coefficient of determination between variable X_j and the other k-1 independent variables. If one independent variable is completely unrelated to the other independent variables, the variance inflation factor would equal one. Kleinbaum et al. (1988 p. 210) state that variance inflation factors greater than ten indicate that collinearity may seriously influence the regression estimates.

Table 4.5 reports the variance inflation factors for Objective One. The variance inflation factors range from 1.1618 to 1.9126 and indicate that the independent variables are unrelated to one another; therefore, collinearity should not seriously influence the regression estimates.

TABLE 4.5

VARIANCE INFLATION FACTORS FOR OBJECTIVE ONE

Variable	Variance Inflation Factor
Intercept	0
TYPE	1.3926
SIZE	1.5682
EFTE	1.9126
TRET	1.1618
DEBT/END	1.2549

Condition indexes provide a second method for detecting collinearity. Condition indexes are determined from the principal component analysis of the independent variables. The principal components, a set of new variables, are linear combinations of the original independent variables. Kleinbaum et al. (1988 p. 212) explain:

> The variances of the these (principal) components are called eigenvalues. The larger the eigenvalue, the more important is the associated principal component in representing the information in the predictor. As an eigenvalue approaches zero, the presence of near collinearity among the original predictors is indicated. The presence of an eigenvalue that is exactly 0 means that a perfect linear dependency exists among the predictors.

The condition index of a principal component is the square root of the ratio of the largest eigenvalue to the eigenvalue

of that individual component. The largest condition index, called the condition number, is a summary measure of the degree of relationship among the independent variables. Belsley et al. (1980 p. 105) indicate that condition indexes of five to ten represent weak relationships, whereas condition indexes of 30 to 100 represent moderate to strong relationships.

Table 4.6 reports the eigenvalues and the condition indexes for Objective One, which range from 1.000 to 15.982. The condition number of 15.982 (largest condition index) suggests reasonably weak relationships among the independent variables.

TABLE 4.6

CONDITION INDEXES FOR OBJECTIVE ONE

Principal Component	Eigenvalue	Condition Index
1	3.792	1.000
2	1.105	1.852
3	0.715	2.302
4	0.258	3.834
5	0.115	5.738
6	0.015	15.982

Belsley et al. (1980 p. 117) suggest that collinearity is potentially harmful only if large condition indexes and large variance proportions occur together. The variance proportion referred to here is a measure of the proportion of the total variance in the estimated regression coefficient that is associated with a particular principal component.

Collinearity is likely to be troublesome if more than one variance proportion loads heavily (greater than 0.5) on a large condition index. Since the condition number of 15.982 in Table 4.6 does not suggest the potential existence of harmful collinearity, the variance proportions are not presented here.

Both VIFs and the condition indexes indicate that harmful collinearity is not present in the regression model for Objective One; therefore, the impact of collinearity on the regression estimates should not be harmful.

Data Analysis

An OLS regression model was used to determine the influence of variables associated with positive accounting theory on the choice of accounting method for endowment investments. The descriptive statistics for the variables used in the regression model are reported in Table 4.7. The dependent variable, Y, is a dichotomous variable with the value 0 used to represent the cost method and the value 1 to represent the FMV method.

The results of the regression model for Objective One are presented in Table 4.8. The joint relationship of several independent variables on the dependent variable is judged by the overall test of significance for the model. The analysis of variance presented in the upper portion of Table 4.8 indicates the regression equation is statistically significant at the 0.0059 level. The regression equation has a multiple coefficient of determination, R^2, of 0.0991 and an adjusted R^2

TABLE 4.7

DESCRIPTIVE STATISTICS FOR OBJECTIVE ONE

(n=162)

Variable	Mean	Standard Deviation	Range
TYPE	0.80	0.40	0, 1
SIZE*	211.60	484.24	3.4 - 4479.0
EFTE**	46.12	61.88	0.4 - 398.4
TRET	15.46	3.08	0.4 - 20.9
DEBT/END	0.52	1.10	0.0 - 10.7

* Expressed in $\$10^{-6}$
** Expressed in $\$10^{-3}$

of 0.0702, which indicates that the independent variables explain almost ten percent of the variation in the choice of accounting method for endowment investments.

An individual test of hypothesis for each independent variable is used to determine which independent variables are significantly related to the choice of accounting method for endowment investment. The lower portion of Table 4.8 shows that three of the five independent variables are statistically significant at less than the 0.10 level. TYPE is significant at the 0.0844 level and TRET is significant at the 0.0882 level, with both variables having the expected sign. SIZE is significant at the 0.0054 level but does not have the expected sign.

As reported, SIZE does not have the expected sign. It was hypothesized that possible political costs would influence the larger institutions to choose the cost method for accounting for investments. If this were true, there would be

TABLE 4.8

REGRESSION ANALYSIS FOR OBJECTIVE ONE

	DF	Sum of Squares	Mean Squares	F	Prob> F
Model	5	2.6028	0.5206	3.43	0.0059*
Error	156	23.6749	0.1518		
Total	161	26.2778			

$$R^2 = 0.0991$$

$$\text{Adjusted } R^2 = 0.0702$$

Variables (Expected Sign)	B Value	Standard Error	T for H_0: B Value= 0	Prob> |T|
Intercept	-0.2253	0.1903	-1.184	0.2383
TYPE (+)	0.1558	0.0897	1.737	0.0844*
SIZE (-)	2.2E-07	7.9E-08	2.822	0.0054*
EFTE (-)	-6.2E-07	6.9E-07	-0.908	0.3651
TRET (+)	0.0184	0.0107	1.715	0.0882*
DEBT/END (+)	0.0026	0.0313	0.082	0.9346

* Significant at the 0.10 Level or Less

an inverse relationship between METHOD and SIZE. However, the sign of the coefficient for SIZE is positive, suggesting a direct relationship. A possible explanation for the results obtained in this study is that the size of endowment has a different meaning for colleges and universities than does the size of sales in for-profit organizations. Zmijewski and Hagerman (1981) found that smaller firms, and firms in less concentrated industries, do not consider political costs in choosing among accounting methods. Bowen, Noreen, and Lacey (1981) also found a positive relationship between size and the choice of an accounting method that increases reported income for firms that are not in a politically sensitive industry. A "threshold" effect has been suggested where only large firms in politically sensitive or highly concentrated industries consider political costs; therefore, colleges and universities appear not to be affected by political costs concerns.

Prior to the data analysis, this study was discussed with representatives from colleges and universities and their opinion was that "bigger was better" when it came to endowment size. Furthermore, they suggested that it was important to an institution's fund raising effort to be able to discuss the size of the endowment fund and to compare the size of endowment funds for similar institutions. The concern over possible political costs was not raised by the representatives from this group. Therefore, the positive coefficient for SIZE may partly be due to the positive effect that a large endowment has on an institution.

EFTE and DEBT/END were not statistically significant; however, both were of the expected sign. EFTE, endowment-per-FTE student, and SIZE, the total value of the endowment, are two different measures of the size of the endowment. SIZE appears to have a stronger relationship on accounting choice than does EFTE. DEBT/END had the smallest "t" value of any variable in the regression model, which suggests that it provides the least influence in the model. It appears that DEBT/END may not be a comparable ratio to the debt-to-equity ratio used by for-profit organizations. In addition, the reliance on debt by colleges and universities appears less important than in the for-profit organizations. For example, the firms in the study by Dhaliwal (1980) had a mean debt-to-equity ratio of 0.68, which indicates a substantially higher reliance on debt than the mean debt-to-endowment ratio of 0.52 (Table 4.7) for the institutions included in this study.

The "t" tests for each individual variable were reported in Table 4.4. There was not a significant difference in the means of cost and FMV for DEBT/END. The difference in means for EFTE was significant at the 0.042 level. This indicates that EFTE provides information in explaining the choice of accounting method, but because it is not significant in the regression model, other independent variables in the OLS regression model are more important in explaining the choice of accounting method.

