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EMPIRICAL STUDIES OF AUDITOR - CLIENT ALIGNMENTS

IN THE CONTEXT OF DIFFERENTIATED AUDIT QUALITY

by

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A thesis submitted in partial fulfillment
of the requirements for the Doctor of
Philosophy degree in Business Administration
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INTRODUCTION

1. Overview

The purpose of this dissertation is to investigate the market for quality-differentiated audits.[1] Each of the three essays in this dissertation is an empirical study of auditor-client alignments within the context of differentiated audit quality. Over the years the accounting literature has grown to accept multiple levels of audit quality. The current established levels of audit quality consist of three groups [see Craswell et al. 1995]. The first level consists of the national/international CPA firms with industry specializations (status usually relegated to CPA firms that are members of the Big Six).[2] The second level consists of the Big Six CPA firms that are not industry specialists for the given industry. The third level of audit quality is given to the non-Big Six CPA firms.

The first essay investigates characteristics of audit clients aligned with CPA firms providing quality-differentiated audits. Client characteristics are defined in terms of two categories: agency costs and the risk of private information transfers. The levels of

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[1] DeAngelo (1981a) defines audit quality to be 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.

[2] In 1989 two mergers took place within the Big Eight to form the Big Six. The Big Eight were Arthur Andersen, Arthur Young, Coopers & Lybrand, Deloitte, Haskins & Sells, Ernst & Whinney, KPMG Peat Marwick, Price Waterhouse, and Touch, Ross & Co. The Big Six are Arthur Andersen, Coopers & Lybrand, Deloitte & Touche, Ernst & Young, KPMG Peat Marwick, and Price Waterhouse.

auditor quality considered consist of (1) Big Six industry specialists, (2) Big Six nonspecialists, and (3) non-Big Six CPA firms. The empirical results are consistent with a positive relationship between proxies for agency costs and the level of audit quality demanded, and a negative relationship between the risk of private information transfers and the level of audit quality demanded.

The second essay examines changes to established auditor-client alignments. These changes were involuntary from the clients' vantage point and were the result of two mergers in 1989 within the set of the Big Eight CPA firms. I argue the stability of these merger-forced realignments between audit clients and CPA firms are related to three factors. The three factors are the perceived level of audit quality provided pre- versus post-merger, the clients' risk of private information transfers, and size of the audit client. The empirical results show smaller audit clients were more likely to abandon the involuntary realignment as were clients having a relatively higher risk of private information transfers.

The third essay investigates perceptions of differentiated audit quality by examining stock market reactions to voluntary changes of auditor-client alignments. The size and direction of market reactions are hypothesized to be related to the type of change in audit quality brought about by the change in CPA firm. I do not find statistically significant market reactions. The remainder of this introduction provides specific discussions of each of the three essays and a summary of what we have learned about the market for quality-differentiated audits via this dissertation.

2. The First Essay

2.1 Quality-Differentiated Auditing and the Demand for Industry Specialized Audit Services

In this essay I examine components of auditor choice that lead to both attractions and aversions to CPA firms providing audits of different quality. A question of particular interest is why do some clients hire an industry audit specialist while other clients do not? Prior auditor choice research has not been especially successful (either studies of the demand for Big Eight/non-Big Eight auditors, or the demand for industry specializations[3]), and the evidence of quality differentiation comes primarily from the supply side (e.g. audit fee studies[4]) and arguments maintaining differentiated reputations.[5]

Client characteristics linked to their agency costs and risk of information transfers are argued to be associated with the level of audit quality demanded. First, managers have incentives to reduce agency costs, and auditing is one component of a general monitoring system whose purpose is to reduce agency costs.[6] Therefore, companies with higher agency costs can benefit from audit services of higher quality. There is however a potential cost associated with hiring an industry specialist auditor, as well as auditors of increasing quality in general. An auditor's market share in an industry typically increases

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[3] Examples include Defond [1992], Francis & Wilson [1988], and Palmrose [1984].

[4] Examples include Craswell et al. [1995], Francis & Simon [1987], and Palmrose [1986].

[5] Examples include DeAngelo [1981a] and Dopuch and Simunic [1982].

[6] See Jensen & Meckling [1976] and Watts & Zimmerman [1986].

as their perceived audit quality for that industry grows. When multiple auditees choose higher quality auditors there is an increased probability that competing companies will be audited by the same CPA firm. In this environment, companies incur a cost represented by an increased risk that their private information may inadvertently be circulated to other industry members via their auditor.

