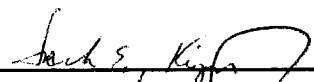


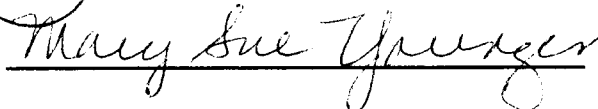
To the Graduate Council:

I am submitting herewith a dissertation written by Randal Keith Edwards entitled "Growth Companies and Changes to Larger Audit Firms: An Examination." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Business Administration.


James M. Reeve, Major Professor

We have read this dissertation
and recommend its acceptance:





Accepted for the Council:


Vice Provost
and Dean of The Graduate School

GROWTH COMPANIES AND CHANGES TO LARGER
AUDIT FIRMS: AN EXAMINATION

A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Randal Keith Edwards

March 1988

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DEDICATION

This dissertation is dedicated to my wife, Margaret,
in appreciation of her unfailing love and support.

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The expertise, support, and patience of my dissertation chairman, Jim Reeve, and committee members Jack Kiger, Jim Scheiner, and Mary Sue Younger are greatly appreciated. I also acknowledge the friendship and support of fellow students and faculty members.

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ABSTRACT

Previous research has identified characteristics of audit firms or of client companies which are significant in predicting why companies change audit firms. This study examined company growth. The purpose of the study was to develop a model which would use growth to predict whether a company would change from a smaller to larger-sized audit firm.

Four variables measured percentage growth in various financial values for the three years before a company changed firms. Audit firms were classified into three categories: local/regional, national, and Big Eight. Companies studied were those changing to a larger-sized audit firm from 1978 to 1982, having annual sales of \$125 million or less, stock which was publicly traded, and information available for the time periods measured. Each company changing to a larger firm was matched to a company which did not change.

Statistical tests found that the companies experiencing highest growth were usually those which were youngest in age. Also, the size of companies changing firms declined over the years studied. T-tests determined that growth in (1) property, plant, and equipment, (2) sales, and (3) capitalization was significantly higher for companies which changed firms than for matched

companies. The same three variables were also significant in logistic regression analysis. However, estimated R^2 and total classification accuracy were less than in similar studies, limiting the model's predictive ability.

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CHAPTER 1

INTRODUCTION

The reasons that companies change audit firms have gained increased attention in recent years. Researchers have attempted to identify significant company or audit firm attributes which predict changes. Companies are now required to disclose to the Securities and Exchange Commission (Accounting Series Release No. 247, 1978) their reasons for changing audit firms. The U.S. Congress (Metcalf Committee, 1977) and Financial Accounting Standards Board (Deloitte Haskins + Sells, 1985) have examined the related issue of firm competition.

Specific reasons which motivate companies to change audit firms vary widely. For example, a company may change because its present audit firm is not perceived as adequately meeting the company's needs for service. Companies may also change in response to disagreements with the audit firm concerning qualified opinions or other issues, including the possibility of lower fees. Audit firms may initiate the change because of cost considerations, firm mergers, or other reasons.

The audit firm's size is often believed to affect a company's decision to change audit firms. Some researchers have suggested larger audit firms may provide lower fees,

better reputation, higher quality, and more "insurance" against losses that stockholders and others might sustain from company financial distress (Simunic, 1980, DeAngelo, 1981, Francis, 1984). On the other hand, smaller audit firms are often perceived as providing more personal service to clients and as having less audit staff turnover.

Some previous studies have identified different or even contradictory reasons associated with company changes. For example, Chow and Rice (1982) found qualified opinions to be significant while Williams (1984) and Schwartz and Menon (1985) did not. Therefore, significant predictors of audit firm changes are probably still unidentified. Because earlier literature has identified growth as significant, this study will examine company growth to determine if it significantly influences a company's decision to change firms.

The Public Accounting Report and findings of questionnaire studies indicate companies change to larger audit firms because of significant growth, expanded product lines or markets, etc. Companies may also change to obtain the perceived increase in reputation, expertise, or prestige provided by a larger audit firm. Although only one other study (Williams, 1984) included company growth as a variable, companies with significant growth are hypothesized in this study to have increased incentives to change audit firms. Also, results from earlier descriptive studies

(Bedingfeld and Loeb, 1974, Carpenter and Strawser, 1971) support the expectation that many growth companies are more likely to change to a larger-sized audit firm.

Purpose of the Study

The study's primary purpose was to develop a predictive model, using company growth as a variable influencing changes from smaller to larger-sized audit firms. The model was used to predict whether growth companies would change to larger audit firms. In the model, growth was measured by percentage increases in specific balance sheet and income statement accounts or categories.

Contributions

There are three primary contributions to the literature which this study could provide. The first contribution is to better aid understanding of the demand for audit services. Second, small audit firms could use the model to identify possible losses in clients or larger firms could identify potential clients. A third contribution is the application of growth literature in an accounting context.

Research Methodology

The association between growth rates and changes to larger audit firms was evaluated using the following procedures:

I. Research Hypothesis and Model

The research hypothesis was formulated and a model containing seven independent variables was developed.

II. Selection of Companies

A. Classification of audit firms

The number of SEC clients audited by each firm was used to classify audit firms into three size categories: local or regional, national, and Big Eight.

B. Identification and selection of change companies

1. Companies changing to larger-sized audit firms from 1978 to 1982 were identified. Changes were then classified as: 1) local or regional to national firms, 2) local or regional to Big Eight firms, and 3) national to Big Eight firms.

2. Companies included in the study were limited to those having \$125 million or less in annual sales, publicly traded stock, and financial information available for the growth period of three years preceding the year of change. Companies were eliminated from consideration if they had attributes, such as bankruptcy, which were identified in earlier studies as significantly influencing changes to larger firms.

C. Selection of comparison companies

Each company in the study was matched to a comparison company which did not change to a larger firm. Comparison

companies were similar companies that were subject to the same limitations and controls as companies that changed.

III. Data Sensitivity Analyses

Analyses evaluated auditor industry concentration, inflation's impact on growth variables, growth when change companies were dichotomized by age, mergers and acquisitions by change companies, the size of audit firm selected, and the size of companies changing firms.

IV. Statistical Procedures

1. Matched-pair t-tests were used to determine whether differences in values of growth variables for change and comparison companies were significant. Logistic regression analysis was used to predict whether a change in firms occurred as a function of the independent variables, and whether the variables could predict that a company would change.

2. Backward logistic regression analysis was used to identify three significant variables. Predictive ability of the logistic model was evaluated using a holdout group of companies which changed to larger-sized firms after 1982 and a matched group of comparison companies.

Organization of the Study

Four more chapters are included in this study. The next chapter reviews relevant auditing research and stages

of development theory literature. Chapter 3 discusses the methodology used; Chapter 4 presents research findings, and Chapter 5 discusses the study's conclusions and limitations.

CHAPTER 2

LITERATURE REVIEW

The first section in this chapter reviews relevant auditing research and develops independent and dependent variables. The second section reviews stages of development theory literature, focusing on growth as a company characteristic important in explaining changes to larger audit firms.

Audit Research

Research relevant to this study can be divided into two streams. The first stream examines theoretical issues related to audit firm (auditor) selection. The second includes empirical studies that have identified specific predictors of the decision to change auditors and that have examined stock price reaction and product differentiation.

I. Theoretical Issues Relevant to Auditor Selection

An overall theory of auditor selection has not yet been developed. However, theoretical issues have developed sufficiently so that three theories are consistently presented to explain why specific auditors are selected: agency, quality and auditor reputation, and insurance. Although these theories have some overlapping properties, they are distinct enough to be discussed separately.

A. Agency

Agency theory is believed to explain a significant component of demand for audit services (Scott, 1984). Demand arises because information asymmetry exists between the owner (principal) and the manager (agent). The manager responds by providing the audit as a monitoring contract to assure the owner that he, the manager, is not acting in his own self-interest. Regulatory requirements, manager demands, and accepted practice require that all publicly traded U.S. companies contract with independent auditors to perform annual audits.

The audit also aids contracting by verifying financial values upon which other arrangements are conditioned (DeAngelo, 1982a). Many companies have debt requirements, managerial compensation arrangements, or dividend payments which are dependent upon financial variables. Audits are an efficient means of providing assurances concerning the values' validity (DeAngelo, 1982a).

Rational managers will always attempt to select the monitoring arrangement which minimizes the total cost of owner-manager contracting (DeAngelo, 1982a). Owners may also encourage selection of a new auditor in an attempt to gain increased monitoring or more reliable monitoring. Although companies change auditors for various reasons, the logical conclusion is that managers believe the new monitoring contract will be more advantageous than the

present one. The advantage may be realized through lower audit fees, reduced agency costs (i.e., a reduction in the cost of other monitoring), or more efficient operations.

New debt or stock issues may also motivate current owners to hire a different auditor. Potential creditors or stockholders may be reluctant to loan money or invest in the company because of information asymmetry between them and current owners. The new auditor might be perceived as providing increased monitoring and improve chances of attracting the new creditors and stockholders. In fact, Bedingfeld and Loeb (1974) found that underwriters, bankers, and/or others often exert pressure on companies to change auditors.

Scott (1984) contends that a shortcoming of most agency models is that they do not consider the auditor's ability to make decisions. (The auditor is treated as a "machine" or "technology.") However, because auditors are rational decision makers and determine the supply of audit services, they influence the agency relationship. Attempts to include the auditor in agency models have not been very successful (Antle, 1982). Therefore, auditors' roles must be considered indirectly by examining attributes they provide. Two attributes are examined in the next section.

In summary, agency theory holds that the audit is required to minimize the costs of monitoring the manager's actions and to provide assurances concerning financial

values. A new auditor is hired if the manager believes the auditor can better and more efficiently meet the company's audit needs.

B. Quality and reputation

Because service companies do not sell a tangible physical product, they are often evaluated by examining the quality of services provided. For example, Allen (1984) contends that companies providing low-quality services at high-quality prices are eventually eliminated from the market for high-quality services. However, most services cannot be fully evaluated until after they are used, creating uncertainty about the level of quality provided (Shapiro, 1982).

DeAngelo (1981) has attempted to reduce uncertainty by identifying an ex ante means of evaluating audit quality. She defines audit quality as "the market assessed joint probability that a given auditor will both (a) discover a breach in the client's accounting system, and (b) report the breach." Although the joint probability is often difficult to measure quantitatively, several benefits of increased quality can be identified. Higher quality enhances operational efficiency and reduces agency costs (Francis, 1984). Also, quality is a good signaling device because higher quality results in lower total costs through increased marketability of stock and debt, adjustments in audit fees, and increased prestige.

Several researchers have evaluated quality by examining its surrogates. Although imperfect, one of the best surrogates for quality is reputation (Shapiro, 1982). Because the audit product (the opinion) is relatively uniform among auditors, reputation can be established by favorable or adverse publicity, by promoting industry specialties, and by providing free publications to clients and others.

"Brand name" is also used to establish auditor reputation and serves to attract clients (Dopuch and Simunic, 1980). Brand name can be associated with the auditor's specific name (Shapiro, 1982) or with membership in a group, such as the Big Eight.

Brand name signals audit quality, when quality cannot be easily observed (DeAngelo, 1982a). Therefore, auditors are motivated to establish or maintain their brand names. Auditors who provide lower than acceptable quality may damage their reputations or brand names and lose future audit fees.

Successful brand names are usually, by definition, firm-specific and they must be virtually worthless for any other use. However, "Big Eight" is a very important brand name which is not firm-specific. Dopuch and Simunic report results of a casual survey conducted by Dow Jones & Company which found that all corporate chief executive officers or presidents surveyed had some familiarity with each Big

Eight firm while 10 to 70 percent had "never heard" of certain non-Big Eight firms. Other studies found that some company managers will only hire Big Eight auditors.

Another possible surrogate for audit quality is auditor size. Size is usually defined in terms of number of clients or total audit fees received from all clients. DeAngelo (1981) argues that auditors with a greater number of clients have less incentive to "cheat" (provide reduced quality) to retain any specific client because the auditors have more future audit fees to lose. DeAngelo thus believes that larger-sized auditors will consistently offer higher quality.

Companies may change auditors to obtain desired increases or decreases in quality levels. As companies expand into new markets, smaller audit firms may not be willing to incur the costs to compete in those markets (Francis, 1984).

Some researchers (Eichenseher and Shields, 1983 and Schwartz and Menon, 1985) believe the audit consists of a package of attributes which includes quality of services, types of services, and audit fees. A new auditor may be selected if the client believes the overall package must be changed. The decision to change could be influenced by quality considerations as well as other attributes.

To summarize, some researchers believe that the quality and reputation of auditors may cause companies to change

auditors. Better quality and reputation is often believed to be provided by larger-sized auditors, especially the Big Eight.

C. Insurance

Wallace (1980), Ng (1978), and Schwartz and Menon (1985) suggest that audit demand is influenced by "insurance" requirements. Insurance is defined as professional liability exposure implicitly assumed by the auditor. Exposure arises because stockholders who experience financial losses may initiate litigation against a company's auditor. Auditors are assumed to be willing to absorb some financial losses so that adverse publicity can be avoided and because they have "deep pockets" (i.e., adequate financial resources to settle claims by stockholders or others). Also, larger-sized auditors usually have a comparative cost advantage because they have more clients over which risk is distributed, making insurance more cost effective than for smaller auditors.