As a further validation of Model 1, both logit and probit models were examined with the above variables. The results

(see Appendix C) are consistent with the OLS regression model. The same variables that were significant under the OLS model were also significant for logit and probit; however, the level of significance for TYPE and TRET was slightly above the 0.10 level using logit. These findings provide further verification of the results stated for OLS regression.

Summary for Objective One

In summary, the results of the overall OLS regression equation are consistent with the general hypothesis for Objective One, that the choice of accounting method for endowment investments by colleges and universities is influenced by the variables associated with positive accounting theory.

For the specific hypotheses related to the five independent variables, the results were mixed. The hypotheses related to government regulations (TYPE) and bonus compensation provisions (TRET) were supported. The hypothesis related to political costs had two variables in the model, SIZE and EFTE. As explained earlier, SIZE was significant but not of the expected sign. EFTE was not significant in the OLS regression equation but it was significant as an individual variable in the "t" test. It appears the political costs associated with size in for-profit organizations may not have the same effect for colleges and universities. Size appears to be positively correlated with the choice of an accounting method that will increase reported assets and earnings. The hypothesis related to debt covenants (DEBT/END) was not

supported.   Debt does not appear to have a significant influence on the choice of accounting method for endowment investments.

The model did not explain a large amount (R^2 = .0991, see Table 4.8) of the variability observed in the accounting method used by colleges and universities. Watts and Zimmerman (1990) report that in many studies related to positive accounting theory, the explanatory power of the model is low. For example, in the studies reviewed in Chapter 2, the explanatory values, R^2, range from a low of 0.0898 for Zmijewski and Hagerman (1981) to a high of 0.396 for Trombley (1989).   According to Watts and Zimmerman, the real issue is the lack of an alternative model with stronger explanatory value.   The findings here are consistent with the level of explanatory values for other studies on positive accounting theory.

Empirical Tests for Objective Two

Objective Two is evaluated by testing the null hypothesis that there is no significant relationship between the variables   representing   certain   other   institutional characteristics and the choice of accounting method for endowment investments by colleges and universities.   Again, OLS regression is used to determine the variables that have a statistically significant influence on the choice of accounting method for investments. The regression assumption regarding collinearity is first validated and then the data analysis results are reported.

Collinearity Analysis

The assumption regarding collinearity was explained earlier. Variance inflation factors and condition indexes were again used to determine the level of collinearity in the model. The variance inflation factors for Objective Two, reported in Table 4.9, range from 1.0177 to 2.9812, indicating that collinearity should not seriously influence the regression estimates.

TABLE 4.9

VARIANCE INFLATION FACTORS FOR OBJECTIVE TWO

Variable	Variance Inflation Factor
Intercept	0
AUDITOR1	1.9578
AUDITOR2	2.0487
AUDITOR3	1.9403
% EQUITY	1.0401
% REAL	1.0177
SPENDING	1.0343
REGION1	2.9812
REGION2	2.5114
REGION3	2.7394

Table 4.10 reports the condition indexes. The condition number of 13.728 suggests reasonably weak relationships among the independent variables. Since the condition number does not suggest the potential existence of harmful collinearity, the variance proportions are not presented here.

TABLE 4.10

CONDITION INDEXES FOR OBJECTIVE TWO

Principal Component	Eigenvalue	Condition Index
1	4.590	1.000
2	1.307	1.874
3	1.168	1.982
4	0.860	2.311
5	0.803	2.390
6	0.689	2.582
7	0.324	3.766
8	0.140	5.720
9	0.096	6.930
10	0.024	13.728

Both VIFs and condition indexes indicate that harmful collinearity is not present in the regression model for Objective Two; therefore, the impact of collinearity on the regression estimates should not be harmful.

Data Analysis

An OLS regression model was used to determine the influence of variables representing certain other institutional characteristics on the choice of accounting method for endowment investments. The descriptive statistics for the variables used in the regression model are reported in Table 4.11. Dummy variables AUDITOR1, AUDITOR2, and AUDITOR3 used to represent the four classifications of the qualitative variable AUDITOR, likewise REGION1, REGION2, and REGION3 are dummy variables for the four classifications of REGION.

TABLE 4.11

DESCRIPTIVE STATISTICS FOR OBJECTIVE TWO

(n=162)

Variable	Mean	Standard Deviation	Range
AUDITOR1	0.253	0.436	0, 1
AUDITOR2	0.228	0.421	0, 1
AUDITOR3	0.327	0.471	0, 1
% EQUITY	50.774	15.164	0 - 87.8
% REAL	2.005	4.111	0 - 35.7
SPENDING	1.957	1.505	0, 1,..., 4
REGION1	0.414	0.494	0, 1
REGION2	0.216	0.413	0, 1
REGION3	0.265	0.443	0, 1

The results of the regression model for Objective Two are presented in Table 4.12. The joint relationship of several independent variables on the dependent variable is judged by the overall test of significance for the model. The analysis of variance presented in the upper portion of Table 4.12 indicates the regression equation is statistically significant at the 0.0002 level. The regression equation has a multiple coefficient of determination, R^2, of 0.1870 and an adjusted R^2 of 0.1389, which indicates that the independent variables explain over eighteen percent of the variation in the choice of accounting method for investments.

An individual test of hypothesis for each independent variable is used to determine which independent variables are significantly related to the choice of accounting method for investments. The lower portion of Table 4.12 shows that the

TABLE 4.12

REGRESSION ANALYSIS FOR OBJECTIVE TWO

	DF	Sum of Squares	Mean Squares	F	Prob> F
Model	9	4.9146	0.5461	3.88	0.0002*
Error	152	21.3631	0.1405		
Total	161	26.2778			

$$R^2 = 0.1870$$

$$\text{Adjusted } R^2 = 0.1389$$

Variables (Expected Sign)	B Value	Standard Error	T for H_0: B Value= 0	Prob> |T|
Intercept	-0.4729	0.1625	-2.910	0.0042
AUDITOR1	-0.0111	0.0948	-0.118	0.9066
AUDITOR2	0.2894	0.1004	2.882	0.0045
AUDITOR3	0.1032	0.0874	1.180	0.2400
% EQUITY (-)	0.0052	0.0020	2.626	0.0095*
% REAL (-)	-0.0026	0.0073	-0.365	0.7153
SPENDING	0.0307	0.0200	1.537	0.1264
REGION1	0.3455	0.1033	3.345	0.0010
REGION2	0.2484	0.1134	2.190	0.0300
REGION3	0.2388	0.1104	2.163	0.0321

* Significant at the 0.10 Level or Less

institution's spending rate policy (SPENDING) and the percentage of endowment funds invested in real estate (% REAL) are not statistically significant in the model. Institutions appear to invest only a nominal amount in real estate (mean value of 2.005%, see Table 4.11) and this may be the reason the variable is not significant.

The percentage of funds invested in equity (% EQUITY) was significant in the model. It was suggested earlier that investments in equity funds may be "politically" sensitive because higher returns are usually produced on which the institutions pay no taxes; therefore, the expected sign for the coefficient for this variable is negative, but it was not. The variables used to represent political costs in the regression models, SIZE for Objective One and % EQUITY for Objective Two, were significant, but not of the expected sign. Institutions with higher concentrations in equity may experience a large difference between values reported at fair market value and values reported at cost and would therefore likely use fair market value accounting. This may be the reason that the variable, % EQUITY, has a positive sign. It does not appear that colleges and universities are affected by potential political costs in the same manner as for-profit organizations.

As discussed earlier, dummy variables were used to represent the influence of AUDITOR (AUDITOR1, AUDITOR2, and AUDITOR3) and REGION (REGION1, REGION2, and REGION3). The statistical significance of qualitative characteristics, such

as AUDITOR and REGION, is determined through a partial "F" test by examining the group of dummy variables together.