The framework of this essay is a cross-sectional equilibrium analysis of auditor-client alignments in 1988 and 1990. Using data from 1988 and 1990 allows me to study the proposed relationship between auditor quality, agency costs, and information transfers in the year immediately preceding and immediately following the two Big Eight CPA firm mergers in 1989. The basic design assumes there exists, at least to some degree, a demand for audit specialists in all industries. Using a multinomial logistic regression, I regress company-specific characteristics affecting agency costs, and company and industry-specific characteristics affecting the risk of information transfers on the existing level of audit quality choice. The level of audit quality is partitioned into three groups: Big Six industry audit specialists, Big Six nonspecialists, and non-Big Six CPA firms. Agency costs are hypothesized to be positively associated with the level of audit quality, while measures of the risk of information transfers are predicted to be negatively associated with the level of audit quality.

The results provide support for the predicted relationships between the level of audit quality demanded, the risk of private information transfers, and some of the agency costs. In particular, companies contracting with Big Six industry specialist auditors are

larger, have lower levels of research and development expenditures, and operate in less concentrated industries than companies hiring a Big Six nonspecialist. The latter result is consistent with the argument that industries with high levels of concentration have fewer key competitors, and this is where the dissemination of private information has the highest probability of affecting a company's competitive standing. Companies contracting with Big Six nonspecialist auditors are larger, have higher levels of debt and receivables, and operate in less concentrated industries than companies hiring a non-Big Six CPA firm.

3. The Second Essay

3.1 Involuntary Auditor Changes: CPA Firm and Audit Client Realignments After the 1989 Mergers that Reduced the Big Eight to the Big Six

The large-CPA firm business environment underwent considerable changes in the late 1980's. Many CPA firms held merger discussions and during 1989 the set of CPA firms known as the "Big Eight" became the "Big Six" via two mergers. One effect of these mergers was a change in the CPA firm choice set available to audit clients. While all companies faced a new CPA firm choice set, audit clients were partitioned into those who could make voluntary auditor changes and those forced into new auditor-client alignments. In particular, 100% of the clients of the four merging Big Eight CPA firms faced involuntary realignments with a newly merged CPA firm (i.e. Ernst & Young or Deloitte & Touche). These involuntary auditor changes were a result of the prior years' CPA firm ceasing to exist.[7] The framework of this essay makes use of the disequilibrium

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[7] The phrases "involuntary realignment" and "involuntary auditor change" are used synonymously throughout the dissertation.

brought to the 1988 alignment of audit clients and CPA firms as a result of the Big Eight CPA firm mergers in 1989. Merger-forced realignments of CPA firms and audit clients were not necessarily desired by some companies and hence many audit clients were induced into switching to one of the other Big Six CPA firms or a lower-tier CPA firm.

This essay focuses on the above mentioned involuntary auditor changes rather than auditor choice per se because of the unique opportunity to examine involuntary auditor changes on a much larger scale than would normally be observed in any given year. In general, examining "clean," involuntary auditor changes is preferable to studying voluntary auditor changes. Rather than being driven by direct economic forces such as the costs/benefits of higher quality audits and the costs associated with potential private information transfers, voluntary auditor changes may be driven by indirect forces such as auditor-client disputes, auditor rotation policies, and opinion shopping.

It is assumed that audit clients in 1988 are aligned with CPA firms in a manner that satisfies an audit client/CPA firm alignment equilibrium. Based on their direct involvement with the mergers, particular attention is given to the 1988 audit clients of Deloitte, Haskins and Sells, Touche, Ross & Co., Arthur Young, and Ernst & Whinney. Each of these clients had the opportunity to either stay with the new accounting firm (Ernst & Young or Deloitte & Touche) or to switch to another CPA firm. Those clients whose alignment environments were markedly disturbed are predicted to be the clients most likely to switch from the newly merged CPA firm (that includes their former auditor) to another CPA firm. This choice is argued to be a function of at least three factors: (1)

The level of audit quality provided pre- versus post-merger, (2) A client's risk of private information transfer, and (3) audit client size.

The analysis implements a logistic regression with the dependent variable representing the choice to accept or leave the involuntary auditor realignment. The independent variables consist of company and industry-specific characteristics affecting the risk of information transfers to competing firms, and the size of the audit client. The act of leaving the involuntary realignment is predicted to be positively associated with an audit client's risk of information transfers and changes in pre- versus post-merger audit quality, and negatively associated with an audit client's size.