Schwartz and Menon (1985) believe auditors may adjust fees to reflect changes in perceived insurance demands. A company will change auditors if it is not willing to pay higher fees resulting from the auditor's belief that the company's riskiness has changed. Even when fees are not increased, attributes such as significant growth or new stock issues may change implied insurance demands and contribute to a change in auditors.

To summarize, insurance theory assumes that auditor changes may be influenced by the amount of insurance an auditor can or will provide.

II. Empirical Research

A. Introduction

Empirical research related to auditor changes can be classified into three categories. The first category contains studies which identify significant predictors of auditor changes. Studies considering stock market reaction to changes comprise the second category. The third category includes studies which examine how auditors attempt to differentiate their product.

B. Predictors of Auditor Change

Studies examining predictors of auditor change are summarized in Figure 1. These studies have focused on various aspects of auditor changes and often do not explicitly consider significant results from earlier research. Diversity among the studies is due partially to absence of an overall theory of auditor changes. As a group, however, the studies provide important information.

1. Types of studies.

Two of the earliest studies (Bedingfeld and Loeb, 1974, and Carpenter and Strawser, 1971) used questionnaires to determine why companies changed auditors. Eichenseher and Shields (1983) also utilized a questionnaire.

Studies	CARPENTIER & STRANER, 1971	BEDINGFELD & LOEB, 1974	CHOW & RICE, 1982	DEANGELO, 1982b	EICHENSEHER & SHEILDS, 1983	MCCONNELL, 1984	WILLIAMS, 1984	SCHWARTZ & MENON, 1985
FEATURES								
Type of Study	Questionnaire	Questionnaire	Archival	Archival	Questionnaire	Archival	Archival	Archival
Controls: Matching Group	No N.A.	No N.A.	Unqualified Opinion No	No N.A.	No N.A.	No N.A.	Industry, Earnings Debt Yes	Industry, Size N.A.
Holdout Group								
Statistical Procedures	None	None	Logistic Regression	Chi-square, Mann-Whitney	Kolmogorov- Smirnov tests	Chi-square	Logistic Regression	Chi-square
Theory	No	No	No	Agency	No	No	Agency, Insurance	Insurance
Time Period	1969 & 1970	1971 to 1973	1973 to 1974	1973 to 1980	1976 & 1977	1974 to 1978	1977 to 1982	1974 to 82
Companies or Responses	165 responses	141 responses	141 cos.	246 cos.	81 responses	748 cos.	186 cos.	132 cos.
Predictors of auditor change (significant predictors are CAPITALIZED)	INITIAL STOCK ISSUE	MGT. & OTHERS WANTED NATIONAL AUDITOR, fees, unsatisfied with services, mergers	QUALIFIED OPINIONS, management changes, new financing, mergers, "other"	INDUSTRY LOBBYING POSITIONS	FEES & WORKING RELATIONSHIPS, accessibility, services, tech. qualif., firm expertise	DISAGREEMENTS	AUDITOR SPECIALITY & LONGEVITY ON AUDIT; FINANCIAL DISTRESS & LOW CO. GROWTH, mgt. changes, qual. opinions, mergers, industry lobbying, 8 other variables	FINANCIAL DISTRESS, qualified opinions, management changes

Figure 1. Studies Examining Predictors of Auditor Change

Other studies have been archival, meaning that data were obtained from existing public sources. Data limitations have allowed only publicly traded companies to be selected. Companies changing auditors were often initially identified from information filed with the Securities and Exchange Commission. Data sources included the Wall Street Journal Index, annual reports, Who Audits America, and Moody's manuals.

2. Experimental design controls.

All predictive studies were ex post, limiting the experimental controls which were available. Also, random selection was not possible because companies in the studies self-selected and not enough data were available. Chow and Rice (1982) and McConnell (1984) used limited randomization after companies were initially identified. However, Abdel-khalik and Ajinkya (1979) contend that "limited randomization is a very poor control procedure. Pair-matching, if properly done, is a much better approach."

Chow and Rice (1982), Williams (1984), and Schwartz and Menon (1984) used pair-matching, selecting a control group from companies which did not change auditors. Chow and Rice also selected only those receiving unqualified opinions. Matching dimensions in the studies have included industry, size, earnings, and/or amount of debt.

Holdout groups are often used to further establish

predictive ability when studies include formal models. The only auditor change study which used a holdout group was Williams (1984). Some other auditing studies did not include a holdout group because sufficient data were not available to have an adequate number of observations. Holdout groups have been used more often in bankruptcy studies (i.e., Zavgren, 1983), usually by reserving data from certain years for the holdout group.

3. Statistical procedures.

Control can also be achieved with statistical procedures (Abdel-khalik and Ajynka, 1979). Extraneous variables not controlled through pair-matching can be explicitly included in a model as independent variables. The dependent variable in auditor change studies is usually "change or not change auditors." Because this variable is dichotomous, ordinary least squares regression is not an appropriate technique. In this situation, logistic regression is preferred to discriminant analysis. Logistic regression applies a log-linear transformation to the dependent variable (Pindyck and Rubinfeld, 1981). Maximum-likelihood estimation is used to estimate parameters which in large ("asymptotic") samples are efficient (minimum variance), normal (follow a normal distribution), and consistent (the probability limit of the estimator is the true value). Logistic regression tests the significance of each variable and the overall model.

Chow and Rice (1982) and Williams (1984) used logistic regression analysis in their studies. Auditor change studies not including a formal model have used Chi-square tests, Mann-Whitney tests, or Kolmogorov-Smirnov tests. The early questionnaire studies did not report any statistical tests.

4. Findings.

While this study examines small companies, significant predictors influencing auditor changes by large companies include qualified opinions (Chow and Rice, 1982), company financial distress (Schwartz and Menon, 1984 and Williams, 1984), audit fees (Eichenseher and Shields, 1983), initial stock issues (Carpenter and Strawser, 1973), and adverse accounting pronouncements (DeAngelo, 1982b). Others are auditor-client relationships or disagreements (Eichenseher and Shields, 1983, McConnell, 1984, and Williams, 1984), and pressures of bankers and creditors (Bedingfeld and Loeb, 1974). Although Williams found low company growth to be significant, his study included only changes between Big Eight firms and did not consider changes to larger firms.

Several studies determined that audit firm size was important in explaining changes. Initial stock issues or pressures of investment bankers and creditors caused companies to change to larger-sized audit firms. Companies experiencing financial distress tended to change to either a larger or smaller auditor (Schwartz and Menon, 1984).

Two studies found that a company is not more likely to change to an auditor favoring the company's position on some issue. DeAngelo (1982b) determined that most oil exploration companies adversely affected by FASB successful efforts requirements did not change to an auditor favoring the alternative treatment of full cost accounting. Companies receiving a qualified opinion and subsequently changing auditors were not less likely than companies which did not change auditors to receive a qualified opinion in the subsequent year (Chow and Rice, 1982).

Zeff and Fossum's 1967 study analyzing large audit clients determined that the Big Eight and national audit firms often specialize in certain industries. However, a replication by Dopuch and Simunic (1980) found that the dominant firm lost market share over the next ten years in 75% of industries studied by Zeff and Fossum. Also, Danos and Eichenseher (1982) found that audit firms tended to increase market share in regulated industries but lost market shares in nonregulated industries. The impact of auditor industry specialization and concentration for this study is examined in Chapter 4.

5. Summary.

Findings of predictive studies can be classified into three categories. First, some studies (Schwartz and Menon, Carpenter and Strawser, Bedingfeld and Loeb) found that attributes such as financial distress, stock issues, or

growth may cause companies to change auditors. The second category of studies (DeAngelo, Williams) examines auditor attributes such as size in terms of number of clients, membership in the Big Eight, or industry specialitites. The third category (McConnell, Chow and Rice, Eichenseher and Shields) examines predictors of changes resulting from interaction between auditor and client; included are disagreements, qualified opinions, and audit fees.

C. Stock market reaction

If an auditor change is a significant economic event and is unexpected, the stock market should react accordingly. Two studies examined this possibility. Fried and Schiff (1981) found weak evidence suggesting negative market reaction to all changes. Nichols and Smith (1983) incorporated auditor size in their study by examining market reaction to changes between Big Eight and non-Big Eight auditors. Although abnormal returns (company returns exceeding market returns) were positive for changes to Big Eight firms and negative for changes from Big Eight firms, Nichols and Smith's results were not statistically significant.

A tentative conclusion from reviewing market reaction studies is that the market probably does react to changes. However, the reaction is influenced by other factors such as company size, qualified opinions, and industry.

D. Product differentiation

Product differentiation is defined as the belief that an auditor will attempt to develop characteristics which attract potential clients. Reputation and brand name (Dopuch and Simunic, 1980) are probably the most important differentiation characteristics because auditors expend significant resources to develop and maintain them.

The audit product can also be differentiated through Big Eight membership and/or auditor size (Danos and Eichenseher, 1986). Other differentiation factors include auditor concentration in specific industries (Eichenseher and Danos, 1981), and audit fees (Simunic, 1980).

Recent research by Francis and Stokes (1986) and Francis and Simon (1987) have refuted Simunic's belief that Big Eight firms do not charge higher fees than non-Big Eight firms. Both studies concluded that product differentiation did exist because the Big Eight charged companies with annual sales below \$125 million "price premiums" (higher fees). These findings imply that small companies which change to Big Eight firms believe benefits of employing the auditor exceed the price premium or the auditor believes the company has characteristics which justify not charging a premium.

Many possible differentiation factors have not yet been studied empirically. Some factors cannot be easily measured, such as responsiveness to client needs. Others,

such as geographical location of auditor offices, can be measured but their importance to specific clients is difficult to determine.

The impact of product differentiation factors on auditor changes is best evaluated by assuming the factors are contained in an overall audit package (Schwartz and Menon, 1985). Auditor changes result from a desired adjustment to the mix and composition of the overall package, implying that at least one differentiation factor must be adjusted.

III. Development of Independent and Dependent Variables

Based on the review of auditing research, a dependent variable and independent variable were developed. Controls for potential confounding variables were also implemented, when appropriate.

A. Dependent variable: change to a larger audit firm

Many companies believe audit firm characteristics vary based on size of the firm (Bedingfeld and Loeb, 1974). Auditor size may influence the decision to change firms and/or the specific firm selected. Anecdotal evidence from the questionnaire surveys (Carpenter and Strawser, 1971 and Bedingfeld and Loeb) suggests large firms are perceived as having more expertise and a more positive reputation. Smaller firms are believed to provide more personal service and audit staffs with less turnover. Other studies found that larger-sized firms are believed to offer lower fees

(Simunic, 1980), higher quality levels (DeAngelo, 1982a), more positive brand name or reputation (Dopuch and Simunic, 1980), and more insurance (Wallace, 1980). Some researchers, including Dopuch and Simunic, define "larger firms" as the Big Eight while others do not distinguish between the Big Eight and other large national firms.

To enhance the possibility of identifying a significant company characteristic and to minimize extraneous effects, this study was limited to changes from smaller to larger-sized firms. Changes to smaller-sized or the same size firms were not included because those changes were expected to involve different company characteristics such as fees, working relationships, etc. The study did include a matched group of companies which did not change to larger firms during the time period measured.

B. Independent variable: growth

Since the most common reasons that company officers give for changing to a larger firm (Public Accounting Report, 1978 to 1982) are company growth and/or the desire for additional firm expertise or prestige, significant company growth was selected as the characteristic to be examined. Companies changing to larger-sized firms are hypothesized to be growing at significantly faster rates than companies not changing to larger firms.

Agency theory assumes that because managers are rational, they select the auditor which provides the most

efficient and economical audit. Rapid growth would usually include factors such as new debt or stock issues, product market expansion, and geographical expansion. These factors would increase information asymmetry and the potential for conflict between managers and owners, as discussed later. Many managers and owners believe larger firms provide higher quality and reputation. The manager would then contract with a larger-sized firm to reduce the owner's anxiety and assure the owner that the manager is not acting in his own self-interest.

A related consideration may be that a smaller audit firm believes rapid growth increases a company's riskiness. The smaller firm could require the manager to pay substantially increased fees or the firm might actually terminate the relationship. Increased riskiness also would raise the level of insurance the auditor must provide. Companies might change to larger firms to provide more insurance to stockholders and creditors. Larger firms are believed (Schwartz and Menon, 1985) to "have a comparative advantage in providing insurance because of the ability to distribute client risk over a greater number of clients".

The agency justification for changing firms is probably valid only with rapid company growth. This study assumes that rapid growth over several years could create such a high degree of information asymmetry and principal uncertainty that the change would be required immediately.

On the other hand, companies experiencing slower growth might not believe that changing to a larger-sized firm was immediately necessary, although the change could be made in some future period.

Because almost all financial resources of a company are required for rapid growth, information asymmetry and owner uncertainty are increased. Reporting practices and internal controls may not be revised as fast as necessary. Asymmetry will be increased because information needs are constrained by limited financial resources.

Rapid growth would also usually involve expansion into new markets, new stock and debt issues, and increasing complexity of operations. The change to a larger firm could be necessary to provide additional assurances to the owner. Postponing the change despite rapid growth might diminish the owner's confidence in the manager.