Table 4.3 (page 70) reported the descriptive information for the variable AUDITOR. The four classifications of auditor were reflected as three dummy variables in the regression model. The group of dummy variables for AUDITOR was significant in the regression model at less than the 0.10 level (F = 2.186 using a partial "F" test). This finding is consistent with the chi-square test for AUDITOR presented in Table 4.3. Therefore, it appears that an institution's auditor has an influence on the choice of accounting method. Specifically, it appears from Table 4.3 that institutions were more likely to use FMV if audited by Coopers & Lybrand.

Table 4.3 also reported descriptive characteristics for the variable REGION. The four classifications of region were represented by three dummy variables in the regression model. The group of dummy variables for REGION was significant in the regression model at less than the 0.10 level (F = 3.917 using a partial "F" test). This finding is also consistent with the results of the chi-square test in Table 4.3. The data in Table 4.3 indicate that institutions in the Northeast were more likely to use FMV than institutions in other regions. Region may serve as a proxy for many different influences on the choice of accounting methods. There are many cultural and economic differences between the four regions of the country, and it is difficult to assess accurately the causal impact of region on the choice of accounting method for investments.

As a further validation of Model 2, both logit and probit models were examined with the above variables. The results (see Appendix C) are consistent with the OLS regression model. The same variables that were significant under the OLS model were also significant for logit and probit. These findings provide further verification of the results stated for OLS regression.

Summary for Objective Two

In summary, the results of the overall OLS regression model are consistent with the general hypothesis for Objective Two, that the choice of accounting method for endowment investments by colleges and universities is influenced by certain other institutional characteristics.

The results for the specific hypotheses related to the influence of the independent variables on the choice of accounting method for investments were mixed. The variables used to represent an institution's spending rate and the percentage of funds invested in real estate were not significant. The institution's auditor and the institution's location on a regional level appear to have an influence on the choice of accounting method. The percentage of funds invested in equity was significant, but did not have the expected sign consistent with the political costs hypothesis.

Similar to the results for Objective One, the model did not explain a large amount (R^2 = 0.1870, see Table 4.12) of the variability observed in the accounting method used by colleges and universities, although it was somewhat larger

than the amount of variability explained by the regression model for Objective One.

Empirical Tests for Combined Model

Both Objective One and Objective Two of this study examine the influence of certain variables on the choice of accounting method for endowment investments by colleges and universities. By combining the variables from the models for Objective One and Objective Two, a third model was constructed. The purpose of examining the Combined Model is to see if all variables taken together might reveal information not shown by the two separate models. Again, OLS regression was used to test this model and the regression assumption regarding collinearity was validated using the same tests used for the other two models.

Collinearity Analysis

Variance inflation factors and condition indexes were used to determine the level of collinearity in the model. Table 4.13 reports the variance inflation factors for the Combined Model. The variance inflation factors range from 1.0683 to 3.2641, indicating that collinearity should not seriously influence the regression estimates.

Table 4.14 reports the condition indexes. The condition number of 24.203 suggests reasonable weak to moderate relationships among the independent variables. The examination of variance proportions indicated that both the intercept (0.95) and predictor variable RETURN (0.65) load

highly on the principal component with the smallest eigenvalue. Kleinbaum et al. (1988 p. 215) suggest that centering the data may be helpful in situations like this.

TABLE 4.13

VARIANCE INFLATION FACTORS FOR COMBINED MODEL

Variable	Variance Inflation Factor
Intercept	0
TYPE	1.5648
SIZE	1.7190
EFTE	2.0881
TRET	1.3250
DEBT/END	1.3379
AUDITOR1	2.0415
AUDITOR2	2.2053
AUDITOR3	1.9800
% EQUITY	1.1848
% REAL	1.0683
SPENDING	1.1238
REGION1	3.2641
REGION2	2.5927
REGION3	2.8831

The data were centered by subtracting the mean value from the independent variables and the regression was recomputed with the transformed variables. The collinearity analysis improved significantly with the condition number dropping to 4.4616. This suggests that collinearity should not seriously influence the regression estimates.

Both VIFs and the condition indexes indicate that harmful collinearity is not present in the regression model for the Combined Model; therefore, the impact of collinearity on the regression estimates should not be harmful.

TABLE 4.14

CONDITION INDEXES FOR COMBINED MODEL

Principal Component	Eigenvalue	Condition Index
1	7.165	1.000
2	1.599	2.117
3	1.230	2.414
4	0.990	2.690
5	0.841	2.917
6	0.795	3.002
7	0.724	3.145
8	0.680	3.245
9	0.328	4.671
10	0.243	5.426
11	0.142	7.094
12	0.122	7.648
13	0.086	9.132
14	0.038	13.720
15	0.012	24.203

Data Analysis

An OLS regression model was used to determine the influence of the variables from the Combined Model on the choice of accounting method for endowment investments. The descriptive statistics for the variables used in the regression model were presented in Table 4.7 and Table 4.11.

The results of the regression model for the Combined Model are presented in Table 4.15. The joint relationship of several independent variables on the dependent variable is judged by the overall test of significance for the model. The analysis of variance presented in the upper portion of Table 4.15 indicates the regression equation is statistically significant at the 0.0004 level. The regression equation has a multiple coefficient of determination, R^2, of 0.2250 and an adjusted R^2 of 0.1512, which indicates that the independent variables explain over twenty percent of the variation in the choice of accounting method for investments.

The individual test of hypothesis for each independent variable is reported in the lower portion of Table 4.15. Not all the variables that were significant in Model 1 and Model 2 remained significant in the Combined Model. Specifically, the variables TRET and TYPE are not significant here. This indicates the two variables provide redundant information to what is already explained by other variables in the regression model.

In addition, a variable which was not significant in Model 2, SPENDING, became significant in the Combined Model. This indicates that the variable SPENDING is interacting with other variables in the model which can occur when low to moderate collinearity is present.

Using a partial "F" test, the group of dummy variables related to AUDITOR was significant at the 0.025 level and the group of dummy variables related to REGION was significant at

TABLE 4.15

REGRESSION ANALYSIS FOR COMBINED MODEL

	DF	Sum of Squares	Mean Squares	F	Prob> F
Model	14	5.9118	0.4223	3.05	.0004*
Error	147	20.3660	0.1385		
Total	161	26.2778			

$$R^2 = 0.2250$$

$$\text{Adjusted } R^2 = 0.1512$$

Variables (Expected Sign)	B Value	Standard Error	T for H_0: B Value= 0	Prob> |T|
Intercept	-0.5686	0.2267	-2.508	0.0132
TYPE (+)	0.0808	0.0908	0.890	0.3749
SIZE (-)	1.7E-07	7.9E-08	2.092	0.0382*
EFTE (-)	-2.2E-07	6.8E-07	-0.327	0.7444
TRET (+)	0.0063	0.0110	0.573	0.5675
DEBT/END (+)	-0.0039	0.0309	-0.125	0.9007
AUDITOR1	-0.0344	0.0961	-0.358	0.7205
AUDITOR2	0.2255	0.1034	2.180	0.0308
AUDITOR3	0.0788	0.0877	0.899	0.3702
% EQUITY (-)	0.0044	0.0021	2.112	0.0364*
% REAL (-)	-0.0055	0.0074	-0.740	0.4602
SPENDING	0.0393	0.0207	1.903	0.0590*
REGION1	0.2939	0.1073	2.739	0.0069
REGION2	0.2152	0.1144	1.881	0.0619
REGION3	0.2247	0.1125	1.998	0.0476

* Significant at the 0.10 Level or Less

less than the 0.010 level. The signs of all the individual variables in the Combined Model were consistent with the two earlier models, with the exception of the variable DEBT/END. The sign of a variable with a very low level of significance (DEBT/END) is unstable and can change when additional variables are added to the model.