The evidence is consistent with smaller clients being more likely to switch away from the merged CPA firm, and there is some evidence that clients concerned with private information transfers were also more likely to switch away from the merged CPA firm. Specifically, there is a positive association between companies operating in highly concentrated industries and switching away from the merging Big Eight CPA firms. Since the CPA firm mergers resulted in larger auditor market shares, audit clients that operate in a concentrated industry and purposely chose different auditors pre-merger would face employing the same CPA firm used by a competitor post-merger. This last result is consistent with the argument that industries with high levels of concentration have fewer key competitors, and this is where the dissemination of private information has the highest probability of affecting a company's competitive standing.

4. The Third Essay

4.1 Market Reaction to Auditor Switches as a Test of Quality-Differentiated Auditing

A number of papers in the accounting literature examine the notion of perceived audit quality as reflected in market reactions to auditor switches.[8] These studies have met with only limited success in finding an association between auditor changes and security prices. This third essay attempts to shed light on the issue of perceived audit quality by reexamining the capital market consequences of auditor switches.

I base my examination of auditor switches on a sample of Over-the-Counter (OTC) firms. As noted by Eichenseher et al. [1989] there are a number of reasons why examining auditor switches for smaller (OTC) firms may be more fruitful than studying auditor switches of larger firms. One reason to study auditor switches in this setting is that large companies require large CPA firms, and as a result it is difficult to separate CPA firm size and audit quality effects. A second reason is that perceived audit quality may be more important for smaller companies because there are fewer substitutes available for external auditing in this environment. Finally, examining the OTC market will increase the sample size and the power of statistical tests over prior studies. Most prior studies examine auditor changes by companies listed on the New York and American Stock Exchanges. Relative to these exchanges, OTC registrants represent a larger number of

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[8] Examples include Eichenseher et al. [1989], Fried and Schiff [1981], Johnson and Lys [1990], and Nichols and Smith [1983].

companies, employ a higher percentage of non-Big Eight CPA firms, and have a higher frequency of auditor changes.

The first hypothesis tests the brand name hypothesis in a manner similar to the extant literature. A change from (to) a non-Big Eight to (from) a Big Eight auditor should lead to a positive (negative) market reaction. There should not be a significant market reaction to a change of auditors within the same audit firm class.[9]

The development of the remaining hypotheses bears the crux of this essay. The remaining hypotheses consider the effects of audit firm industry specialization, separately and possibly distinctly from the general brand name test (i.e., Big Eight versus non-Big Eight). The second hypothesis posits the market reaction due to a change from (to) a non-Big Eight to (from) a Big Eight audit firm should be positive (negative) and increasing (decreasing) in the level of industry audit complexity. The final hypothesis directly tests market reactions to auditor switches in conjunction with CPA firm-level industry specialization. There is a predicted positive relationship between market reactions to auditor changes and the level of industry specialization associated with the previous and current CPA firms.

An event type methodology is employed linking daily CRSP data to the announcements of 254 auditor switches over the period of 1988-1991. Daily and cumulative abnormal returns are calculated using the deviation of observed daily returns

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[9] This hypothesis assumes there are no quality differences within auditor classes. Later in the paper I test for within class quality differences based on the degree of audit firm industry specialization.

from estimated returns based on a standard market model regression. I measure the significance of the daily abnormal returns and use the cumulative abnormal returns as the dependent variable in a number of ordinary least squares regressions to test the hypotheses stated above.

The analyses performed in this study do not fair any better than previous studies of the market reaction to auditor changes. Consistent with most prior studies, I do not consistently find statistically different market reactions for firms switching between a Big Six CPA firm and a non-Big Six CPA firm in either direction. Regarding the tests specific to this essay, it does not appear that market reactions to auditor changes between a Big Six and a non-Big Six audit firm are influenced by the level of industry audit complexity nor are the market reactions influenced by the prior or current auditor's industry specialization.

5. Summary

The purpose of the three essays discussed above was to investigate the market for quality-differentiated audits. The research questions addressed were related to (1) the demand for industry specialized audit services, (2) "involuntary" auditor changes after the Big Eight mergers of 1989, and (3) market reactions to auditor switches across multiple levels of auditor quality.

Consistent with prior research, the first essay demonstrates the demand for quality-differentiated audit services is related to an audit client's agency costs. Additionally, the demand for quality-differentiated audit services is related to an audit client's risk of

information transfers to their competitors. The second essay adds to the accounting

literature through its examination of involuntary auditor changes. The second essay

demonstrates that involuntary auditor switches are influenced by the size of the audit client

and the audit client's risk of information transfers to their competitors. The third essay

examines market reactions to auditor changes across multiple levels of audit quality.