Higher quality and reputation that larger firms are often believed to possess would also influence the decision to change. In addition to providing increased assurance to present owners, the larger firm might be needed to attract new stockholders or creditors. The need for these new owners would be intense as growth creates additional demand for cash to finance expansion.

C. Controls for potential confounding factors

Although growth is the variable of interest, three other independent variables were included in the study to

control for potential confounding factors. The first variable was number of years a company had been audited by its predecessor audit firm (defined as the firm dismissed when the company changed to a larger one). Williams (1984) found that companies which had used the same firm for a number of years ("longevity") were more likely to change firms. Companies having used the same auditor for shorter periods were thus believed to be less likely to change.

Company age was the second control variable. Because stages of company development writers (including Churchill and Lewis, 1983 and Greiner, 1972) often suggested that high growth companies may be relatively young, age was expected to be a significant variable.

The third control variable measured the degree of audit firm competition in each company's geographic region. Competition to become a company's new firm was expected to influence the decision to change. The accounting profession continues to regard firm competition as important, illustrated by the Emerging Issues Task Force of the FASB identifying competition as a significant present and future concern (DH+S, 1985).

Higher competition levels will make changing easier for several reasons. First, there are more firms from which to choose. Also, new stockholders and creditors resulting from increased financing may be more likely to demand a change if many other qualified audit firms are readily

available. Ceteris paribus, higher levels of competition will result in lower audit fees. Therefore, companies in areas with high competition may change firms to receive a lower fee.

Wallace (1980) and Schwartz and Menon (1985) have suggested larger audit firms will usually have a comparative cost advantage. Larger firms are able to distribute client risk over a greater number of clients. Also, larger firms can probably more efficiently maintain the technical expertise necessary to meet needs of SEC clients. Cost advantages may thus be passed to the client.

In addition to the three control variables, other controls were implemented. One control was to include only smaller-sized companies in the study, because almost all large companies are audited by the Big Eight (Dopuch and Simunic, 1980 and Who Audits America, 1983).

Chow and Rice (1982) observed that companies were more likely to change firms if they received a qualified opinion the previous year. The importance of qualification in influencing changes from smaller to larger firms has not been determined. However, because qualifications may confound results, the control was to eliminate companies receiving a qualification (except the qualification for consistency) in the year prior to the year of change.

Companies were also eliminated if they experienced bankruptcy or failed to meet debt obligations in the three

years after the change year. This control is based on Schwartz and Menon's (1985) finding that failing companies tended to change to larger or smaller-sized audit firms. Changes in audit firms as a result of mergers or other events not controlled by the company were eliminated. Finally, financial institutions, insurance companies, and real estate companies with Standard Industrial Classification (SIC) codes from 6000 to 6790 were eliminated because growth in variables such as net income may be regulated; the companies may have only minimal property, plant, and equipment (PPE), capitalization may be generated internally, or companies may avoid changing due to concern about increased attention from regulators.

D. Theoretical justification for growth

The accounting literature does not contain a theoretical justification for growth as a significant company attribute explaining auditor changes. However, literature in the management area contains a theory of the stages of development in a company's life, with growth as a common stage. Stages of development literature and growth are reviewed next.

Stages of Development and Growth

Many specific models (i.e., Greiner, 1973, Vozikis and Glueck, 1980, Churchill and Lewis, 1983, Miller and Friesen, 1984, Kazanjian, 1984, and Vozikis, 1984) describe

the stages of development a company may pass through. Each model has several common stages, summarized by Quinn and Cameron (1983):

Changes that occur in organizations follow a predictable pattern that can be characterized by developmental stages. These stages (1) are sequential in nature, (2) occur as a hierarchical progression that is not easily reversed, and (3) involve a broad range of organizational activities and structures.

The development models contain three, four, or five stages, starting with the organization's birth and following the company as it ages and increases in size. A common stage between birth and maturity is growth. Churchill and Lewis (1983), Vozikis (1984), Greiner (1972) and others have suggested that many companies never progress through all stages. Resource constraints, lack of successful new products or markets, etc., prohibit some companies from moving into a new stage. Other companies make the conscious decision to not grow, thus avoiding problems which might arise by expanding into a new stage.

After a thorough review of the literature, the development model formulated by Churchill and Lewis (1983) was selected to examine in detail. The Churchill and Lewis model was one of the most well researched and was developed by drawing on earlier work of Greiner (1973), Steinmetz (1969), and others. Empirical support was provided by asking eighty-three small company owners and managers to review a preliminary model. Results were used to prepare a final model, containing five stages: existence, survival,

success, take-off, and resource maturity. (Instead of providing concise definitions of stages, Churchill and Lewis characterized them by identifying common opportunities and problems. For example, problems in the existence stage are "obtaining customers and delivering the product or service contracted for".) Churchill and Lewis believed that the rate at which a company passes through each stage is a function of size.

Companies in Churchill and Lewis' survival stage may, through growth, move to the success stage or may remain at the survival stage for an extended time period. Companies at the success stage can remain at this stage for long periods through the conscious decision not to grow or due to lack of growth opportunities. Alternatively, the company may be used as a "platform for growth." Take-off stage companies grow rapidly and may eventually reach resource maturity enjoyed by large, stable businesses.

Figure 2 is a graphic representation of Churchill and Lewis' model, illustrating an average company's growth. Although most companies begin at Stage I, Churchill and Lewis believe some new companies have the resources and opportunities to begin at Stage III or IV. High growth companies can be young but are expected to be in a more advanced stage than low growth companies.

Development writers have proposed several growth definitions, including increase in size, profitability,

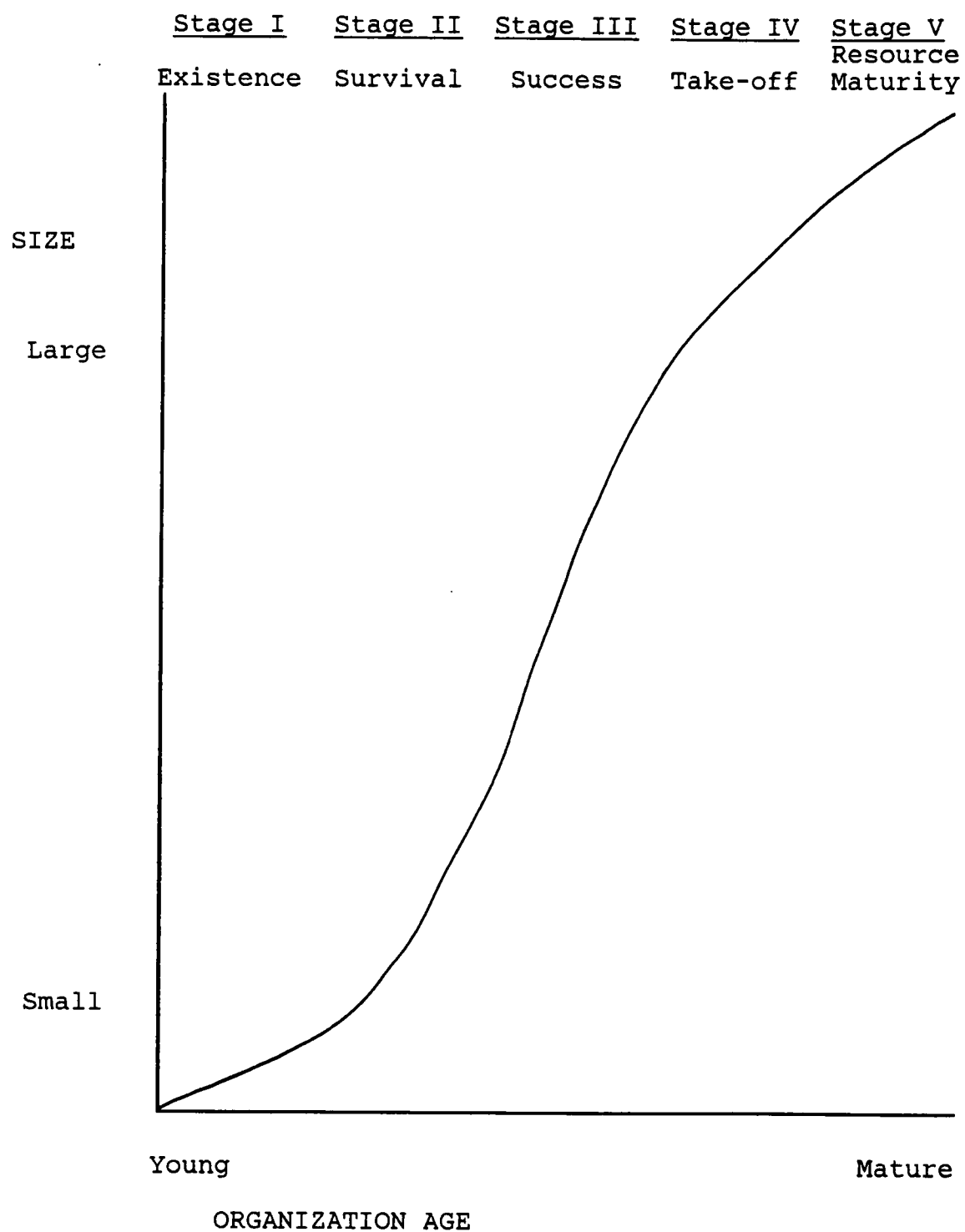


Figure 2. Churchill and Lewis' Model of Stages of Development (Harvard Business Review, 1983)

plant assets, and financing. Increase in size is probably the most common definition. For example, Starbuck (1971) has noted that a basic organizational growth model is the cell-division model, which focuses on percentage change in size. Development models commonly use size as a variable causing movement between or within stages.

Churchill and Lewis (1983) included sales in their definition of the composite size variable. Griffin (1971) contends that executives measure business success based on the rate at which sales are increasing. Miller and Friesen (1984) have suggested companies in growth stages have sales growth greater than 15%. Other development models have defined size as total number of employees. However, total number of employees may often be influenced more by company labor intensity than company growth. Because the most common size definition is revenues or sales, they will be used in this study.

Another common growth definition is profitability. Fruhan's (1984) search for the most desirable growth rate concluded that the key to value is profitability. Fruhan argued that if companies cannot improve profitability, they should consider rapid reduction in size. Dent (1971) surveyed chief executives and found that many executives believed the goals of being profitable (or making money) and growing to be synonymous. Kazanjian (1984) has noted that companies in growth stages have pressures to attain

profitability. Penrose (1971) stated "The primary motive for growth...is maximization of long-run profits."

Companies experiencing substantial growth are also expected to be significantly increasing the size of productive plant assets. Buckley (1979) has suggested that companies with high growth and a desire to increase market share need additional fixed capital. Churchill and Lewis' (1983) composite size variable included product line expansion and technological changes.

A final growth definition involves increased financing. Growth companies usually need liquid assets to finance continued expansion (Helmich, 1978; Clifford, 1973; Buckley, 1979; and Churchill and Lewis, 1983). Miller and Friesen (1984) found that companies in growth stages had more disperse ownership than companies not in growth stages, suggesting growth companies had more stock issues.

Relation of This Study to Stages of Development

This study utilizes stages of development literature because changes to larger audit firms are believed to be explained by company growth. Specific independent variables used to measure growth in size, profitability, productive assets, and financing will be discussed in the next chapter. In general, companies changing to larger audit firms are expected to be growing at significantly faster rates than companies not changing to larger firms.

Summary

This chapter contained a review of three theoretical issues concerning auditor selection: agency theory, quality and reputation, and insurance. Auditor change research was also reviewed and classified into three categories: predictors of auditor change, stock market reaction, and product differentiation. Based on the literature review, growth was identified as a primary factor expected to influence companies which change to larger-sized audit firms. Theoretical support for examining growth was developed from stages of company development literature.

CHAPTER 3

METHODOLOGY

The study's purpose was to predict whether companies growing at significantly faster rates than other companies are more likely to change to larger-sized audit firms. Methodology included the following procedures, discussed in detail in this chapter:

1. Formulate the research hypothesis and develop a model to test the hypothesis. The model contained four growth and three control variables.
2. Select a group of companies changing to larger-sized audit firms during a specified time period. Match each company changing firms to a comparison company which did not change to a larger firm.
3. Perform sensitivity analyses to evaluate data in the study and to better understand characteristics of the companies.
4. Perform statistical procedures to determine if differences are significant and if a predictive model could be developed. Procedures included t-tests and logistic regression analysis.

Research Hypothesis and Model

This section presents the research hypothesis and model. Three subsections are titled Growth Variables,

Control Variables, and Other Control Procedures.

The research hypothesis was:

Companies changing to larger-sized firms have faster growth rates than companies not changing to larger-sized firms.

The research hypothesis was evaluated in two steps. First, t-tests were used to determine if mean differences in individual variables for matched-pairs were significant. Logistic regression analysis was used to predict whether a change in audit firms occurred, as a function of the growth variables, and if independent variables could predict that a company would change to a larger firm.

A logistic regression model containing seven independent variables was formulated. Four variables were used to measure growth. Three variables were used to control for other significant factors affecting the likelihood that a company changed to a larger audit firm. The model was as follows:

Change or not change to a larger audit firm =

f (Growth variables, Control variables)

where

Growth variables were:

percentage change in sales or revenues.

percentage change in net income.

percentage change in property, plant, and equipment.

percentage change in long-term debt, bond issues,
and stock issues.