As a further validation of the Combined Model, both logit and probit models were examined with the above variables. The results (see Appendix C) are consistent with the OLS regression model. The same variables that were significant under the OLS model were also significant for logit and probit with the exception of the variable SPENDING (0.1453 for probit and 0.1277 for logit). These findings provide further verification of the results stated for OLS regression.

Summary for Combined Model

In general, the results of the overall OLS regression for the Combined Model provide support for the influence on the variables identified in Model 1 and Model 2 on the choice of accounting method for endowment investments by colleges and universities. The results of the tests of significance for the individual independent variables were mixed. Two of the significant variables in earlier models were not significant and one variable not previously significant became so in the Combined Model. This indicates that some variables from Model 1 and 2 provide somewhat redundant information and there is a moderate amount of collinearity among the variables.

Summary of Empirical Tests for All Models

The first two models were designed to determine if certain factors are associated with the accounting method used for endowment investments. The variables selected to represent these factors were based on previous research in positive accounting theory (Model 1) and from discussions with representatives from higher education (Model 2). It was hypothesized that these variables have an influence on the choice of accounting method for endowment investments by colleges and universities. The results of the regression analysis indicate that the variables in both Model 1 and Model 2 explain a statistically significant amount of the variation in the accounting method used for endowment investments. The variables from the two models were combined into a third model, which was also significant in explaining the choice of accounting method for endowment investments.

The results for each independent variable were mixed. Not all variables were significant and not all of the coefficients had the expected signs. The findings of this study and the conclusions reached are discussed further in the following chapter.

CHAPTER 5

SUMMARY, CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

This chapter presents a summary of the study, the conclusions reached, and the limitations of the study. Some recommendations for future research are also presented.

Summary

The choice among alternatives in accounting methods has received significant attention in the research literature over the last thirteen years. Watts and Zimmerman (1978) proposed a positive accounting theory that examines managers' economic incentives in selecting among accounting methods. The theory is used to explain the choice of accounting methods on the basis of certain institutional characteristics.

This study represents an initial attempt to extend positive accounting theory research methodology to the not-for-profit environment. In examining the choice of accounting method for endowment investments by colleges and universities, the study had three objectives. The first objective was to determine if the findings in positive accounting theory hold true for the choice of accounting method for endowment investments for not-for-profit colleges and universities. The second objective was to determine if certain other

institutional characteristics are associated with the choice of accounting method for endowment investments. The third objective was to provide policymakers information regarding accounting for long-term investments by not-for-profit organizations.

Certain variables used in previous positive accounting theory research were not appropriate in the not-for-profit setting; therefore, modifications of these variables were made for the study, and they are as follows: The variable used to represent political costs concerns was the market value of the endowment. The variable used to represent the bonus plan provisions influence was the five-year average total return on the endowment, and the debt-to-endowment assets ratio was used as the variable to represent the influence of debt covenants.

The study, in examining the choice of accounting method decision by managers in colleges and universities, has certain advantages. By examining institutions from one industry, the study controls for possible systematic differences that can occur among firms from different industries. In addition, because endowment funds for colleges and universities are reported in a separate fund group, the study reasonably isolated the dependent variable from other accounting method decisions related to the financial "bottom line."

To test the first two objectives, two models were developed with the appropriate variables; the independent variables of interest were:

<u>Positive accounting theory variables</u>

TYPE = Public vs private institutions

SIZE = Size of endowment

EFTE = Endowment-per-FTE

TRET = Five-year average total return

DEBT/END = Long term debt-to-endowment

<u>Other institutional characteristics</u>

AUDITOR = Institution's auditor

% EQUITY = Percentage invested in equity investments

% REAL = Percentage invested in real estate

SPENDING = Spending rate policy

REGION = Location in one of four regions

A positive relationship was hypothesized between TYPE, TRET, and DEBT/END and the use of FMV accounting for investments and a negative relationship was hypothesized for SIZE, EFTE, % EQUITY, and % REAL and the use of FMV accounting for investments. No specific relationship was hypothesized for AUDITOR, SPENDING, and REGION.

OLS regression was used to test the two models; both models were significant at the 0.01 level or less. The results support the general hypothesis that both groups of variables are statistically significant in explaining the choice of accounting method for endowment investments by colleges and universities.

In the first model, the variables EFTE and DEBT/END were not statistically significant, but the coefficients were

consistent with the expected sign. It appears that the information provided by EFTE is redundant with that provided by other variables in the model. The relatively low level of debt for colleges and universities may explain the insignificance of the DEBT/END variable. The variables TYPE and TRET were statistically significant and the coefficients were of the expected sign.

The variable SIZE was statistically significant, but the coefficient was not consistent with the expected sign. Political costs considerations do not appear to influence the choice of accounting methods in the same manner as they do for for-profit organizations. A "threshold" effect has been suggested by Zmijewski and Hagerman (1981) and Bowen et al. (1981) where only large firms in politically sensitive or highly concentrated industries consider political costs, and therefore, colleges and universities would not be affected by political costs concerns. The results indicated that for endowment funds a "bigger is better" influence may be present.

In the second model, the variables % REAL and SPENDING were not statistically significant. The low concentration of investments in real estate by colleges and universities may explain the insignificance of the % REAL variable, although the coefficient was of the expected sign. The spending rate policy of an institution, represented by the variable SPENDING, also was not statistically significant. It appears that the decision regarding the spending rate is not

significantly related to choice of accounting method for the underlying endowment investments in Model 2.

The dummy variables used to represent AUDITOR and REGION were statistically significant at less than the 0.10 level. The variable % EQUITY was also statistically significant but the coefficient was not of the expected sign. Institutions with a large concentration in equity funds appear to prefer reporting investments under the FMV method, which is inconsistent with the relationship suggested by concentrations in politically sensitive investments and the threat of some political action.

The Combined Model was developed by using all the variables from both Model 1 and Model 2. The Combined Model was statistically significant at the 0.0004 level. The independent variables SIZE, % EQUITY, and the groups of dummy variables used to represent AUDITOR and REGION were statistically significant at less than the 0.025 level in the Combined Model as well as an earlier model. However, two of the independent variables significant in an earlier model, TYPE and TRET, were not statistically significant in the Combined Model. This indicates that both variables (TYPE and TRET) provide information in the model that is redundant with other variables. The variable SPENDING which was not significant in an earlier model was significant in the combined model.

The coefficient signs of all the independent variables remain consistent with the results of the two individual

models, with the exception of the variable DEBT/END. Overall, the Combined Model explains more of the differences observed in accounting for endowment investments than the two individual models, indicating that both sets of variables have a significant influence on the choice of accounting method for endowment investments.

The results from the three models provide information regarding relationships between certain institutional characteristics and the choice of accounting methods for endowment investments. This insight should be useful to policymakers considering the treatment of investments for not-for-profit organizations.

Conclusions

The results of the three models support the association of certain institutional characteristics and the choice of accounting method in a not-for-profit environment. This finding is generally consistent with previous positive accounting theory studies [Watts and Zimmerman (1986), Ayres (1986), Wong (1988), Deakin (1989), and Trombley (1989)] that reports the influence of certain variables on the choice of accounting methods. Certain other institutional characteristics were also associated with the choice of accounting method.

Positive accounting theory suggests that four factors influence the choice of accounting method: government regulations, political costs, bonus plan provisions, and debt covenants. Overall the results of the Model 1 provide support

for the influence of these variables in the not-for-profit environment. The effect of the individual variables is discussed below.

The government regulations hypothesis suggests that institutions that are regulated are negatively related with accounting methods that increase reported income. Support for this hypothesis was found in studies of for-profit firms by Watts and Zimmerman (1978), Deakin (1989), and Wong (1988). This study found that public institutions, which face the possibility of some type of government action, are negatively related to an accounting method that reports higher returns and asset values. This finding provides new support for the influence of government regulations suggested by positive accounting theory.