Despite expanding the domain of investigation for market reactions to auditor changes,

consistent with prior research, the third essay fails to find significant results.

CHAPTER I
QUALITY-DIFFERENTIATED AUDITING AND
THE DEMAND FOR INDUSTRY SPECIALIZED
AUDIT SERVICES

1. Introduction

Empirical evidence consistent with the existence of auditor product differentiation

has been found in studies involving audit fees and litigation rates. Using litigation rates,

Palmrose [1988] concluded that Big Eight CPA firms provide higher quality audits than

non-Big Eight CPA firms. Francis & Simon [1987] report the existence of a Big Eight

price premium relative to both non-Big Eight national (second-tier) firms and

local/regional firms, and Palmrose [1986] reports the existence of a Big Eight price

premium relative to non-Big Eight firms.

Craswell et al. [1995] extend the audit product differentiation literature by

providing evidence consistent with an audit fee premium accruing to CPA firms investing

in industry specializations (in the Australian audit market). This industry specialization

premium exists above and beyond the documented Big Eight audit fee premium. The

industry specialization premium is consistent not only with a supply of quality

differentiated audits, but also a demand for quality differentiated audits based on industry

specializations. The existence of industry specializations is well known and recognized.

For example, a recent AICPA report stated: "By creating specialties along industry lines,

large firms have sought to be in a better position to market their services to potential clients and to audit existing clients more effectively" (AICPA, 1994). Given evidence that industry specializations exist, the question investigated is why do some firms hire the industry specialist while others do not?[10]

Prior auditor choice research has not been especially successful at answering this question (either studies of the demand for Big Eight/non-Big Eight auditors, or the demand for industry specializations).[11] The evidence of quality differentiation that does exist comes primarily from the supply side (e.g. Craswell et al. [1995], Francis & Simon, [1987], and Shockley & Holt [1983]) and arguments about maintaining differentiated reputations (e.g. DeAngelo [1981a] and Dopuch & Simunic [1982]). The Big Eight accounting firms are argued to hold brand name reputations for higher quality audits. In addition, subsets of the Big Eight are argued to hold industry specialist reputations for higher quality audits. This paper extends the literature in line with suggestions of Craswell et al. [1995] by examining components of auditor choice that lead to both attractions and aversions to CPA firms providing audits of different quality. Examining this issue increases our understanding of auditor choice by exploring the characteristics of

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[10] The sample in the Craswell et al. [1995] study indicates that in industries having one or more auditor specialists, only 22% of the sample companies elected to hire the more costly industry specialists.

[11] Discussion of specific studies is delayed until section 2.

companies that choose an auditor that is (1) a Big Six industry specialist, (2) a Big Six nonspecialist, or (3) a non-Big Six CPA firm.[12]

Agency costs and information transfer issues affect the demand for quality-differentiated levels of external monitoring. Managers have incentives to reduce agency costs, and auditing is one component of a general monitoring system whose purpose is to reduce agency costs.[13] Therefore, management's choice of auditor quality is positively related to the size of the firm's agency costs. The benefits of reduced agency costs are mitigated by the costs of hiring an auditor of increasing quality. These costs are represented by audit fee premiums and the risk of information transfers. Craswell et al. [1995] estimate audit fee premia earned by Big Eight CPA firms. Big Eight industry specialists earn (on average) a 34% premium over nonspecialist Big Eight CPA firms, and nonspecialist Big Eight CPA firms earn (on average) a 30% premium over non-Big Eight CPA firms. A second cost of hiring a higher quality auditor is an increased risk that a client's proprietary information will be circulated to other industry members. Therefore, companies facing higher potential losses from information transfers are less likely to choose higher quality auditors.

I study the cost/benefit tradeoff of contracting with auditors of increasing quality. Benefits are investigated by examining company specific characteristics that affect agency

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[12] During 1989 the set of CPA firms known as the "Big Eight" became the "Big Six" via two mergers. Deloitte, Haskins, & Sells merged with Touche, Ross & Co, to form Deloitte & Touche and Ernst & Whinney merged with Arthur Young to form Ernst & Young. Other than when referring to prior research, I use the phrase Big Six throughout this paper.

[13] See Jensen & Meckling [1976] and Watts & Zimmerman [1986].

costs. Costs are investigated by examining company and industry-specific characteristics affecting the risk of information transfer. The basic design assumes there exists, at least to some degree, a demand for audit specialists in all industries. The results are consistent with a positive association between the demand for increasing levels of auditor quality and agency costs, and a negative association between the demand for increasing levels of auditor quality and the risk of proprietary information transfers.