Control variables were:

years with the predecessor audit firm.

company age.

audit firm competition in the company's
geographic region.

The dependent variable in the logistic model was dichotomous. Companies changing audit firms were coded as one and companies in the comparison group were coded as zero.

I. Growth Variables

Growth variables measured various aspects of companies' financial condition. Correlation between growth variables was expected because growth usually affects a company's overall financial condition (Churchill and Lewis, 1983). Correlations and related significance levels are presented in the next chapter.

The growth variables were measured as the percentage change from the third to the first year prior to the year of change in auditors. For example, if a company changed to a larger firm in June, 1979, and the fiscal year ended on December 31, percentage changes from December 31, 1976, to December 31, 1978, were computed. The data source for growth variables was Moody's manuals.

II. Control Variables

Three additional variables expected to affect the likelihood of changing firms were included in the study as controls. First, the number of years a company had been audited by the predecessor audit firm was expected to make a difference. Because available data sources (Moody's manuals, etc.) often did not permit a determination of the exact number of years an audit firm had been employed, the alternative was to measure years with the predecessor audit firm as a dichotomous variable. The significant growth period was expected to be the three years prior to the year of change. Therefore, having used the same audit firm for more than three years or for three years or less were the two variable values. (For comparison companies, years with the present audit firm were measured.) Companies having changed firms within the past three years were expected to be more likely to have anticipated growth and selected an auditor believed capable of dealing with a growth company. Alternatively, companies having used the same firm for more than three years were believed more likely to change to a larger firm when significant growth was experienced. The number of years with predecessor auditor (present auditor for comparison companies) was taken from information in annual Moody's manuals.

Company age was also included in the study as a control variable. Moody's manuals were used to determine

initial dates of incorporation. The variable was measured by computing the number of years from incorporation to the year of change. Companies changing to larger firms were expected to be younger than companies not changing because stages of development literature often suggests high growth companies are relatively young.

The final independent variable measured the degree of audit firm competition in each company's geographic region. The competition variable was computed using audit demand and audit supply values. Audit demand was measured using U.S. Census Bureau total retail and manufacturing revenues for the Standard Metropolitan Statistical Area (SMSA) in which each company was located. Demand for companies not in a SMSA was measured using total revenues for a comparable geographic region, based on county and city totals.

The supply measure was the total number of audit firms in each SMSA or geographic region who had at least one SEC client. Number of firms was collected from information in Who Audits America (1983 edition).

Competition was defined as the demand measure, total retail and manufacturing revenues for the SMSA or region, divided by the supply measure, number of SEC audit firms in the SMSA or region. Lower variable values indicated higher competition and that companies had more auditors from which to choose.

III. Other Control Procedures

Potential confounding factors were controlled so that the impact of predictor variables could be assessed. Several procedures were employed to achieve control. As discussed later, a one-to-one pair-matching on industry and time period was utilized. Also, Dopuch and Simunic (1980) and others have noted that almost all large companies are audited by the Big Eight. A size limitation was imposed in this study to ensure that a sufficient number of changes to larger non-Big Eight firms was included. Companies included in the study were those having \$125 million or less in annual sales. Although the limitation was selected arbitrarily, Simunic (1980) and Francis and Stokes (1986) used the same amount in identifying smaller companies.

Selection of Companies

I. Classification of Audit Firms

The change group included companies changing from local or regional to national audit firms, local or regional to Big Eight firms, and national to Big Eight firms. Who Audits America (1983) was reviewed to determine the most appropriate measure for placing firms into one of the three categories. Most audit firms had less than 50 SEC clients and less than 14 office locations; these were classified as local or regional. Six firms had between 50 and 250 SEC clients and also had offices located throughout

most of the United States; these were classified as national. The Big Eight category included audit firms having more than 250 SEC registered clients.

II. Change Companies

Candidates for inclusion in the group of companies changing firms were those listed in monthly issues of the Public Accounting Report as changing to a larger audit firm between January, 1978, and December, 1982. The Public Accounting Report was used because it provides more detailed information concerning changes than Securities and Exchange Commission documents, the other primary source of information. For companies changing firms, the Public Accounting Report lists the predecessor audit firm, the successor audit firm, and reasons the company gave for changing. Companies included in the publication are those traded over-the-counter or listed on the New York, American, or regional stock exchanges.

To evaluate the accuracy of the month in which the Public Accounting Report listed a company's change in auditors, month of change was compared (on a test basis) to the actual date given in the SEC News Digest. The Public Accounting Report reported changes approximately two months later than the actual date the SEC received notification. If a two month lag would have changed the years over which growth was measured, the auditor change was assumed to have

taken place earlier than the month reported in the Public Accounting Report.

The change group included companies having financial information available for the three fiscal years prior to the year of auditor change. Data were collected from annual volumes of Moody's OTC Industrial Manual or Moody's Industrial Manual.

III. Comparison Group Selection and Pair-Matching

The objective of matching change and comparison companies was to control for extraneous factors which might have biased results. Ijiri and Simon (1967) have suggested growth is composed of a factor applicable only to a specific company and an industry factor. Company growth was the factor measured in this study. Potential industry-specific growth was controlled by matching on industry. The possible impact of general U. S. economic growth was controlled by measuring financial values for matched pairs over the same time periods.

Candidates for inclusion in the comparison group were companies having securities registered with the SEC, annual sales of \$125 million or less, and SIC codes other than in the 6000 to 6790 range. One-to-one pair-matching was achieved by matching on industry and time period and by controlling for the audit firm's size.

The first step in matching was to identify, by listings of three-digit SIC codes in the SEC's Directory of

Companies Required to File Annual Reports with the SEC, qualified candidates having the same code as change companies. If no qualified candidates had the same code, the closest code with qualified candidates was selected. Financial information in Moody's OTC Industrial or Moody's Industrial manuals was reviewed to determine if a potential comparison company had information available for the three fiscal years closest to the three fiscal years of the matched change company.

Two exclusions based on firm size were necessary to ensure that comparison companies had not already changed to a larger firm because of significant growth. First, a company was eliminated from consideration if its audit firm was larger in size than the predecessor firm of the matched company. Companies were also excluded if they changed to a larger-sized firm within three years after the latest year for which financial information was measured.

IV. Profile Analysis of Companies

To determine if change and comparison companies were comparable, a profile analysis of companies was conducted. Average values for each growth and control variable were computed for each group. Also computed were dollar averages of various amounts for the last year each company's information was measured.

Data Sensitivity Analyses

Several analyses were conducted to evaluate data in the study and to better understand company characteristics.

I. Concentration of Auditors in Certain Industries

The first analysis examined the possibility that the changes to other auditors were influenced by concentration or specialization of auditors in certain industries. A listing of the number of auditors in each industry was prepared and reviewed. Industry was defined as three-digit Standard Industrial Classification (SIC) codes or as one-digit codes.

II. Potential Impact of Inflation on the Study's Data

During the late 1970's and early 1980's significant inflation occurred. Because matched pair t-tests are based on differences in values for each pair and information for various companies was measured from as early as the mid-1970's to as late as 1981, mean values of differences may have been impacted by inflation. To evaluate inflation's impact, matched pair t-tests on growth variables were conducted using adjusted values.

Financial values were adjusted by dividing each year's value by the Consumer Price Index (CPI) for the same year. For example, if a company changed to a larger firm in June, 1979 and its fiscal year ends on December 31, the CPI adjusted percentage change in sales was computed as:

$$\% \text{ change in sales} = \frac{\frac{\text{sales in 1978}}{\text{CPI in 1978}} - \frac{\text{sales in 1976}}{\text{CPI in 1976}}}{\frac{\text{sales in 1976}}{\text{CPI in 1976}}}$$

The CPI is widely accepted (Williams, et. al., 1984), required by the FASB (SFAS #33), and often taken as a measure of general economic inflation. Although other indices might provide a more precise measure of inflation by industry, the CPI was believed to give a reasonable indication of inflation's impact on t-test results.

III. Company Age

Churchill and Lewis (1983) suggested that some younger companies may experience high growth. If young companies in the study experienced higher growth than older companies, these companies may "drive" results of the total change group. A review of companies' ages revealed that ten years old appeared to be a natural break. To evaluate the impact of age, t-tests compared average values of growth variables for companies less than ten years old to average values of growth variables for companies ten years old and older.

IV. Acquisitions and Mergers

The potential impact of acquisitions and mergers on growth was considered. The Directory of Corporate Affiliations and Moody's manuals were used to identify

change and comparison companies which acquired or merged with other companies in the three years for which financial information was measured. A Pearson chi-square test of association (test of independence) between group (change or comparison) and acquisition or merger was conducted. Logistic regression analysis was also conducted with acquisition or merger as a dichotomous independent variable (coded as one for companies with an acquisition or merger and zero for all other companies).

V. Relation of Growth Rates to Audit Firm Size

Another data analysis evaluated whether growth companies tended to change to certain sized firms. Average growth rates for sales, net income, property, plant, and equipment, and capitalization were evaluated using independent sample t-tests. Three separate sets of t-tests compared average values for companies changing to various sized firms. Comparison companies were omitted from the analyses.

First, averages for companies changing from local or regional to Big Eight firms were compared to averages for companies changing from local or regional to national firms. Next, average values for companies changing from national to Big Eight firms were compared to averages for companies changing from local or regional to Big Eight firms. Finally, averages for companies changing from local

or regional to national and Big Eight firms were compared to averages for companies changing from national to Big Eight firms.

VI. Company Size and Year of Auditor Change

Companies included in the study changed to a larger audit firm between 1978 and 1982, inclusive. During this time period larger audit firms began more aggressively pursuing small potential clients. Several firms established or expanded separate "small business practices" which served only small companies and offered more competitive audit fees. The possibility that company size varied by year of change was evaluated using t-tests.

First, average differences for total dollar sales and total dollar assets were compared by year for change and comparison companies. The next analysis compared average dollar sales and average dollar assets of companies changing in the earliest year, 1978, to values for companies changing in the latest year, 1982. Average dollar sales and average dollar assets for companies changing in 1978 were also compared to averages for companies changing in 1982, after including companies not in the original study because all data were not available or a matched comparison company could not be identified.

If small companies were more likely to change in later years of the study, those companies might have higher growth than companies in the earlier years. After

reviewing the data to determine the specific years which should be studied, logistic regression analysis was conducted for two time periods and results compared to a holdout group from 1983 and 1984. The first analysis included companies changing auditors in 1981 and 1982 and matched comparison companies. The other analysis included only companies changing in 1982 and matched comparison companies.

Statistical Procedures

I. Descriptive Statistics

Means, standard deviations, etc., were computed by group and for all companies in both groups. Pearson product-moment correlations and related significance levels were computed for growth and control variables. Matched pair t-tests were used to identify variables whose mean values were significantly different for change and comparison groups.

Growth was measured over the three years before auditor change so that growth preceding, and contributing to, the audit firm change could be measured. Neilsen (1978) used a three year time period in his study. However, Quinn and Cameron (1983) note that stages of development models do not specify the length of time companies remain in each stage. Growth over three other time periods was also examined to determine if these

periods better measured growth. One time period was the year before the year of change to the year after the year of change. The second time period was from the year of auditor change to two years after the year of change. Finally, average annual growth was evaluated from three years before the change to two years after the change.

II. Logistic Regression Analysis

Logistic regression analysis was used to estimate the probability of a change in audit firms, as a function of growth rates in the four growth variables and of the three control variables. Logistic regression is appropriate with dichotomous or polytomous dependent variables. A maximum-likelihood estimation procedure is used to compute parameter estimates (Pindyck and Rubinfeld, 1981).

The LOGIST procedure (Harrell, 1983) in the SAS statistical package supplemental library provides likelihood ratio (chi-square) statistics and associated significance levels for the overall model and each independent variable. The backward stepwise procedure first fits a model containing all variables to the data. Variables are then eliminated one-by-one based on likelihood ratio tests at some predetermined significance level. The significance level selected for this study, consistent with previous studies, was arbitrarily set at 0.10.

The logistic model provided a procedure for estimating the probability that a company would change auditors. Classification tables were used to evaluate the model's performance by classifying companies as changing or not changing. Companies were classified as changing auditors if their predicted probability of changing was 0.50 or greater.

Hunt (1985) suggested that conditional logistic regression should be used when paired data and a number of controlling categories are involved. Because the current study controlled for industry, time period, audit firm size, etc., conditional logistic regression was conducted using the PHGLM procedure in the SAS statistical package supplemental library. Results using conditional logistic regression with PHGLM were very similar to results from LOGIST, confirming findings by Breslow, et.al. (1978). Because logistic regression is more widely accepted, LOGIST results are reported in the next chapter. Conditional regression results are reported in Appendix Table A-5.

III. Holdout Group

To evaluate the model's predictive ability, a holdout group was included in the study. Companies listed in the Public Accounting Report as changing to larger audit firms from January, 1983, to March, 1984, were included in the holdout group. All requirements for inclusion, the data

sources, and the variables measured were identical to those in the original study. Data availability limitations did not allow determination of bankruptcy subsequent to the change year, as was done in the original study. This limitation could only bias results in a conservative direction by including companies which changed firms because of impending bankruptcy.