The political costs hypothesis suggests that relatively larger institutions are negatively related with accounting methods that increase reported income. Support for this hypothesis was found in studies of for-profit firms by Watts and Zimmerman (1978), Daley and Vigeland (1983), Ayres (1986), and Wong (1988). This study found that the relative size of an institution is positively related to an accounting method that reports higher returns and asset values, which is inconsistent with the political costs hypothesis. It appears that institutions are influenced by a "bigger is better" factor and that a "threshold" effect may also be present for this type of not-for-profit organization. The "threshold" effect is consistent with the findings of Zmijewski and

Hagerman (1981) and Bowen et al. (1981), who found that only large firms in politically sensitive or highly concentrated industries are influenced by political costs concerns.

The bonus plan provisions hypothesis suggests that institutions with management bonus compensation plans are positively related to accounting methods that increase reported income. Support for this hypothesis was found in studies of for-profit firms by Zmijewski and Hagerman (1981), Dhaliwal et al. (1982), Healy (1985), Ayres (1986), and Deakin (1989). In studies where earnings were used to represent the influence of a bonus plan [Trombley (1989) and Ayres (1986)], managers who experienced a decline or had a relatively smaller percent increase in earnings were more likely to elect early adoption of an income increasing accounting method. This study found that return on investments, used to represent this factor, is positively related to the choice of accounting method that reports higher returns and asset values, which is consistent with the bonus plan provisions hypothesis.

The debt covenants hypothesis suggests that institutions with relatively higher debt-to-equity ratios are positively related with accounting methods that increase reported income. Support for this hypothesis was found in studies of for-profit firms by Dhaliwal (1980), Zmijewski and Hagerman (1981), Bowen et al. (1981), Dhaliwal et al. (1982), Daley and Vigeland (1983), Ayres (1986), Wong (1988), Trombley (1989), and Deakin (1989). This study found the debt-to-endowment assets ratio, used to measure this factor, not to be significant. The data

indicate that the level of debt is significantly less for colleges and universities than it is for for-profit organizations and therefore has less influence on the choice of accounting method.

In conclusion, the study supports the extension of positive accounting theory research methodology in the not-for-profit environment. Model 1 was statistically significant in explaining the differences observed in choice of accounting method for endowment investments. The government regulations and bonus plan provisions hypotheses were supported. The political costs hypothesis was not supported, and size appears to have a different influence on the choice of accounting method. The debt covenants do not have a significant influence on choice of accounting method.

The second model developed in the study examined the influence of certain other institutional characteristics on the choice of an accounting method for endowment investments by colleges and universities. These characteristics were identified from discussion with representatives from colleges and universities. Overall, the results of Model 2 provide support that these characteristics influence the choice of accounting method for endowment investments. The effects of the individual variables are discussed below.

Trombley (1989) suggested that a firm's auditor may have an influence on the choice of an accounting method, especially in an industry made up of relatively small firms. Based on this finding, a variable was added to the study to reflect the

institution's auditor. The results indicate that the auditor effect was statistically significant for colleges and universities. Institutions that were audited by a "Big Six" firm (especially Coopers & Lybrand) were more likely to use FMV accounting than those audited by some other firm.

It was suggested that the composition of an institution's endowment may have an influence on the choice of accounting method. It was hypothesized that higher concentrations of endowment investments in "politically sensitive" assets would influence an institution to select an accounting method that would report lower returns and asset values. The study found the opposite effect for investments in equity funds, and investments in real estate were not significant. Again, political costs concerns do not appear to have a significant influence on the choice of accounting method for colleges and universities.

Institutions must determine a spending rate policy for endowment funds, which can range from spending a modest level (less than five percent of market value) to spending all income from the endowment. It was suggested that the institution's spending rate policy may have an influence on the choice of accounting method for investments. The study found mixed results for the influence of a spending rate policy. There was a significant relationship between spending rate policy and the choice of accounting method for endowment investments for the Combined Model, but not for Model 2. The positive sign of the coefficient indicates that institutions

that spend a relatively larger amount of their endowment earnings are more likely to use FMV accounting method for investments than are firms that spends a relatively smaller amount.

It was suggested that the location of an institution may have an influence on the choice of accounting method. For example, institutional managers belong to related regional professional organizations where ideas are often exchanged, which may have an influence on institutional practices and procedures. In addition, location may serve as a proxy for some systematic social and economic differences among regions. The results of the study indicate a difference among regions on the choice of accounting method for endowment investments.

In conclusion, the results of the study provide support for the influence of certain other institutional characteristics on the choice of accounting methods. Specifically, the institution's auditor, location, and concentration of investments in equity funds have a statistically significant influence on the choice of accounting methods for endowment investments.

Limitations

Several limitations of this study are similar to those of other studies in positive accounting theory. Watts and Zimmerman (1990) identified several limitations that are discussed below. In addition, limitations unique to this study are discussed.

Overall, most studies in positive accounting theory have relatively low explanatory values, as was the case for this study. Watts and Zimmerman suggest that this is due to problems with model specification, problems with specifying the left-hand-side and right-hand-side variables, and omitted variables, which are discussed below.

Watts and Zimmerman identified two problems with the model specification. First, the model examines the effects of compensation plans, debt agreements, and the political process on the wealth of a manager via the choice of accounting method. The variables can represent both efficiency and opportunism on the part of management. The model interprets the compensation plan as only managerial opportunism. Second, problems with the model specification result from ignoring the interactive effects of the independent variables. The compensation plan may suggest one type of action by management, while the debt agreements and political process may suggest a different action. The model assumes the independent variables are additive and ignores the interactive effects.

The major problem with the left-hand-side variable is the focus on a single method choice variable. As was explained earlier, managers make accounting method choice decisions as part of an overall reporting strategy. When the left-hand-side variable represents only one accounting choice, the effect of other accounting decisions is ignored. This study compensates somewhat for this limitation because the endowment

fund is reported separately; therefore, the effect of the choice of accounting method is isolated from other accounting method decisions.

The major problem with the right-hand-side variables is that the variables are not properly measured. For example, size, used to measure political sensitivity, may be a surrogate for other institutional characteristics. Debt-to-endowment is an imprecise measurement of the effects of debt agreements, and prior returns is also an imprecise measure of management compensation.

Possible omitted variables in the model present another limitation of studies in positive accounting theory. There may be other factors that influence managers' wealth that are not included in the model. One such influence, the systematic difference in industry, is controlled in this study because it examines institutions from only one industry.

There may also be omitted variables outside the factors considered by positive accounting theory that have an influence on the choice of accounting methods. These variables may have no impact on the wealth of a manager but may be significant in explaining the choice of accounting method. This study examined several such variables; however, there may be others.

Another limitation of this study is the potential bias introduced by the data gathering methods employed. The NES includes a majority of colleges and universities with significant endowments. The study's final sample represented

only colleges and universities from the NES that also provided other needed information. Furthermore, the institution must have responded to the questionnaire. The final sample of 162 institutions represents forty-nine percent (162/330) of the institutions in the NES. Data availability constraints precluded a more extensive study sample.

Finally, the data used for institutional debt were from fiscal year 1987-88, because the data from fiscal year 1988-89 were not available. The results of the regression equations indicated that the variable DEBT/END had the least amount of influence on the choice of accounting method for endowment investments. Thus, the effect of using the institutional debt from 1987-88 appear to have little impact on the study.

Recommendations

The study provides a basis for some interesting future research. The study represents an initial attempt to extend positive accounting theory research to a choice of accounting method in a not-for-profit organization. The results indicate systematic differences in an accounting method used by colleges and universities and certain factors identified in previous positive accounting theory research. Thus, not-for-profit institutions provide a relatively unexplored area for future research related to positive accounting theory.