The remainder of this paper is organized as follows. Section 2 examines the market for auditor industry specializations. Characteristics of companies predicted to contract for increasing levels of audit quality are discussed in section 3. Sections 4 and 5 contain the methodology employed and the details of the sample selection process. Results are presented in section 6 and section 7 concludes.

2. The Market for Auditor Industry Specializations

The importance of auditing is widely acknowledged. For example, the AICPA stated: "The independent audit fills an essential role for the investing public and creditors by enhancing the reliability of corporations' published financial statements and giving assurance of that reliability to users of those financial statements" (AICPA, 1994). This viewpoint is consistent with Jensen & Meckling's [1976] research linking auditing to a general monitoring system whose purpose is to reduce agency costs. Jensen & Meckling [1976] argue that management has incentives to prepare financial statements and then contract for an independent audit of the financial statements as a means of reducing the

firm's agency costs. This contracting arrangement is a result of management reaping all of the benefits from the increase in the value of the firm due to the monitoring contracts.

Monitoring contracts cover the entirety of a company's accounting environment. A company's accounting environment includes its internal control system and the set of accounting procedures used for reporting the outcomes of economic activities. These environments differ across industries and to a lesser degree across individual firms within an industry. Within industries firms tend to adopt similar accounting practices (Skinner [1993]). Craswell et al. [1995] argue when accounting environments become relatively industry specific rather than generic, the agency cost-reducing contracts of firms in that industry will also develop industry unique features. Auditor industry specializations arise when CPA firms make incremental, costly investments in human capital and specialized audit technologies to monitor these industry specific accounting environments. Auditing larger numbers of clients in an industry allows a CPA firm to build a reputation of being an industry specialized auditor. This specialist reputation conveys credentials which include maintaining a large amount of industry specific knowledge, and the ability to provide a specialized audit in a superior fashion (i.e., with effectiveness and efficiency).

Support for the need of industry specializations can be found in the auditing literature such as the AICPA's annual Audit Risk Alert series. In addition to the general Audit Risk Alert, which provides a general update on economic, regulatory, and accounting and auditing matters, the AICPA issues industry specific Audit Risk Alerts for industries with specialized accounting and reporting principles and practices. Industry

specific Audit Risk Alerts are produced for a number of industries including oil and gas producers and construction contractors (*Audit Risk Alert* (AICPA) 1993). I assume unique industry features exist, at least to some degree, for all industries. This assumption allows me to test the cost/benefit components of the agency cost/audit quality argument on a large, industry diverse sample.[14] Statistical tests of greater power and results generalizeable to firms in a more diverse set of industries are the benefits of this larger and broader sample. Previous tests of the agency cost/audit quality argument have been limited to relatively small sample sizes and concentrate on the benefits of contracting with a higher quality auditor. Small sample sizes can lead to statistical tests of reduced power. The low to moderate success of previous agency cost/audit quality studies may be the result of low-power statistical tests.

For example, Defond [1992] and Francis & Wilson [1988] examine the relationship between auditor changes and agency costs. Defond's [1992] sample consists of 131 auditor changes. After controlling for changes in size and securities issues, changes in agency costs are positively associated with changes in auditor quality. Agency cost variables achieving significance (p=0.05) include changes in leverage and changes in management ownership. Changes in the size of short-term accruals were not associated with changes in auditor quality. Francis & Wilson [1988] utilize a sample of 196 auditor changes to test the relationship between auditor changes and agency costs in the general Big Eight/non-Big Eight audit market. After controlling for growth, changes in (1) the

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[14] Discussion of sample selection and final sample size is deferred until section 5.

existence of bonus plans and (2) the percentage of ownership held by the largest owner are associated with changes in auditor quality (p=0.05). Variables not associated with changes in auditor quality include changes in stock ownership by managers and directors, changes in leverage, and new security issues. Palmrose [1984] examines the association between agency costs and quality-differentiated auditors in Big Eight/Non-Big Eight and industry specialist/nonspecialist settings. The relationships were tested at individual industry levels for a sample of 276 companies in four industries. Size was the only significant explanatory variable, and it was significant only in the Big Eight/Non-Big Eight regressions. Variables not associated with the demand for higher quality auditors include the degree of owner versus management control, leverage, number of subsidiaries, existence of bonus plans tied to accounting numbers, and the exchange listing of the company.