The same matching procedures were used as with the original change and comparison companies. However, data availability limitations prohibited the determination of whether some comparison companies changed to a larger firm in the three years subsequent to the latest year financial information was measured. This missing control could also only bias results in a more conservative direction.

T-tests compared mean differences in growth variables for holdout and comparison companies to determine if holdout and original companies were comparable. Parameter estimates from logistic regression analysis of the original change and comparison groups were used to predict probabilities of change for the holdout group. Predictive ability of variables which were significant in the original analysis were generated for the holdout group.

IV. Overrepresentation Correction

One-to-one pair-matching in bankruptcy studies has been criticized because the group of companies going

bankrupt is overrepresented (Eisenbeis, 1977). Zmijewski (1984) observes that if companies self-select into a group random sampling is prohibited, creating asymptotically biased parameter and probability estimates. A similar situation existed in this study. Companies changing to larger audit firms represented approximately five percent of all public companies with \$125 million or less in annual sales. Manski and McFadden (1981) suggested a weighting technique to correct for the overrepresentation problem. Zmijewski illustrated the technique in an accounting research context. Zmijewski adjusted the log-likelihood ratio in his study for the percentage of companies going bankrupt. After adjustment, the model's chi-square actually increased. However, the model's ability to correctly classify companies in Zmijewski's treatment group (corresponding to the change group in this study) was less than in the unadjusted model.

Based on Zmijewski's study, the logistic regression log-likelihood function used to correct for overrepresentation was as follows:

Begin with the usual likelihood function,

$$L = \sum (Y_i) \ln P + \sum (1-Y_i) \ln(1-P)$$

where

$Y_i = 0$ for the comparison group

$Y_i = 1$ for the change group

$\ln$ = natural log

P = estimated probability that a company changed firms.

The first term in the formula contained only change group companies and was multiplied by the ratio of POP/SAMP where

POP = ratio of number of companies which changed firms and had sales equal to or less than \$125 million to number of all publicly traded companies with \$125 million or less in sales.

SAMP = proportion of change group companies in the study.

After reviewing information in Who Audits America and Simunic (1980), the percentage of publicly traded companies with \$125 million or less in annual sales who change auditors in a specific year (POP) was estimated to be .05. SAMP was .50.

The second term in the formula contained comparison group companies and was multiplied by the ratio of POP for comparison companies/SAMP for comparison companies where:

POP for comparison companies = $1 - (\text{POP for change cos})$.

SAMP for comparison companies = $1 - (\text{SAMP for change cos})$.

Therefore, the log-likelihood function to be maximized was:

$$L = \left(\frac{.05}{.50} \right) \sum (Y_i) \ln P + \left(\frac{.95}{.50} \right) \sum (1 - Y_i) \ln(1 - P)$$

Summary

This chapter discussed methodology used in the study. The research hypothesis and model were formulated. Four variables expected to measure growth and three control variables were included. Companies changing audit firms between 1978 and 1982 were selected and matched to comparison companies with similar characteristics. Several analyses evaluated data and characteristics of the companies. Statistical procedures included logistic regression analysis and t-tests. The model's predictive ability was evaluated using classification tables and a holdout group.

Chapter 4 will present results of procedures described in Chapter 3. Results will evaluate whether growth companies are actually more likely to change to larger audit firms.

CHAPTER 4

DATA ANALYSIS

The research was conducted according to procedures presented in Chapter 3. Research findings are summarized in this chapter. Conclusions and limitations applicable to the findings are discussed in Chapter 5.

Research Hypothesis and Model

I. Growth Variables

As discussed in Chapter 3, growth variables measured the percentage change in values from the third to the first year prior to the year of change in auditors and the corresponding period for matched companies. Growth variables were:

percentage change in sales or revenue.

percentage change in net income.

percentage change in property, plant, and equipment.

percentage change in long-term debt, bond issues, and stock issues.

II. Control Variables

Control variables were:

number of years audited by the predecessor firm for change companies and number of years with the present firm for comparison companies.

company age in years.

audit firm competition in the company's geographic region (computed as the demand measure divided by the supply measure).

III. Other Control Procedures

The \$125 million size limitation imposed on change companies caused approximately 18 to be eliminated. Also, approximately 10 companies were eliminated because a matched company in the same or similar industry could not be located.

Selection of Companies

I. Classification of Audit Firms

Sixty-five change companies in the study had a local or regional predecessor audit firm (firm from which a company changed) and 22 had a national firm as predecessor. Fifteen companies changed to audit firms classified as national and 72 companies changed to one of the Big Eight firms.

II. Change Companies

Eighty-seven companies changing to a larger firm could be matched to a comparison company. (The number of companies excluded because all data were not available for the change or matched comparison company were 9 in 1978, 5 in 1979, 15 in 1980, 15 in 1981, and 11 in 1982.) Moody's manuals were used as the source for financial data.

Several companies in the study had very high percentage growth in one or more independent variables, causing the variables to have limited dispersion. Harrell (1983a) has noted that variables with limited dispersion (defined as $[\text{mean}-\text{minimum}]/\text{range}$ less than .05 or greater than .95) have little chance of being statistically significant in logistic regression analysis. Therefore, the maximum percentage change for growth variables was arbitrarily set at 1000 percent. Appendix Table A-4 illustrates by independent sample t-tests that, except for sales with 2000 or 5000 percent maximums, limits of 500, 2000, and 5000 percent yielded similar results to the 1000 percent limitation (reported in Table 10). Growth values greater than 1000 percent were recorded as 1000.

III. Comparison Group Selection and Pair-Matching

Five of the 87 (5.7%) companies were matched to a company with a different three-digit code but exactly the same industry description. (For example, SIC codes 805 and 806 are both defined by the SEC as "medical and other health services"). Another four companies were matched to a company in a different, but similar, SIC classification. All nine companies (10.3%) had the same two-digit SIC code as their matched comparison company. Table A-1 in the Appendix lists the eighty-seven change companies, matched comparison companies and three-digit SIC codes for all

companies. Descriptions of three-digit SIC codes are in Appendix Table A-2.

IV. Profile Analysis of Companies

Table 1 contains a profile analysis of change and comparison companies. Average values by group for growth and control variable were computed. Also, selected dollar financial values were computed for the year before the change (and the corresponding fiscal year for comparison companies). Table 1 indicates that three of four growth variables were higher for the change group and also that change companies were younger. Change and comparison companies were similar in size of total assets and sales and had similar dollar net income.

Table 1 also reports that the 87 companies came from 52 different three-digit SIC codes. Appendix Table A-2 lists the number of change companies in each industry. Table A-2 illustrates that no industry classification contains an excessive percentage of the total sample.

Maximum and minimum values of the variables are listed in Appendix Table A-3 (values reflect the 1000 percent limitation imposed on the four growth variables). Very few companies had growth in any variable greater than 1000%, although several had growth in the 500% to 1000% range. For example, only three change companies experienced sales growth greater than 1000%. An interesting characteristic of the three companies was that

Table 1

Profile Analysis: Average Amounts of Variables
and Other Selected Information for Change
and Comparison Companies

	Change Companies	Comparison Companies
Growth Variables:		
Sales	120.9%	63.4%
Net Income	5.3%	20.5%
Property, Plant, & Equip.	178.9%	73.9%
Capitalization	151.8%	64.8%
Control Variables:		
Yrs. with Predecessor Auditor (coded as 1 for ≤ 3 yrs., 0 for > 3 yrs.)	0	0.11
Company Age	18.6 yrs.	21.84 yrs.
Competition (demand measure divided by supply measure)	1,128.9	1,210.4
Dollar Values for the Year Before Auditor Change and Corresponding Year for Comparison Companies:		
Total Assets	\$14,424,426	\$11,973,138
Sales	\$15,524,908	\$18,907,472
Net Income	\$612,287	\$543,333
Prop., Plant, & Equip.	\$3,888,011	\$3,685,575
Capitalization	\$4,864,736	\$5,400,092
# of 3-digit SIC codes represented	52 codes	52 codes

they had been incorporated three, five, and six years at the change date and thus were younger in age than the average for the change group. The finding that high growth companies were younger is consistent with stages of company development and is examined later in this chapter.

Eighteen companies changed from an auditor which had no other SEC clients. The companies, predecessor auditor, and three-digit SIC industry code are listed in Appendix Table A-6. Because the companies in Table A-6 came from sixteen different industry codes, changes were apparently motivated primarily by companies' needs for increased services and not by industry-specific factors.

Data Sensitivity Analysis

I. Concentration of Auditors in Certain Industries

The possibility that companies were influenced by auditor concentration in a specific industry was also considered. The wide dispersion of industries (52 industry codes) would prohibit auditor industry concentration from biasing the study's results. This conclusion was supported by reviewing the number of auditors represented in each industry in the study (Appendix Table A-2). For example, the seven companies in SIC #131 selected four different auditors. Also, this study included only companies in non-heavily regulated industries, which had declines in auditor concentration (Danos and Eichenseher, 1981).

II. Potential Impact of Inflation on the Study's Data

Matched pair t-tests using values adjusted for inflation were conducted for growth variables and are reported in Table 2. Results were very similar to those for unadjusted values reported in the Descriptive Statistics section and on page 76. Adjusting for inflation was thus not considered necessary and was not used in subsequent tests.

III. Company Age

Stages of development literature often suggests that high growth companies are younger in age. T-test results reported in Table 3 illustrate that companies younger than 10 years of age did in fact experience significantly higher growth in sales, PPE, and capitalization than other companies. Thus, companies most likely to experience high growth and change to a larger firm were the youngest ones. Implications of this finding are discussed in Chapter 5.

IV. Acquisitions and Mergers

Acquisitions and mergers of companies were examined to determine if they were a source of growth. Table 4 reports that eighteen of the 87 change companies (20.7%) and 13 comparison companies (14.9%) acquired another company or merged with another company during the three years before auditor change. All 13 comparison companies and 16 of the 18 change companies had an acquisition; one

Table 2

Matched Pair T-tests Comparing Differences for
Growth Variables Adjusted for Inflation

Variable	Difference Mean	T-Value	Prob. > T
Sales	54.1%	2.36	.0205*
Net Income	-27.7%	-.59	.5536
Prop., Plant, & Equip.	83.7%	2.76	.0071*
Capitalization	84.3%	2.57	.0117*

* = statistically significant

Table 3

Comparison of Growth of Change Companies Less than
Ten Years Old at Time of Auditor Change to Growth
of Change Companies Ten Years or Older at the
Time of Auditor Change

Category	Mean	T-Value	Prob. > T
Sales:			
Age < 10 yrs.	281.3%	-	-
Age ≥ 10 yrs.	79.0%	2.4243	.0259*
Net Income:			
Age < 10 yrs.	-98.6%	-	-
Age ≥ 10 yrs.	32.4%	-1.0805	.2916
Prop., Plant, & Equip.:			
Age < 10 yrs.	360.3%	-	-
Age ≥ 10 yrs.	143.6%	2.3167	.0307*
Capitalization:			
Age < 10 yrs.	362.9%	-	-
Age ≥ 10 yrs.	104.6%	2.6433	.0156*

Age < 10 yrs. = 18 companies

Age ≥ 10 yrs. = 69 companies

* = statistically significant

Table 4

Acquisitions or Mergers by Change and Comparison
Companies during the Time Periods
Measured in the Study

	Change	Comparison
Total companies acquiring or merging with another company	18 cos.	13 cos.
% of total group of 87 companies	20.7%	14.9% #

A Pearson chi-square test of association between group (change or comparison) and acquisition or merger yielded a chi-square of 0.98, finding no statistical significance.

change company merged, and one change company had an acquisition and merger.

A Pearson chi-square test of association between group (change or comparison) and acquisition or merger yielded a chi-square value of 0.98, finding no significant statistical association between group and acquisition or merger. Also, logistic regression analysis was conducted, using change or not change as the dependent variable and acquisition or merger as an independent variable. Acquisition or merger was coded as one for change and comparison companies with an acquisition or merger and zero for all other companies. The independent variable was not significant in any analysis.

Statistical results illustrate that the study is not significantly biased by including companies with an acquisition or merger. Also, acquisitions usually involve a larger company purchasing a relatively small company while mergers are usually between companies of similar size. Companies with acquisitions could have substantial growth for other reasons. Therefore, acquisitions or mergers were not considered the primary source of growth for most change companies.

V. Relation of Growth Rates to Audit Firm Size

Three sets of t-tests compared average variable values for various types of changes to evaluate whether growth companies tended to change to certain sized audit

firms. Table 5 summarizes the findings. Only one comparison had significant differences in average values of growth companies. Companies changing from local or regional to national firms had significantly higher average growth than companies changing from local or regional to Big Eight firms. Sales, PPE, and capitalization were significant. However, results were opposite a priori expectations that growth and firm size are positively related. Companies changing to national firms were growing faster than companies changing to Big Eight firms.

Only fifteen companies changed to national audit firms. Several of the fifteen companies experienced high growth, substantially increasing variable means and the likelihood of significant differences in average values of variables. Because there was no apparent common link, such as industry (the 15 companies came from 13 different three-digit SIC codes), among companies changing to national firms, the reason for these results is not clear.