The not-for-profit environment provides some unique situations to test positive accounting theory. For example, in this study it was possible to reasonably isolate the dependent variable, choice of accounting method for endowment

investments, because of the use of fund accounting. There may be other such situations in the not-for-profit environment since there are several different types of not-for-profit organizations and several different reporting formats.

The results of the study indicate a different effect for size than would be expected from the political costs hypothesis; there is a need for a more thorough investigation of the size effect in the not-for-profit environment. The "auditor" effect was also significant and further research is needed to determine the role of the auditor on accounting decisions in industries that are not highly concentrated.

Investment in equity funds had significant influence on the choice of accounting method for endowment investments which indicates that the accounting method used and the allocation strategy of the underlying assets are related. Further investigations of these types of relationships may provide additional insight into accounting method decisions. Additional research is also warranted in determining the effect of location and spending policy on the choice of accounting method.

The not-for-profit environment may also provide some unique situations to test for the influence of government regulation and the political process. This study provides one example of how the type of organization can influence a choice of accounting method.

In addition to the variables related to positive accounting theory, the study included several other variables

in the examination of the choice of accounting method, identified from discussion with representatives from colleges and universities. There may be other variables that influence the choice of accounting methods and the variables may vary among the different types of not-for-profit organizations. Additional research is needed to determine which institutional characteristics have an influence on choice of accounting methods.

LIST OF REFERENCES

LIST OF REFERENCES

Ayres, F. L. 1986. Characteristics of Firms Electing Early Adoption of SFAS 52. _Journal of Accounting and Economics_ (June): 143-158.

Ball, R. J. 1972. Changes in Accounting Techniques and Stock Prices, Empirical Research in Accounting: Selected Studies. _Journal of Accounting Research_ (Supplement): 1-38.

_____, and P. Brown. 1968. An Empirical Evaluation of Accounting Income Numbers. _Journal of Accounting Research_ (Autumn): 159-178.

_____, and G. Foster. 1982. Corporate Financial Reporting: A Methodological Review of Empirical Research, Studies on Current Research Methodologies in Accounting: A Critical Evaluation. _Journal of Accounting Research_ (Supplement): 663-682.

Belsley, D. A., E. Kuh, and R. E. Welsh. 1980. _Regression Diagnostics: Identifying Influential Data and Sources of Collinearity_. New York: John Wiley & Sons.

Bowen, R., E. Noreen, and J. Lacey. 1981. Determinants of the Corporate Decision to Capitalize Interest. _Journal of Accounting and Economics_ (August): 151-179.

Chow, C. W. 1982. The Demand for External Auditing: Size, Debt, and Ownership Influences. _Accounting Review_ (April): 272-291.

Christenson, C. 1983. The Methodology of Positive Accounting. _Accounting Review_ (January): 1-22.

Christie, A. A. 1990. Aggregation of Test Statistics: An Evaluation of the Evidence on Contracting and Size Hypotheses. _Journal of Accounting and Economics_ (January): 15-36.

Daley, L. A., and R. L. Vigeland. 1983. The Effects of Debt Covenants and Political Costs on the Choice of Accounting Methods: The Case of Accounting for R&D Costs. _Journal of Accounting and Economics_ (December): 195-211.

Deakin, E. B. 1989. Rational Economic Behavior and Lobbying on Accounting Issues: Evidence from the Oil and Gas Industry. _Accounting Review_ (January): 137-151.

Dielman, T. E. 1991. _Applied Regression Analysis for Business and Economics_. Boston: PWS-Kent Publishing Company.

Dhaliwal, D. 1980. The Effects of the Firm's Capital Structure on the Choice of Accounting Methods. _Accounting Review_ (January): 78-84.

_____, G. Salamon, and E. Smith. 1982. The Effects of Owner Versus Management Control on the Choice of Accounting Methods. _Journal of Accounting and Economics_ (July): 41-53.

Duke, J. C., and H. G. Hunt III. 1990. An Empirical Examination of Debt Covenant Restrictions and Accounting-Related Debt Proxies. _Journal of Accounting and Economics_ (January): 45-63.

Fama, E. F. 1980. Agency Problems and the Theory of the Firm. _Journal of Political Economy_ (April): 288-307.

Financial Accounting Standards Board (FASB). 1990. _Exposure Draft_. Disclosures about Market Value of Financial Instruments. Stamford, Connecticut: FASB.

_____. 1976. _Statement of Financial Accounting Standards Number 12_. Accounting for Certain Marketable Securities. Stamford, Connecticut: FASB.

_____. 1990. _Statement of Financial Accounting Standards Number 105_. Disclosure of Information about Financial Instruments with Off-Balance-Sheet Risk and Financial Instruments with Concentrations of Credit Risk. Stamford, Connecticut: FASB.

Gordon, M. J. 1964. Postulates, Principles and Research in Accounting. _Accounting Review_ (April): 251-263.

Hagerman, R. L., and M. Zmijewski. 1979. Some Economic Determinants of Accounting Policy Choice. _Journal of Accounting and Economics_ (August): 141-161.

Harris, C. 1990. NACUBO Report: Time to Seek a Newer World. _Business Officer_ (August): 67-88.

Healy, P. M. 1985. The Effects of Bonus Schemes on Accounting Decisions. _Journal of Accounting and Economics_ (April): 85-107.

Holthausen, R. W. 1981. Evidence on the Effect of Bond Covenants and Management Compensation Contracts on the Choice of Accounting Techniques: The Case of the Depreciation Switch-Back. _Journal of Accounting and Economics_ (March): 73-109.

_____. 1990. Opportunistic Behavior, Efficient Contracting, and Information Perspectives. _Journal of Accounting and Economics_ (January): 207-218.

_____, and R. Leftwich. 1983. The Economic Consequences of Accounting Choice: Implications of Costly Contracting and Monitoring. _Journal of Accounting and Economics_ (August): 77-117.

Hong, H., R. S. Kaplan, and G. Mandelker. 1978. Pooling vs Purchase: The Effects of Accounting for Mergers on Stock Prices. _Accounting Review_ (January): 31-47.

Jaschik, S. 1990. As Probe of Tuition Ends Its First Year, Colleges are Confused, Cautious. _Chronicle of Higher Education_ (15 August): 1.

Jensen, M. C., and W. H. Meckling. 1976. Theory of the Firm: Management Behavior, Agency Costs and Ownership Structure. _Journal of Financial Economics_ (October): 305-360.

Kaplan, R. S., and R. Roll. 1972. Investors Evaluation of Accounting Information: Some Empirical Evidence. _Journal of Business_ (April): 225-257.

Kelly, L. 1983. The Development of a Positive Theory of Corporate Management's Role in External Financial Reporting. _Journal of Accounting Literature_ (Spring): 111-150.

Kleinbaum, D, G., L. L. Kupper, and K. E. Muller. 1988. _Applied Regression Analysis and Other Multivariable Methods_. 2d ed. Boston, Massachusetts: PWS-Kent Publishing Company.

National Association of Colleges and University Business Officers. 1990. _1989 NACUBO Endowment Study_. Prepared by Cambrige Associates, Inc. Washington, D. C.: National Association of Colleges and University Business Officers.

Mckee, A. J., Jr., T. B. Bell, and J. R. Boatsman. 1984. Management Preferences over Accounting Standards: A Replication and Additional Tests. _Accounting Review_ (October): 647-659.

McLaughlin, J. K., and A. Farley. 1989. Not-For-Profit Financial Reporting. _Journal of Accountancy_ (April): 77-89.

Moses, O. D. 1987. Income Smoothing and Incentives: Empirical Tests Using Accounting Changes. _Accounting Review_ (April): 358-377.

Noreen, E. 1988. An Empirical Comparison of Probit and OLS Regression Hypothesis Tests. _Journal of Accounting Research_ (Spring): 119-133.

Peat Marwick Mitchell & Company. 1985. _Principles & Presentation: Higher Education_. New York: Peat Marwick.