If auditing is a means of reducing agency costs (Jensen & Meckling [1976]) and the cost of auditing increases with the level of audit service quality (Craswell et al. [1995]), companies with higher agency costs will most likely benefit from audit services of higher quality. Continuing the logic of Jensen & Meckling [1976] and the empirical evidence of the agency costs/audit quality literature, I argue the desire to reduce agency costs will influence management's choice of an auditor between (1) a non-Big Six auditor, (2) a Big Six nonspecialist auditor and (3) a Big Six industry audit specialist. In addition to the *benefits* of reduced agency costs, I examine the *costs* of hiring auditors of increasing

quality. The next section presents arguments linking company and industry characteristics to demands for quality-differentiated audits.

3. Characteristics of Companies that Choose Increasing Levels of Auditor Quality

Watts & Zimmerman [1986] describe the roles of accounting and auditing as follows:

> The demand for accounting arises from its use in contracts that reduce the firm's agency costs. However, those contracts are of little use in reducing agency costs unless their provisions are monitored and enforced. Auditing is one of the ways in which the contracts are monitored. The auditor checks that the numbers used in contractual provisions have been calculated using accepted procedures and whether the contractual provisions have been breached (p. 312).

As discussed above, a company's agency costs are predicted to be positively related to the level of audit quality demanded. There are, however, costs associated with a company hiring an auditor of increasing quality. These costs include the payment of audit fee premiums and the risk of proprietary information transfers. Craswell et al. [1995] estimate audit fee premia earned by Big Eight CPA firms. Big Eight industry specialists earn (on average) a 34% premium over nonspecialist Big Eight CPA firms, and nonspecialist Big Eight CPA firms earn (on average) a 30% premium over non-Big Eight CPA firms.

3.1 Assets-in-Place

Companies with higher levels of assets-in-place are more likely to rely on agency cost-reducing contracts that are based on accounting numbers (Skinner [1993]).[15] These contracts must be monitored in order for them to be effective in restricting agency costs. Therefore the use of such contracts leads to an increase in the demand for audited financial statements, as an audit is conducted to determine whether the overall financial statements are stated in accordance with generally accepted accounting principles and whether contracting provisions have been breached.

Expenditures on auditing (compared to other monitoring mechanisms such as directors) are positively related to the proportion of a firm's assets-in-place relative to the market value of the firm (Anderson et al. [1993]). This is equivalent to saying that expenditures on auditing are inversely related to the proportion of a firm's growth opportunities relative to the market value of the firm. One reason for this association is that generally accepted accounting principles provide less assistance in handling contingencies associated with growth options (because of the uniqueness of such assets) relative to handling assets-in-place. High growth firms will rely more on directors who are specialized, and hence more efficient, in the role of monitoring managers who develop and exercise the firm's growth options.[16]

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[15] Specifically, Skinner [1993] documents that firms with higher levels of assets-in-place are more likely to have accounting-based debt covenants and are more likely to use bonus plans that are directly tied to accounting earnings.

[16] Anderson et al. [1993] note the positive association between audit expenditures and a firm's level of assets-in-place also stems from the notion that firms with high levels of assets-in-place can support debt and debt contracts which employ accounting numbers when specifying payoffs. In comparison, firms with

A firm's level of assets-in-place is measured by the ratio of accounting book value of total assets to market value of the firm (AIP). The market value of the firm is proxied by the market value of common equity plus the book value of total debt and preferred stock. This definition follows the argument in Myers [1984] that book values represent assets-in-place (tangible assets and working capital) and market values reflect intangibles and growth options as well as assets-in-place.

In summary firms with higher levels of assets-in-place are more likely to have accounting-based contracting rules, which leads to a higher demand for monitoring from auditors and increased expenditures on auditing. For some of these firms, an audit from a general brand name (Big Six) CPA firm will be of sufficient higher quality. If the number and complexity of accounting-based contracting rules increases with the level of a firm's assets-in-place, firms with the highest levels of AIP will demand audits from costlier Big Six industry specialists. Therefore, AIP is expected to be positively related to the choice of increasing auditor quality.

H1: A company's level of assets-in-place is positively related to the demand for increasing levels of auditor quality.

3.2 Debt

Smith & Warner [1979] argue the use of externally audited financial statements should be positively related to the firm's debt/equity ratio since the bondholder-

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relatively more growth options rely less on debt contracts and therefore less on accounting numbers and auditors when determining payoffs to claimholders.

stockholder agency conflict increases with the debt level in a firm's capital structure.
When firms' debt covenants are specified in terms of accounting numbers, debt levels
should be positively related to the demand for higher quality Big Six auditors. Big Six
industry specialists, who are most familiar with the nuances of the industry, will most
likely be demanded if debt contracts are written with industry specific provisions and/or
use industry specific assets of the firm as collateral. The debt level of individual firms
(**DEBT**) is measured as the ratio of long-term debt to total assets. Based on the previous
arguments **DEBT** is expected to be positively related to the choice of increasing levels of
auditor quality.[17]

H2: A company's level of debt is positively related to the demand for increasing levels of auditor quality.