VI. Company Size and Year of Auditor Change

Table 6 reports results of matched pair t-tests, comparing differences in average total sales and average total assets for change and comparison companies when classified by year of auditor change. There was no discernable pattern to the differences. Table 7 summarizes, by year, average variable values for change

Table 5

T-Tests Comparing Average Growth for Various
Types of Audit Firm Changes

Variable	Means	T-Value	Prob. > T
Local to National or Big Eight (65 companies) vs. National to Big Eight (22 companies)			
Sales:			
Local to Nat. or B8	123.9%	-	-
Nat. to B8	111.8%	-.2218	.8258
Net Income:			
Local to Nat. or B8	8.0%	-	-
Nat. to B8	-2.9%	-.1188	.9060
PPE:			
Local to Nat. or B8	210.7%	-	-
Nat. to B8	122.8%	-1.3705	.1774
Capitalization:			
Local to Nat. or B8	161.3%	-	-
Nat. to B8	148.6%	-.1778	.8598
National to Big Eight (22 companies) vs. Local to Big Eight (50 companies)			
Sales:			
Nat. to B8	111.8%	-	-
Local to B8	71.6%	-.8032	.4297
Net Income:			
Nat. to B8	-2.9%	-	-
Local to B8	53.6%	.6460	.5226
PPE:			
Nat. to B8	122.8%	-	-
Local to B8	149.1%	.4263	.6722
Capitalization:			
Nat. to B8	148.6%	-	-
Local to B8	87.2%	-.9015	.3742

Table 5 (continued)

Variable	Means	T-Value	Prob. > T
Local to Big Eight (50 companies) vs. Local to National (15 companies)			
Sales:			
Local to B8	71.6%	-	-
Local to Nat.	298.4%	-2.4984	.0250*
Net Income:			
Local to B8	53.6%	-	-
Local to Nat.	-147.3%	1.2628	.2245
PPE:			
Local to B8	149.1%	-	-
Local to Nat.	361.3%	-2.0621	.0545*
Capitalization:			
Local to B8	87.2%	-	-
Local to Nat.	372.7%	-2.7226	.0148*

Nat. = National

B8 = Big Eight

* = statistically significant

Table 6

Matched Pair T-tests Comparing Differences in Average
Total Dollar Sales and Average Total Dollar Assets
for Change and Comparison Companies, Classified
by Year of Auditor Change

	Year of Auditor Change				
	1978	1979	1980	1981	1982
# of Companies in each group	18	16	18	12	23

Avg. Total Sales:

Change Cos.	\$24,375	\$24,087	\$14,577	\$17,703	\$ 8,260
Comparison Cos.	31,308	8,649	19,497	9,075	15,674
Difference in Average Sales	-6,933	15,438	-4,920	8,627	-7,414
T-Value	-.83	3.56	-.99	1.09	-1.56
Prob. > T	.4163	.0029	.3360	.3002	.1331

Avg. Total Assets:

Change Cos.	\$15,139	\$13,448	\$10,228	\$12,400	\$ 9,832
Comparison Cos.	20,432	6,179	12,810	8,313	12,090
Difference in Average Assets	-5,293	7,269	-2,582	4,088	-2,258
T-Value	-.66	2.75	-.81	1.25	-.68
Prob. > T	.5182	.0149	.4275	.2360	.5022

Notes: All dollar amounts are in thousands.

One company causes the averages for change companies in 1981 to be much higher. Removing that company would change average sales to \$11,363 and average assets to \$9,953.

* = statistically significant

Table 7

Average Total Dollar Sales and Average Total Dollar
Assets for Companies Changing Auditors,
Classified by Year of Change

	Year of Auditor Change				
	1978	1979	1980	1981	1982
# of Companies	18	16	18	12	23
Avg. Total Sales (in thousands)	\$24,375	\$24,087	\$14,577	\$17,703	\$8,260
T-test Comparing Average Sales for 1978 and 1982:					
T Value					2.9157
Probability > T					.0075*
Avg. Total Assets (in thousands)	\$15,139	\$13,448	\$10,228	\$12,400	\$9,832
T-test Comparing Average Assets for 1978 and 1982:					
T Value					1.2232
Probability > T					.2319
Percentage Growth in Sales	110.3%	108.4%	119.2%	156.5%	120.5%
Percentage Growth in Net Income	-66.3%	21.1%	59.1%	53.5%	-17.0%
Percentage Growth in PPE	133.0%	70.4%	186.0%	133.8%	302.8%
Percentage Growth in Capitaliz.	61.0%	88.4%	105.3%	192.4%	282.7%
Age in Years	13.9	20.1	19.9	18.9	19.9
Competition (demand divided by supply)	1,099.4	1,161.7	1,956.6	911.8	1,299.5

* = statistically significant

group companies. T-tests compared average values for total sales and total assets in 1978 and 1982. Size, measured in dollar sales, was significantly smaller in 1982 than in 1978. The average of dollar assets was also smaller in 1982, but not significantly different in the t-test. Growth in property, plant, and equipment, and capitalization was highest in 1982. Results are consistent with the belief that larger audit firms were more aggressively pursuing small companies by the early 1980's. Specifically, larger auditors may have been more likely to attract small, high growth companies.

The analysis reported in Table 8 compared total sales and total assets of companies changing auditors in 1978 and 1982, after including a total of 22 companies which were not in the original study because all data were not available or a matched comparison company could not be identified. The 22 additional companies (9 in 1978 and 13 in 1982) caused average total assets and average total sales to be significantly smaller in 1982 than in 1978.

Because year of change apparently impacted results, logistic regression analysis was conducted for two time periods. The time periods were selected by reviewing results in Tables 6 and 7 to determine when small, high growth companies were more likely to change. One time period covered 1981 and 1982. The second period was 1982 only. The logistic regression contained growth and

Table 8

T-tests Comparing Average Total Dollar Sales and Average
Total Dollar Assets for Companies Changing Auditors in
1978 and 1982, Including Twenty-two Companies
Not in the Original Study

	<u>Year of Auditor Change</u>	
	<u>1978</u>	<u>1982</u>
# of companies in the original study	18	23
companies not in the original study because all data were not available or the companies could not be matched to comparison companies	<u>9</u>	<u>13</u>
total companies	27	36
Avg. Total Sales (in thousands)	\$20,197	\$8,618
T-Value	-	3.0314
Prob. > T	-	.0046*
Avg. Total Assets (in thousands)	\$19,318	\$8,607
T-Value	-	2.1272
Prob. > T	-	.0416*

* = statistically significant

control variables and included comparison companies. Analyses for both periods are reported in Table 9. Property, plant, and equipment (PPE) and competition (Compt.) were significant variables. Predictive ability was similar to other change studies with an estimated R^2 of .080 for 1981 and 1982, and .152 for 1982 only.

The competition variable in 1981 and 1982 was higher for change companies than for comparison companies. As discussed in Chapter 3, lower values indicate more audit firm competition. Companies changing in 1981 and 1982 were apparently those in areas with less competition among audit firms for small, high growth clients. Several explanations are possible for the findings concerning competition. First, companies may have been changing in geographic areas where only one or a few audit firms were dominant. Another possibility is that the variable does not adequately measure all competitive factors which influence change and comparison companies. A third explanation is that the finding is simply an unexplainable occurrence and does not have any significance to the study.

To summarize material in this section, company age and company size were significant. Age is included in the next section as a control variable. Size affects conclusions in Chp. 5 but is not included in procedures discussed next.

Table 9

Logistic Regression Results for Companies Changing
Auditors in 1981 and 1982 or Only in 1982

	Predicted Classification	
	Not Change (Holdout)	Change (Holdout)

Years of Change: 1981 and 1982

Significant Variables: PPE & Competition

$(\hat{Y} = -1.27946100 + .00347067[PPE] + .00077008[Compt.]$
estimated $R^2 = .080$

Actual	Not Change	74.3%	(63.0%)	25.7%	(37.0%)
	Change	42.9%	(51.9%)	57.1%	(48.1%)

OVERALL: 65.7%

OVERALL (Holdout): 55.6%

Year of Change: 1982

Significant Variables: PPE & Competition

$(\hat{Y} = -2.13709218 + .00411004[PPE] + .00136797[Compt.]$
estimated $R^2 = .152$

Actual	Not Change	69.6%	(55.6%)	30.4%	(44.4%)
	Change	34.2%	(63.0%)	65.2%	(37.0%)

OVERALL = 67.4%

OVERALL (Holdout): 46.3%

Note: There were 35 change and 35 comparison companies for 1981 and 1982; 23 change and 23 comparison companies for 1982 only; 27 change and 27 comparison companies in the holdout group. The holdout group is discussed on pages 50, 51, 87, 88, and 89.

Statistical Procedures

I. Descriptive Statistics

Tables 10 and 11 contain means and results of matched pair t-tests for the seven independent variables.

(Results of nonparametric Wilcoxon tests yielded the same significant variables and are not reported.) The variable, years with predecessor, was coded as one for companies having the same firm for three years or less and zero for companies having used the same firm for more than three years. Although the t-test indicated a significant difference, all companies which changed had used the predecessor firm for more than three years. Eighty-two of 87 (94.3%) comparison companies had also used the predecessor firm for more than three years. (Because a t-test may not be valid with dichotomous data, a Chi-Square test was performed. Results were similar to the t-test.) Years with predecessor firm was not believed to be a meaningful variable in explaining changes to larger firms and not included in subsequent analyses.

Tables 10 and 11 illustrate that growth in sales, property, plant, and equipment, and capitalization was significantly higher for the change group than for the comparison group and that change companies were younger. The finding in Table 10 that average growth in net income was higher for comparison companies (although not significantly higher) than change companies is supported

Table 10
Matched Pair T-tests Comparing Differences
in Growth Variables

Variable	Mean	Difference Mean	T-Value	Prob. > T
Sales:				
Change	120.9%			
Comparison	63.4%	57.5%	2.37	.0200*
Net Income:				
Change	5.3%			
Comparison	20.5%	-15.2%	-.30	.7674
Property, Plant, & Equip.:				
Change	178.9%			
Comparison	73.9%	105.0%	3.2	.0015*
Capitalization:				
Change	151.8%			
Comparison	64.8%	87.0%	2.51	.0139*

* = statistically significant

Table 11

Matched Pair T-tests Comparing Differences
in Control Variables

Variable	Mean	Difference Mean	T-Value	Prob. > T
Yrs. with Predecessor (coded 1 for $\leq$ 3 yrs., 0 for $>$ 3 yrs.):				
Change	0.00			
Comparison	0.11	-.11	-3.33	.0013#
Company Age:				
Change	18.56 years			
Comparison	21.84 years	-3.28	-2.06	.0420*
Competition:				
Change	1,128.9 units			
Comparison	1,210.4 units	-81.49	-.42	.6766

Chi-square test for independent samples yielded a Chi-square of 5.69, significant at the .025 level.

* = statistically significant

by Francis and Stokes' 1986 study. They reported that small companies with Big Eight auditors were less profitable than small companies using other auditors.

Table 12 presents Pearson correlation coefficients and related significance levels. Sales, property, plant, and equipment (PPE), and capitalization were significantly positively correlated with each other and significantly negatively correlated with the company's age, suggesting that high growth companies may be relatively young (supported by age's significance in Table 11).

Table 10 reported growth in variables when measured over the three years preceding the change year. Tables 13 and 14 report results of matched pair t-tests with growth measured over two other time periods. Appendix Table A-7 reports average annual growth from three years before the auditor change to two years after the change. (Appendix Table A-8 lists the reasons why 42 companies [87 in the original analysis minus 45] could not be included in the analyses summarized in Tables 14 and A-7). T-tests in Tables 13, 14, and A-7 found that differences in means for time periods were insignificant at the 0.10 level, except capitalization in Tables 14 and A-7. Table 10 reported that differences in means for the original time period were significant for three growth variables. These results seem to imply that the three years before an auditor change measure the most significant growth.

Table 12
Pearson Product-Moment Correlations

	Sales	NI	PPE	CAP	AGE
NI	.0854 (.2628)				
PPE	.3644 (.0001)	-.0574 (.4522)			
CAP	.3385 (.0001)	-.0208 (.7858)	.5904 (.0001)		
AGE	-.2581 (.0006)	.0955 (.2103)	-.3398 (.0001)	-.2434 (.0012)	
COMPT	-.0085 (.9111)	.1087 (.1533)	-.1088 (.1529)	-.1262 (.0971)	.1135 (.1358)

Note: significance levels are in parenthesis.

NI = Net Income

PPE = Property, Plant, and Equipment

CAP = Capitalization

AGE = Company Age

COMPT = Competition

Table 13

Matched Pair T-tests Comparing Average Growth from the
Year Before to the Year After the Audit Firm Change

	Mean	Difference Mean	T-Value	Prob. > T
Sales:				
Change	58.97%		-	-
Comparison	42.87%	16.10	.67	.5065
Net Income:				
Change	79.79%		-	-
Comparison	-.61%	80.40	1.32	.1909
PPE:				
Change	101.30%		-	-
Comparison	54.81%	46.49	1.54	.1280
Capitalization:				
Change	78.37%		-	-
Comparison	59.53%	18.84	.57	.5687

Note: Each group contains 62 companies.