Smith, C. W., and J. B. Warner. 1979. On Financial Contracting: An Analysis of Bond Covenants. _Journal of Financial Economics_ (June): 117-161.

Sterling, R. R. 1990. Positive Accounting: An Assessment. _Abacus_ (September): 97-135.

Stone, M., and J. Rasp. 1991. Tradeoffs in the Choice Between Logit and OLS for Accounting Choice Studies. _Accounting Review_ (January): 170-187.

Sunder, S. 1973. Relationship Between Accounting Changes and Stock Prices: Problems of Measurement and Some Empirical Evidence. _Journal of Accounting Research_ (Supplement): 1-45.

Trombley, M. A. 1989. Accounting Method Choice in the Software Industry: Characteristics of Firms Electing Early Adoption of SFAS No. 86. _Accounting Review_ (July): 529-538.

_____. 1990. A Reply to "A Comment on 'Accounting Method Choice in the Software Industry'." _Accounting Review_ (October): 955-959.

U. S. Department of Education. 1988. _Integrated Postsecondary Education Data System Financial Statistic Survey Fiscal 1988_. [Washington, D. C.]: U. S. Department of Education.

Van Matre, J. G., and G. H. Gilbreath. 1987. _Statistics for Business and Economics_. 3d ed. Plano, Texas: Business Publications, Inc.

Watts, R. 1978. Systematic "Abnormal" Returns After Quarterly Earnings Announcements. _Journal of Financial Economics_ (June-September): 127-150.

_____, and J. Zimmerman. 1978. Towards a Positive Theory of the Determinations of Accounting Standards. _Accounting Review_ (January): 112-134.

_____, and J. Zimmerman. 1979. The Demand for and the Supply of Accounting Theories: The Market for Excuses. _Accounting Review_ (April): 273-305.

_____, and J. Zimmerman. 1990. Positive Accounting Theory: A Ten Year Perspective. _Accounting Review_ (January): 131-156.

_____, and J. Zimmerman. 1986. _Positive Accounting Theory_. Englewood Cliffs, New Jersey: Prentice-Hall.

Whittington, G. 1987. Positive Accounting: A Review Article. _Accounting and Business Research_ (Autumn): 327-336.

Williams, P. F., K. B. Frazier, and A. J. Mckee, Jr. 1990. A Comment on "Accounting Method Choice in the Software Industry." _Accounting Review_ (October): 946-954.

Wong, J. 1988. Political Costs and an Intraperiod Accounting Choice for Export Tax Credit. _Journal of Accounting and Economics_ (April): 36-51.

Zmijewski, M., and R. Hagerman. 1981. An Income Strategy Approach to the Positive Theory of Accounting Standard Setting/Choice. _Journal of Accounting and Economics_ (August): 129-149.

APPENDIX A

QUESTIONNAIRE AND COPY OF COVER LETTER

COPY OF COVER LETTER

NACUBO

September 11, 1990

Dear NES Participant:

Let me first encourage you to complete the *1990 NACUBO Endowment Questionnaire* that was sent to you a short time ago. The importance and circulation of the *NACUBO Endowment Study* has increased substantially over the last few years in large measure because of your willingness to provide us with your institution's endowment performance data. Thanks for your ongoing cooperation in this project.

I would also ask your indulgence in answering the attached inquiry regarding the accounting method used to value your endowments. The Financial Accounting Standards Board (FASB) asked NACUBO to obtain this information right after the larger survey instrument had been mailed. I ask that you answer the following survey and return it directly to me at the following address:

> Robin Jenkins
> Financial Management Center
> ████████
> ████
> ████████
> ████████

If you should have any questions regarding this inquiry, please feel free to call me at ███ ███
████

The *NES Questionnaire* should be returned in the usual manner to Cambridge Associates.

Thanks again for your assistance.

Sincerely,

Robin Jenkins

Enclosure

QUESTIONNAIRE

NACUBO
ACCOUNTING METHOD STUDY
ENDOWMENT FUNDS

1. Name of institution _____

2. In the institution's balance sheet, what accounting method is used to report investments in the endowment funds?

    Fair market value   ___
    Cost method   ___
    Other (please specify)   ___
    _____

3. Is the institution required to use the above accounting method for investments by any external affiliation or association?

    No ___
    Yes ___ (please specify the affiliation or association _____)

4. Has the institution changed its accounting method for investments in the last five years?

    Yes ___
    No ___

    If a change has been made in the last five years, what accounting method was used before the change? _____

5. If the institution has considered a change in accounting method for investments in the last 5 years, please describe what methods were considered and why they were not adopted.

    _____
    _____
    _____

6. Who audits the institution's financial statements? _____

APPENDIX B

List of Colleges and Universities

LIST OF COLLEGES AND UNIVERSITIES

Name	1989 Endowment ($000s)
Agnes Scott College	114,823
University of Akron	33,980
Albion College	49,894
Allegheny College	47,785
Alma College	41,722
Amherst College	266,506
Arizona State University	13,693
University of Arizona	55,300
Austin College	68,464
Babson College	24,929
Baldwin-Wallace College	39,995
Barmard College	43,969
Berea College	252,052
Berry College	60,459
Bethany College	24,134
Boston University	150,547
Bowdoin College	144,156
Bowling Green State University	25,665
Brandeis University	144,618
Bryant College	30,657
Brun Mawr College	133,917
Bucknell University	87,335
Buena Vista College	35,472
Butler University	90,847
California Institute of Technology	477,879
California Institute of the Arts	24,300
Canisius College	20,916
Carleton College	157,632
Carnegie-Mellon University	291,271
University of Chicago	973,697
Claremont McKenna College	92,666
Claremont University Center	50,603
Clarkson University	34,953
Colby College	7,403
Colgate University	123,309
University of Colorado Foundation, Inc.	57,356
Columbia University	1,460,356
Connecticut College	35,581
Cooper Union	100,375
Cornell College	22,691

Name	1989 Endowment ($000s)
Cornell University	823,000
Dartmouth College	632,027
University of Delaware	329,280
Denison University	69,184
Depaul University	34,235
Dillard University	21,608
Emory University	923,612
Fordham University	61,653
Franklin and Marshall College	78,703
George Washington University	265,772
Goucher College	57,490
Grinnell College	294,328
Guilford College	20,553
Hamilton College	113,945
Hampden - Sydney College	30,339
Hampton University	75,359
University of Hartford	24,123
Harvard University	4,478,976
Harvey Mudd College	63,143
Haverford College	78,119
Hope College	23,766
Illinois College	27,423
Ithaca College	56,743
Johns Hopkins University	527,209
Juniata College	23,441
Kalamazoo College	38,765
Kentucky Wesleyan College	3,394
University of Kentucky	70,455
Knox College	28,019
Lafayette College	187,117
Lawrence University	69,590
Lehigh University	225,628
Loyola Marymount University	96,558
Loyola University of Chicago	246,236
Lynchburg College	23,794
Madonna College	11,828
Marietta College	22,258
Marquette University	71,972
Mary Baldwin College	16,079
University of Maryland System	52,471
Memphis State University	12,429
Mercer University	93,041
Michigan State University	51,012
University of Michigan	422,809