3.3 Auditee Size

Craswell et al. [1995], using a large sample of Australian companies, find results
which strongly support the hypothesis that audit fees of Big Eight auditors contain premia
relating to both a general brand name and industry specialization. Based on their results
regarding specialist auditors, the demand for industry specialists appears to be confined to
larger sized auditees. This is consistent with the argument that as the size of an

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[17] I take the position that ex ante both the **AIP** variable and the **DEBT** variable have a place in the current model even though the literature predicts that corporate borrowing is directly proportional to the market value of the firm accounted for by assets-in-place (e.g. Myers [1977]). These variables in part represent some non-common determinants of auditor choice. **AIP** is more related to the de facto valuation of assets, in particular their industry specific values, and **DEBT** is more related to the agency relationship that exists between creditors and stockholders.

organization increases the number and the severity of agency relationships also increases (Fama & Jensen [1983], Palmrose [1984]). The number of agency relationships increases as there become more layers of manager/shareholder, shareholder/bondholder, and top management/lower levels of management agency conflicts. This generally leads to increasing complexities in decision control systems as organization size increases. Decision control systems include internal and external monitoring mechanisms. Size therefore is a general proxy for the degree of agency costs within a firm. If increasing levels of audit quality provide incremental decreases of agency costs, client size will be positively related to the choice of increasing levels of auditor quality.[18] Auditee size (**SIZE**) is proxied by the natural log of total assets.

H3: A company's size is positively related to the demand for increasing levels of auditor quality.

3.4 Asset Makeup - Inventories and Receivables

Auditors and the audit pricing literature have long recognized that receivables and inventories are risky balance sheet components. First, the 1993 *Audit Risk Alert* (AICPA) includes inventories and receivables in a discussion of "Audit Problems to Watch for." These accounts receive substantial attention during audits because they often represent a

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[18] Alternatively client size may be associated with larger auditors (who are potential industry specialists) due to audit efficiencies rather than reductions in agency costs. By developing specializations in audit technologies (e.g. branch offices and SEC compliance) large CPA firms can provide economies of scale and scope in rendering services to companies whose operations are geographically dispersed and involve a large number of complex accounting transactions (Johnson & Lys [1990]).

large percent of a firm's assets and are highly susceptible to manipulation. [19] Kinney & Martin [1994] review audit related adjustments to a number of individual financial statement accounts. Pre-audit levels of receivables and inventories were found to be overstated on average. Concerns about the misstatement of receivables and inventories apply to auditor industry specializations, as well as to audits in general. For example, industry specialized audits are required if receivables are the result of complex, industry specific contracts. Inventories with industry specific attributes require industry specialized audits to evaluate inventory obsolescence reserves.

Second, Simunic (1980) notes liability exposure can be expected to vary cross-sectionally with the relative size of receivables and inventories in different auditee balance sheets. Evidence consistent with this claim is found in audit fee determinant studies such as Simunic (1980), Francis & Simon (1987), and Craswell et al. [1995]. The percentage of a firm's assets in inventories (**INV**) and receivables (**REC**) are measured by the ratios of inventories and receivables to total assets respectively.

In summary, as the level of **INV** and/or **REC** increases firms are generally predicted to contract with Big Six auditors having a reputation for higher quality. If industry specializations exist, at least to some degree, across industries, firms with the

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[19] SEC investigations of overstatements of accounts receivable and inventories make up 70% of the 224 Accounting and Auditing Enforcement Releases issued between April 1982 and April 1989 (Feroz et al. [1991]). These overstatements resulted in material financial disclosure violations. A commonality among the SEC cited auditing deficiencies was the failure to gather sufficient evidence to support the audit opinion on the clients' financial position and accounting methods.

highest levels of **INV** and/or **REC** will be more likely to contract with Big Six industry specialist auditors.

H4: A company's level of INV and REC are positively related to the demand for increasing levels of auditor quality.