Table 14

Matched Pair T-tests Comparing Average Growth
from the Year of Audit Firm Change to
Two Years After the Change

	Mean	Difference Mean	T-Value	Prob. > T
Sales:				
Change	40.82%		-	-
Comparison	87.06%	-46.24	-1.25	.2175
Net Income:				
Change	32.82%		-	-
Comparison	-2.12%	34.94	.53	.5957
PPE:				
Change	64.63%		-	-
Comparison	91.91%	-27.28	-.77	.4441
Capitalization:				
Change	56.45%		-	-
Comparison	30.70%	25.75	1.86	.0697*

Note: Each group contains 45 companies.

* = statistically significant

Stages of development literature also support the findings in Tables 10 (page 76), 13, and 14. Miller and Friesen (1984) found that sales levels in the maturity (post-growth) stage averaged less than 15% per year. Table 14 reports average growth in sales over three years of only 40.82%. Churchill and Lewis (1983) and Kazanjian (1984) believe companies in growth stages often have difficulty maintaining profitability, consistent with income growth in Table 10 (page 76) of only 5.3% over three years. Churchill and Lewis (1983) and Vozikis and Glueck (1980) note that companies moving out of growth stages focus on increasing profitability and return on investment. Peak profitability of companies in a study by Metzner, Wall, and Glueck (1975) came four months before the company reached maturity. Companies which have experienced significant growth would also be expected to become more profitable as a result of increased market share, an expectation supported by Buckley (1979) and Buzzell, Gale, and Sultan (1975). Francis and Stokes (1986) found that, of companies audited by the Big Eight, larger companies were more profitable than smaller ones.

II. Logistic Regression Analysis

Table 15 reports logistic regression results using the backward elimination option. (Conditional logistic regression results using the PHGLM statistical procedure were very similar and are reported in Table A-5 in the

Table 15

Logistic Regression Analysis of the Original
Model, Using Backward Elimination

Variable	Chi-Square Significance	MODEL	
		Chi-Square	Significance
Sales	.4025	12.02	.0614
Net Income	.8556		
PPE	.0751		
Capitalization	.5689		
Company Age	.7981		
Competition	.9710		
Sales	.4030	12.02	.0345
Net Income	.8527		
PPE	.0747		
Company Age	.7954		
Capitalization	.5656		
Sales	.4125	11.99	.0174
PPE	.0728		
Company Age	.7801		
Capitalization	.5628		
Sales	.3878	11.91	.0077
PPE	.0580		
Capitalization	.5567		
Sales	.3453	11.56	.0031
PPE	.0174		
PPE	.0049	10.60	.0011

Appendix.) The only variable significant at the 0.10 level was property, plant, and equipment (PPE). Because sales, PPE, and capitalization were significantly correlated, the possibility existed that PPE prevented finding significant results for sales and capitalization. Table 16 reports various model combinations when PPE or PPE and capitalization were omitted from the model. Sales, PPE, and capitalization were all effective in separating the change and comparison groups when the other two correlated variables were not included.

Estimated R^2 reported for the logistic models with PPE only, sales only, or capitalization only are reported in Table 17. Although change companies had significantly higher growth in three of four variables, the R^2 's (.036 for PPE) were lower than in other studies. Chow and Rice (1982) reported an estimated R^2 of .104 with the variable "qualified opinions" in their logistic model. Williams (1984) had an estimated R^2 of .158 in a model with four significant variables. (Morrison, 1972, notes that R^2 in logit type models usually cannot exceed .333.)

Classification results are reported in Table 17 for model combinations containing only one of the three significant variables. Companies were classified as changing if the estimated probability was 0.50 or greater. The various models were more accurate when classifying

Table 16

Logistic Regression Analysis of the Original
Model, Excluding Certain Variables

Variable	Chi-Square Significance	MODEL	
		Chi-Square	Significance
Backward Elimination Without PPE:			
Capitalization	.0303	5.66	.0174
Backward Elimination Without PPE and Capitalization:			
Sales	.0625	4.48	.0343

Table 17

Logistic Regression Classification Results for the
Original Groups and for the Holdout Groups, Using
Growth Variables Which Were Significant
for the Original Groups

		Predicted Classification			
		Not Change		Change	
		Original	Holdout	Original	Holdout
Variable: PPE					
$(\hat{Y} = -.29639634 + .00257975[PPE])$					
(estimated $R^2 = .036$)					
Actual	Not Change	78.2%	88.9%	21.8%	11.1%
	Change	60.9%	63.0%	39.1%	37.0%
OVERALL (Original Grp.): 58.6%					
OVERALL (Holdout): 68.5%					
Variable: Sales					
$(\hat{Y} = -.16816316 + .00195857[Sales])$					
(estimated $R^2 = .010$)					
Actual	Not Change	85.1%	88.9%	14.9%	11.1%
	Change	63.2%	74.1%	36.8%	25.9%
OVERALL (Original Grp.): 60.9%					
OVERALL (Holdout): 57.4%					
Variable: Capitalization					
$(\hat{Y} = -.16399503 + .00161933[Cap.])$					
(estimated $R^2 = .015$)					
Actual	Not Change	85.1%	70.4%	14.9%	29.6%
	Change	67.8%	81.5%	32.2%	18.5%
OVERALL (Original Grp.): 58.6%					
OVERALL (Holdout): 44.4%					

Note: The original analysis contained 87 change and 87 comparison companies. The holdout group contained 27 change and 27 comparison companies.

companies in the comparison group than when classifying change companies. Overall classification accuracy for PPE was 58.6%, with 102 of 174 companies correctly classified. Table 17 also reports classification results of a holdout group, discussed in the next section.

III. Holdout Group

A holdout group was used to evaluate the model's predictive ability. Twenty-seven companies changing to larger firms were matched to comparison companies. As with the original groups, the growth variables were measured over three year periods. Table 18 reports results of matched pair t-tests for each growth variable and compares values to those in the original analysis (reported in Table 10, page 76). The sales and PPE variables had the only statistically significant difference means. Insignificant differences for capitalization in the holdout group imply that capitalization's significance may apply only to the original time period. Determining whether capitalization's significance in the original analysis or insignificance in the holdout group is more representative was not possible. However, capitalization is not as meaningful a growth variable as PPE and sales, confirmed by capitalization's overall classification accuracy of only 44.4% in Table 17.

Classification results in Table 17 for the holdout group were computed using parameter estimates from the

Table 18

Matched Pair T-tests Comparing Mean Values for Growth Variables of Holdout Change and Comparison Companies and for Original Change and Comparison Companies

	Means for Holdout Companies	T-Value	Prob. > T
Sales:			
Change	78.75%	-	-
Comparison	51.85%	2.48	.0198*
Original Groups		2.37	.0200*
Net Income:			
Change	-13.81%	-	-
Comparison	-99.23%	1.07	.2937
Original Groups		-.30	.7674
PPE:			
Change	178.66%	-	-
Comparison	36.81%	2.33	.0276*
Original Groups		3.27	.0015*
Capitalization:			
Change	77.40%	-	-
Comparison	66.73%	.52	.6057
Original Groups		2.51	.0139*

Note: 27 companies in each holdout group.
87 companies in each original group.

* = statistically significant

original groups. Classification accuracy for sales and capitalization was less than with the original groups. Overall accuracy for PPE increased slightly, although accuracy for only change companies did not.

IV. Overrepresentation Correction

Classification results and estimated R^2 's reported for the original analysis and the holdout group illustrate that the growth variables do not provide a predictive model as accurate as in other studies. Therefore, the overrepresentation correction, which is primarily a tool for adjusting classification results, is not as important. However, because PPE appears to be the most significant variable, the overrepresentation correction for that variable is reported. Results for the 87 change companies in the original analysis were adjusted for the overrepresentation problem using the variable PPE.

Table 19 compares model chi-square and classification results for the uncorrected and corrected model. The model's chi-square using the adjusted log-likelihood formula was 12.75. The chi-square was higher than the unadjusted chi-square with only PPE in the model. However, an additional seven change companies were classified incorrectly. The percentage of change companies correctly classified declined from 39.1% to 31.0%. Thus, correcting for overrepresentation did not reduce the model's

Table 19
Overrepresentation Correction Results

	Model with PPE only	
	Uncorrected	Corrected
Chi-Square	10.60	12.75
(Significance)	(.0011)	(.0008)

Number of Change Companies		
Correctly Classified:	34 (39.1%)	27 (31.0%)

significance but did reduce its accuracy, further diminishing the effectiveness of PPE (and the other growth variables) as predictors.

Summary

Company age was negatively correlated with growth and change group companies were significantly younger in age than comparison companies. Growth over other time periods was not significantly higher for change companies. The size of audit firm a company changed to did not appear directly related to the magnitude of a company's growth. Change group companies were smaller in size in the latest years studied and predictive ability for models containing only changes in 1981 and 1982 was substantially better than for the original time period.

The research hypothesis was supported for three of four growth variables. T-tests found that growth in sales, PPE, and capitalization were significantly higher for companies changing to larger firms than for companies not changing to larger firms. Sales, PPE, and capitalization were significant variables in logistic regression. However, only approximately one-third of the companies changing to larger firms were correctly classified. The three significant growth variables were surrogates for each other, as evidenced by correlations. Conclusions and limitations of the research findings are discussed in Chapter 5.

CHAPTER 5

CONCLUSIONS AND LIMITATIONS

Conclusions

This study's primary objective was to develop a predictive model using company growth as a significant attribute influencing changes from smaller to larger-sized audit firms. The relatively low classification accuracy and small R^2 's of PPE, sales, and capitalization reflect limited ability to identify companies likely to change. T-tests of growth variables found that companies changing to larger-sized audit firms experienced significantly higher growth rates than companies not changing to larger firms. Logistic regression results illustrated that variables measuring growth in sales, PPE, or capitalization were useful in individually separating the two groups of companies. To summarize, there is a difference in growth of change and comparison companies but predictive ability in the original analysis is lower than in other studies.

Sales, PPE, and capitalization variables were included to measure increases in size, productive assets, and financing, respectively. However, productive assets and financing might also be considered measures of company size; thus all three variables may simply measure growth in size. A possible interpretation, consistent with the hypothesized relationship, is that companies are more

likely to change to larger firms if they increase in size at a faster rate than the average company. However, this interpretation is probably not valid because the most common size measure, sales, is influenced by fluctuations in market factors, sales prices, etc., that do not impact PPE and capitalization directly. Growth in capitalization and growth in PPE are expected to be more closely related.

The capitalization variable included stock issues, bond issues, and changes in other long-term debt. Most PPE acquisitions would be financed by one or more of these components of capitalization. The correlation coefficient between PPE and capitalization was .5904, illustrating a strong positive relationship. However, PPE's strength in logistic regression (Table 15, page 83) suggests growth in PPE is influenced by factors not directly related to capitalization. PPE acquisitions not financed by capitalization would be financed from current operations, which are generated by sales. Therefore, sales and capitalization could have been significant when PPE was omitted from the model (Table 16, page 85) because, at least partially, these two variables are used to finance PPE acquisitions. If this reasoning is valid, the important issue is why PPE measures growth.

Increases in PPE are often influenced by a company's primary industry. For example, oil and gas processing companies operate at a higher production level and need

more productive assets when their product's sales price is relatively high. Results reported in the previous chapter found that companies changing auditors came from a large number of different industries. Thus, the primary reason for PPE's significance was not believed to be industry differences.

PPE could also be significant because growth companies increase the technological complexity of production processes, expand to other locations, increase product lines, and/or expand into new markets. Companies may believe these factors increase the need for a larger audit firm or creditors and investors may require a larger firm.

Another finding in the study was that companies changing auditors were younger than companies not changing. In the group of companies changing, the youngest companies experienced the highest growth. Also, the classification accuracy of young companies (age less than 10 years) was substantially improved over that of the total group of change companies. Some younger companies may pursue growth more aggressively. Older companies which do not change firms also may become more comfortable with a specific firm or firm size and tend to favor the status quo. Finally, some companies may have grown by acquiring or merging with other companies.

Size of change companies declined over the years

studied. The logistic model had better predictive ability in the latest years studied. Therefore, small, high growth companies appeared to be more able to change to a larger firm in the early 1980's, corresponding to an increase in the efforts large firms made to attract some small companies.

Limitations

Data for this study did not come from a random sample. The implicit assumption, however, is that the time period from which data came was randomly selected. Findings can be generalized to the general population of publicly traded companies only to the extent that companies in the study are representative of all companies in the population of interest. However, the representativeness of companies cannot be evaluated because there was not a random sample.

Change and comparison companies were limited to those with financial information available for the proper years. The matching process also eliminated some companies.

An additional limitation is that the model may be mis-specified. Other significant variables have been omitted from the model because a general theory of audit firm selection does not exist and important attributes are still unidentified. Some attributes are so firm-specific they could not be included in any study of firm changes.

Summary

Growth in sales, property, plant, and equipment, and capitalization was higher for companies changing to larger-sized firms. However, the model's predictive ability was not as good as other studies. Young companies are more likely to experience high growth and subsequently change to a larger-sized firm. Companies changing auditors in later years were smaller in size.