Name	1989 Endowment ($000s)
Middlebury College	216,920
Mills College	68,275
University of Mississippi	37,707
University of Missouri	131,968
Monmouth College (New Jersey)	9,274
Moravian College	18,001
Muhlenberg College	28,777
University of Nebraska	155,284
University of Nevada System	56,056
College of New Rochelle	6,924
New School for Social Research	22,628
New York University	540,315
University of North Carolina at Chapel Hill	151,562
Northwestern University	893,680
Norwich University	28,101
University of Notre Dame	542,501
Ohio Northern University	21,556
Ohio State University	287,298
University of Oregon Foundation	24,386
Philadelphia College of Pharmacy & Science	48,284
University of Pittsburgh	259,144
Pitzer College	14,222
Pomona College	271,053
Princeton University	2,483,829
Purdue University	133,431
Radcliffe College	91,574
Randolph-Macon College	21,642
Reed College	74,528
Rensselaer Polytechnic Institute	209,406
University of Richmond	265,310
Roanoke College	25,164
Rochester Institute of Technology	155,630
University of Rochester	538,078
Russell Sage College	8,060
Rutgers the State University	112,097
Saint Louis University	160,779
Saint Mary's College (Indiana)	25,854
Saint Norbert College	18,698
Saint Peter's College	4,775
Salem College	17,387
Santa Clara University	96,781
Scripps College	56,869
Simmons College	62,535
Southern Methodist University	334,643
Southwestern University	114,554

Name	1989 Endowment ($000s)
The University of the South	92,328
Spelman College	46,940
Stanford University	1,775,000
Swarthmore College	304,911
Sweet Briar College	47,300
Syracuse University	144,015
Temple University	54,501
Thomas Jefferson University	185,229
Trinity College (Connecticut)	113,160
Tufts University	130,666
Tulane University	221,424
Union College	95,238
Utah State University	13,995
Vanderbilt University	556,567
Vassar College	226,953
Virginia Commonwealth University	53,770
Virginia Tech Foundation, Inc.	105,800
University of Virginia	446,476
Wake Forest University	284,670
Washburn Endowment Association	33,874
Washington and Lee University	101,169
Washington State University	144,697
University of Washington	147,978
Wayne State University	39,510
Wellesley College	341,746
Wells College	27,050
Wesleyan University	275,138
College of William and Mary	73,653
University of Wisconsin Foundation	112,126
College of Wooster	69,210
Worcester Polytechnic Institute	97,298
Xavier University (Cincinnati)	19,072
Yale University	2,336,495

APPENDIX C

COMPARISON OF RESULTS FOR
OLS, PROBIT, AND LOGIT

APPENDIX C

Appendix C compares the results obtained from three
multivariate procedures: OLS regression, probit, and logit.
As described in Chapter 3, this study involves a dichotomous
dependent variable, which violates certain assumptions of OLS
regression. However, based on the findings of Noreen (1988)
and Stone and Rasp (1991), OLS regression can still be
effectively used in studies that have samples of less than
200. The purpose of this comparison is to further validate
the OLS regression models used for the data analysis.

Table C.1 compares the results of the three multivariate
procedures on Model 1. The coefficients and levels of
significance for each variable are reported in the table. For
example, the levels of significance for the variable TYPE
were 0.0844 for OLS, 0.0911 for probit, and 0.1021 for logit.
The same variables that were significant using OLS were also
significant for probit. For logit, two variables (TYPE and
TRET), had slightly higher levels of significance.

For Model 2 and the Combined Model, probit and logit
could not properly converge on a solution for the dummy
variables used to represent REGION. The data related to
REGION in Table 4.3 indicates that one of the regions (west)
had no occurrences of institutions using FMV accounting for

the dependent variable. The west and midwest regions were combined and all three multivariate procedures applied again. The results obtained for OLS using only three regions were similar to those reported in the study (see Tables 4.12 and 4.15). The same variables that are significant in the OLS regression model used here were also significant in the model used in the study. Table C.2 reports the results of Model 2 and Table C.3 reports the results of the Combined Model.

The interpretation of the signs of the coefficients for the probit model is different from that of OLS and logit. For example, probit reports a negative coefficient for the variable TRET (-0.0739) in Model One: indicating that the probability of an institution using the cost method decreases as TRET increases. This interpretation is consistent with the positive sign for the coefficient for TRET obtained using OLS and logit.

Appendix C indicates very similar results for all three multivariate procedures. A variable that is significant at a small level in the OLS model was also significant at a small level in probit and logit. Generally, for the variables identified as significant using OLS regression, the level of significance was slightly higher for probit and logit, which is consistent with the findings of Noreen (1988) and Stone and Rasp (1991). The comparison of the three methods supports the use of OLS in the study.

TABLE C.1

COMPARISON OF MODEL 1 RESULTS FOR
OLS, PROBIT, AND LOGIT

Variables	(-----OLS-----)		(-----PROBIT-----)		(-----LOGIT-----)	
	B Value	Prob.	B Value	Prob.	B Value	Prob.
Intercept	0.1903	0.2383	2.5922	0.0115*	-4.7703	0.0036*
TYPE	0.0897	0.0844*	-0.6500	0.0911*	1.1973	0.1021
SIZE	2.2E-07	0.0054*	-7.6E-07	0.0306*	1.2E-06	0.0417*
EFTE	-6.2E-07	0.3651	2.4E-06	0.3462	-4.3E-06	0.3357
TRET	0.0184	0.0882*	-0.0739	0.0937*	0.1460	0.1011
DEBT/END	0.0026	0.9346	0.0032	0.9840	0.0055	0.9849

* Significant at the 0.10 Level or Less

TABLE C.2

COMPARISON OF MODEL 2 RESULTS FOR
OLS, PROBIT, AND LOGIT

Variables	(-----OLS-----)		(-----PROBIT-----)		(-----LOGIT-----)	
	B Value	Prob.	B Value	Prob.	B Value	Prob.
Intercept	-0.2061	0.1370	2.8236	0.0001*	-4.9647	0.0001*
AUDITOR1	-0.0331	0.7291	0.0151	0.9748	0.1647	0.8586
AUDITOR2	0.2477	0.0141	-0.9985	0.0292	1.9013	0.0304
AUDITOR3	0.0979	0.2700	-0.5855	0.1693	1.1471	0.1762
% EQUITY	0.0051	0.0116*	-0.0247	0.0120*	0.0417	0.0146*
% REAL	-0.0020	0.7820	0.0336	0.4563	-0.0486	0.5152
SPENDING	0.0297	0.1441	-0.0988	0.2333	0.1976	0.1801
REGION1	0.1065	0.2047	-0.3817	0.2767	0.5929	0.3311
REGION2	-0.0794	0.3414	0.3803	0.3040	-0.7369	0.2761

* Significant at the 0.10 Level or Less

TABLE C.3

COMPARISON OF COMBINED MODEL RESULTS FOR
OLS, PROBIT, AND LOGIT

Variables	(------OLS------)		(-----PROBIT-----)		(------LOGIT-----)	
	B Value	Prob.	B Value	Prob.	B Value	Prob.
Intercept	-0.3306	0.1290	3.5868	0.0011*	-6.4176	0.0026*
TYPE	0.0921	0.3160	-0.4465	0.3097	0.7478	0.3481
SIZE	1.9E-07	0.0166*	-8.3E-07	0.0475*	1.4E-06	0.0580*
EFTE	-4.9E-07	0.4758	3.1E-06	0.3014	5.4E-06	0.3061
TRET	0.0054	0.6241	-0.0374	0.4618	0.0762	0.4533
DEBT/END	-0.0008	0.9788	0.0748	0.7859	-0.1461	0.7679
AUDITOR1	-0.0526	0.5874	0.0278	0.9557	0.1776	0.8533
AUDITOR2	0.1911	0.0656	-0.8801	0.0715	1.7389	0.0630
AUDITOR3	0.0745	0.4019	-0.5576	0.2070	1.1584	0.1863
% EQUITY	0.0045	0.0348*	-0.0227	0.0330*	0.0378	0.0421*
% REAL	-0.0052	0.4861	0.0843	0.1308	-1.4610	0.1669
SPENDING	0.0367	0.0800*	-0.1316	0.1453	0.2480	0.1277
REGION1	0.0831	0.3251	-0.2649	0.4674	0.3744	0.5570
REGION2	-0.0578	0.4914	0.3777	0.3587	-0.6874	0.3190

* Significant at the 0.10 Level or Less

VITA