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APPENDIX

Table A-1

Listing of Change and Matched Comparison Companies, Their
Three-Digit SIC Codes, and Type of Auditor Change
(Change Company is Listed First in Each Pair)

	SIC Code	Type of Change
Albuquerque Western Solar (change)	343	Local to B8
Solaron Corp. (comparison)	343	
Analogic Corp.	357	Local to Nat.
Mylee-Digital Sciences	357	
Atlan-tol Ind.	366	Local to B8
Geotel	366	
Balco Energy Corp.	138	Local to B8
Big Piney Oil & Gas	138	
Beacon Photo Service	739	Local to Nat.
Polymer Research	739	
Beehive Int.	357	Local to B8
Compuscan	357	
Burris Chemical	519	Local to B8
Britt Tech. Corp.	516	
C-Cor Electronics	367	Nat. to B8
Electronic Research Associates	367	
Century Oil & Gas	131	Local to Nat.
Double Eagle Petro.	131	
Chicago Rivet & Machine	345	Local to B8
Groff, Ind.	344	
Clini-Therm	384	Local to Nat.
Moyco Ind.	384	
Codi Corp.	367	Nat. to B8
Dionics, Inc.	367	
CPT Corp.	357	Nat. to B8
Anderson Jacobson	357	
Digi-Log Systems	357	Local to B8
Computer Transceiver	357	

Table A-1 (continued)

	SIC Code	Type of Change
Discovery Oil, LTD	679	Nat. to B8
Inter. Royalty & Oil	679	
Drew National	596	Local to B8
Books Mobile	596	
Eastco Industrial Safety	509	Local to B8
Dynamic Classics	509	
Electric Regulator	362	Local to B8
Dynamic Instrument	362	
Electronic Modules	382	Local to B8
Astrosystems	382	
Ellman's	599	Nat. to B8
Integrity Entertainment	599	
Emerson Radio	365	Local to B8
Audiofidelity Enterprise	365	
Environmental Tectonics	381	Nat. to B8
Aerosonic Corp.	381	
Fairmount Chemical	286	Local to B8
CPS Chemical	286	
Flock Ind.	220	Local to Nat.
China Grove Cotton Mills	220	
Golden Nugget	799	Local to B8
Showboat	799	
Golden Triangle Royalty	131	Local to Nat.
Permeator	131	
Hadron	366	Nat. to B8
Checkpoint Systems	366	
Harwyn Ind.	275	Local to Nat.
Cybermatics	279	
Helen of Troy	399	Local to B8
Hydroculture, Inc.	399	
Hiller Aviation	372	Nat. to B8
Kayot	373	

Table A-1 (continued)

	SIC Code	Type of Change
Homasote Co.	264	Local to B8
American Controlled	264	
IMC Magnetics	356	Nat. to B8
Met-Pro	356	
Input Business Machine	357	Local to B8
Image Systems	357	
Jefferson Corp. & Nat.	327	Local to B8
Indiana Limestone	327	
Johnson Products	284	Nat. to B8
Nestle-Lemur Company	284	
Jones Intercable	489	Local to B8
Gross Telecasting	483	
Key Pharmaceuticals	283	Local to B8
Forest Labs	283	
La Barge	331	Nat. to B8
Welded Tube Co. of America	331	
La Maur	284	Local to B8
Minnetonka, Inc.	284	
La Pointe Ind.	366	Local to B8
Andrea Radio Corp.	366	
Los Alamitos Race Course	794	Local to B8
Inter. Speedway Corp.	794	
Mathematical Applications	737	Local to B8
Comarco	737	
Mega	503	Nat. to B8
Patrick Industries	503	
Microdyne Corp.	366	Local to B8
Andersen Group	366	
Micro Semiconductor	367	Nat. to B8
Energy Optics	367	
Micro-Z	737	Local to Nat.
Datatab	737	

Table A-1 (continued)

	SIC Code	Type of Change
Mincomp Corp.	737	Local to Nat.
Decision Systems	737	
Monitor Labs	381	Local to B8
Intercontinental Dynamics	381	
Morgan's Restaurants	581	Nat. to B8
Associated Hosts	581	
Mutual Enterprises	805	Nat. to B8
Comprehensive Care	806	
Natpac, Inc.	541	Local to Nat.
Jurgensen's	541	
Newport Electronics	381	Local to B8
Humphrey	381	
Norstan	349	Local to B8
General Magnaplate	349	
Nuclear Pharmacy	283	Local to B8
Newport Pharmaceuticals	283	
Packaging Systems	220	Local to B8
Burke Mills	220	
Panelfab Int.	344	Nat. to B8
Air Cargo Equip.	344	
Parkwood Homes	371	Local to Nat.
Bowles Fluidics	371	
Pasquale Food Co.	514	Local to B8
Bozzuto's	514	
Pentron Ind.	349	Local to B8
Peerless Tube	349	
Petrol Industries	131	Local to B8
Cap Corp.	131	
Petro-Silver	131	Local to B8
Mexco	131	
Phillip A. Hunt Chemical	386	Local to B8
National Patent Development	384	

Table A-1 (continued)

	SIC Code	Type of Change
Photo-Marker	386	Local to Nat.
Computer Specialties	386	
Rai Research	307	Local to B8
Bristol Corp.	307	
Silvercrest Industries	245	Nat. to B8
Hodgson Houses	245	
Solar Industries	343	Local to Nat.
Jensen Ind.	343	
South States Oil & Gas	131	Nat. to B8
Aracca Petroleum	131	
SSP Industries	353	Nat. to B8
Flame Industries	353	
Staff Builders	739	Local to B8
Harrell International	739	
Standard Microsystems	367	Local to B8
Del Electronics	367	
Stansbury Mining	550	Local to Nat.
Empire-Crown Auto	550	
Superior Care	805	Local to Nat.
NVDH Corp.	806	
Technical Communications	366	Local to B8
Allister Corp.	366	
Tensor Corp.	364	Local to B8
Columbia Chase	364	
Texas American Resources	131	Local to B8
Bolyard Oil & Gas	131	
Texas Energies	138	Nat. to B8
Intermountain Energy	138	
Time Sharing Resources	737	Local to B8
Advanced Computer Techniques	737	
Transducer Systems	367	Local to B8
Electro Powerpacs	367	

Table A-1 (continued)

	SIC Code	Type of Change
Transwestern Exploration	138	Nat. to B8
Crawford Energy	138	
U.S. Antimony	109	Local to B8
Power Resources	109	
U.S. Energy Search	131	Local to B8
Bennett Petroleum	131	
Vaughan-Jacklin	519	Local to B8
Standard Commercial Tobacco	519	
Verit (was Tanger)	201	Local to B8
Tobin Packing Co.	201	
Video Corp. Of America	781	Local to B8
Movielab	781	
Vintage Enterprises	245	Nat. to B8
Clary Corp.	245	
Volume Merchandise	560	Local to B8
Kenwin Shops	562	
Williams Industries	170	Local to B8
Dublin Engineering	170	

Local = local or regional firms

Nat. = national firms

B8 = Big Eight firms

Table A-2

Industry Descriptions, Number of Companies Changing
Firms, and Number of Firms Auditing the Companies
in Each Three-Digit and One-Digit
SIC Industry Classification

SIC Code	Description	# of Companies Changing Audit Firms	# of Firms Auditing the Companies in Each Industry Classification	
			3-Digit Code	1-Digit Code
109	metal mining	1	1	
131	crude petro. extraction	7	4	
138	oil & gas field services	3	3	
170	special trade contractors	1	1	6
201	meat products	1	1	
220	weaving, finishing, yarn	2	2	
245	wood blds. & mobile homes	2	2	
264	misc. converted paper	1	1	
275	printing	1	1	
283	drugs	2	2	
284	soap, cleaners	2	2	
286	basic chemicals	1	1	6
307	rubber	1	1	
327	concrete	1	1	
331	iron & steel	1	1	
343	plumbing & heating	2	2	
344	nonferrous	1	1	
345	screw machine	1	1	
349	fabricated metal	2	2	
353	farm machine	1	1	
356	general industrial machine	1	1	
357	office & computing machine	5	5	
362	electric industrial	1	1	
364	electric lighting	1	1	
365	radio, TV	1	1	
366	radio, TV, & receiver sets	5	3	
367	electronic components	5	5	
371	motor vehicles	1	1	
372	aircraft	1	1	
381	scientific instruments	3	2	
382	scientific instruments	1	1	
384	medical inst. & supplies	1	1	
386	photographic equipment	2	2	
399	manufacturers-misc.	1	1	11
489	communication services	1	1	1

Table A-2 (continued)

SIC Code	Description	# of Companies Changing Audit Firms	# of Firms Auditing the Companies in Each Industry Classification	
			3-Digit Code	1-Digit Code
503	wholesale trade - lumber	1	1	
509	wholesale trade - misc.	1	1	
514	wholesale trade	1	1	
519	wholesale trade - misc.	2	2	
541	grocery	1	1	
550	auto, aircraft	1	1	
560	apparel	1	1	
581	eating	1	1	
596	nonstore retailers	1	1	
599	retail stores	1	1	9
679	misc. investing inst.	1	1	1
737	computer & D.P. services	4	4	
739	misc. business services	2	2	
781	motion picture production	1	1	
794	amusement & recreation	1	1	
799	amusement & recreation	1	1	8
805	medical & other	2	2	2
	total	<u>87</u>		

Table A-3

Maximum and Minimum Values for the
Seven Independent Variables

Variable	Maximum	Minimum
Sales:		
Change	1000%	-49.9%
Comparison	1000%	-85.7%
Net Income:		
Change	1000%	-1000%
Comparison	1000%	-1000%
PPE:		
Change	1000%	-96.7%
Comparison	1000%	-76.7%
Capitalization:		
Change	1000%	-93.8%
Comparison	1000%	-32.3%
Years with Predecessor:		
Change	0	0
Comparison	1 year	0
Company Age:		
Change	70 years	1 year
Comparison	99 years	2 years
Competition:		
Change	6341.7	35.9
Comparison	10310.9	163.0

Note: 87 companies in each group.

Table A-4

T-Tests Comparing Average Growth in Variables When
Various Percentage Limitations are Imposed

Variable	T-tests	
	T-Value	Prob. > T
500% Maximum		
Sales	-2.7609	.0065
Net Income	-.5225	.6020
PPE	-2.9086	.0042
Capitalization	-2.8143	.0055
2000% Maximum		
Sales	-1.4476	.1497
Net Income	-.0271	.9784
PPE	-3.0633	.0028
Capitalization	-2.3898	.0183
5000% Maximum		
Sales	-.9202	.3588
Net Income	.5138	.6080
PPE	-2.5127	.0137
Capitalization	-2.1509	.0338

Table A-5
Conditional Logistic Regression Analysis
of the Original Model

Variable	Chi-Square Significance	Model	
		Chi-Square	Significance
Sales	.4544	14.28	.0267
Net Income	.8596		
PPE	.1045		
Capitalization	.4019		
Company Age	.2767		
Competition	.9706		
Sales	.4548	14.28	.0140
Net Income	.8618		
PPE	.1043		
Capitalization	.4018		
Company Age	.2729		
Sales	.4637	14.24	.0066
PPE	.1058		
Capitalization	.3765		
Company Age	.2725		
PPE	.0597	13.65	.0034
Capitalization	.3074		
Company Age	.2310		
PPE	.0176	12.53	.0019
Company Age	.2037		
PPE	.0068	10.84	.0010

Table A-6

Change Group Companies Whose Predecessor Auditor
Had No Other Clients Registered With the
Securities and Exchange Commission

Company	Predecessor Auditor	SIC Code
Albuquerque Western	Mitchell, Newberry	343
Analogic	Edelstone & Bonder	357
Balco Energy	Overcash, Alsup	138
Beacon Photo	Hertz, Herson	739
Burris Chemical	William Muckenfuss	519
Clini-Therm	Branch, Orcutt	384
Digi-Log Systems	Rainer & Company	357
Electronic Modules	Woodson & Benson	382
Fairmount Chemical	Stanley Marcus	286
Golden Triangle Royalty	Corbis Walker	131
Homasote	Bugni, Labanca, & Poretzky	264
Jones Intercable	O'Connor & Reynolds	489
Mathematical Applications	Max Rothenberg	737
Microdyne	Jones & Healey	366
Mincomp	Michael Gray	737
Parkwood Homes	Raymond C. Hipple	371
Pasquale Food	H.L. Rayburn	514
Rai Research	Gelfand	307

Table A-7

Average Annual Growth from Three Years Before the Auditor
Change to Two Years After the Auditor Change

Variable	Mean	Difference Mean	T-Value	Prob. > T
Sales:				
Change	29.2	-	-	-
Comparison	20.6	8.6	.86	.3925
Net Income:				
Change	74.6	-	-	-
Comparison	116.0	-41.4	-.34	.7353
Property, Plant, & Equipment:				
Change	44.6	-	-	-
Comparison	30.5	14.1	1.30	.2013
Capitalization:				
Change	36.0	-	-	-
Comparison	16.6	19.4	2.19	.0337*

Note: There are 45 companies in each group.

* = statistically significant

Table A-8

Reasons for Companies Not Having Data
Available for All Six Years
Measured in Table A-7

	# of Companies
Information for all six years was not available in Moody's manuals for change group companies	23
Information for all six years was not available in Moody's manuals for comparison companies	13
The change company was acquired by or merged into another company in years subsequent to the year of auditor change	5
The change company became privately held in a year subsequent to the year of auditor change	<u>1</u>
Total companies not included in Tables 6 and A-7	<u>42</u>

VITA

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