3.5 Risk of Information Transfer

The determinants of auditor choice previously articulated all dealt with agency costs arising within a company. It was argued that increasing levels of the identified "agency costs" variables would result in companies demanding higher quality auditors. This section discusses a potential cost associated with hiring an industry specialist auditor, as well as auditors of increasing quality in general. The cost is represented by an increased risk that a company's proprietary information may be circulated to other industry members. Dye [1986] notes a manager's array of private information consists of both proprietary and nonproprietary information. Proprietary information is defined to be information whose *disclosure* reduces the present value of cash flows of the firm endowed with the information (emphasis in original). The dissemination of any private information, whether proprietary or nonproprietary, may lead to reductions in a firm's competitive standing.

Intra-industry information transfers have been studied from a number of perspectives. These studies include the effect of one firm's earnings announcements on the share price of nonannouncing firms (e.g. Clinch & Sinclair [1987]), the effect of management earnings forecasts on the share price of nonforecasting firms (e.g. Baginski

[1987]), and the effect of the dissemination of valuable information by auditors on a firm's competitive standing (Danos & Eichenseher [1988] and Kwon [1996]). Danos & Eichenseher [1988] and Kwon [1996] develop and test theories that companies have an aversion to the auditors of their industry peers. A company's aversion to certain CPA firms is driven by the potential dissemination of valuable information which could affect the company's competitive standing. Danos & Eichenseher's tests of auditor-client alignments in the U.S. banking industry indicate a general aversion to the auditors of peer banks. Kwon studies how auditor/client alignments are affected by the competition within a client's industry. Kwon's results demonstrate that audit clients are less likely to engage the same auditor as the concentration in the clients' industry increases.

Contracting with a higher quality auditor increases the risk of information transfers in two ways. First, a company can produce higher quality financial statements by contracting with a higher quality auditor. Higher quality financial statements may provide clearer signals about the company's cost structure (or other types of strategic information) which will compromise the company's competitive position. Therefore, companies have an incentive not to choose higher quality auditors. Second, a company's proprietary information may inadvertently be circulated to other industry members via their auditor. During an auditor/auditee relationship, auditors accumulate client specific data about product status, contracting conditions, and other private information. As an auditor's general knowledge of industry conditions is augmented by servicing multiple intra-industry

clients, the potential for inadvertent circulation of a company's private information to other industry members increases.[20,21]

In this study, circumstances where the transfer of private information will have a strong effect on the choice of auditor quality are identified at industry and firm specific levels. Industries where the dissemination of private information will affect a company's competitive standing include industries with high levels of concentration. These industries are represented by fewer key competitors in which the dissemination of private information has a higher probability of affecting the company's competitive standing. For example, when multiple auditees choose higher quality auditors they increase the probability that competing firms will be audited by the same CPA firm. This provides an opportunity for information transfers to occur. Therefore, it is hypothesized that auditor choice will be affected by the overall level of client industry concentration. A firm's

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[20] An example of such a scenario involves PepsiCo and Coca-Cola. Prior to the 1989 merger of Arthur Young and Ernst & Whinney, PepsiCo's auditor was Arthur Young and Coca-Cola's auditor was Ernst & Whinney. For their 1990 fiscal year audits Coca-Cola retained Ernst & Young and PepsiCo hired KPMG Peat Marwick. One of the major concerns for the parties involved was maintaining an adequate level of information independence as noted in the following comments:

> In New York, Morton Meyerson, director of public communications for Ernst & Young, said the choice was made by the accounting firm. 'We chose not to stand for re-election for the 1990 audit [of PepsiCo] because we understood Coca-Cola's concerns about full and open communications with us as auditors of both companies,' he said (*The Wall Street Journal*, February 26, 1990).

> Ernst & Young was forced to drop the audit of PepsiCo after another Ernst & Young audit client, Coca-Cola Co., put pressure on the accounting firm to drop one of the two soft-drink giants because of alleged confidentiality problems (*The Wall Street Journal*, March 22, 1990).

[21] The idea that auditors may inadvertently circulate private information is not an assertion that auditors consciously transfer privileged information across clients.

concern over information transfers are greatest when an industry specialized audit is desired. Since only a few CPA firms (on average) are specialized in an industry, contracting with an industry specialist increases the probability that the firm will share an auditor with an industry competitor. The concerns of information transfers are mitigated (but not eliminated) if a firm desires an auditor with only a general reputation for higher audit quality. The decreased level of concern is a result of choosing from a larger set of potential auditors.

The higher the level of concentration in the auditee's primary business industry, the more averse the firm will be to the transfer of private information and hence the less likely it will be that multiple auditees in an industry choose auditors of higher quality. Therefore the coefficient on the level of industry concentration is predicted to be negative. The level of industry concentration (**CONC**) is measured using the Herfindahl, or H index, defined as the sum of the squared values of firms' shares.[22] For any given industry j, H is calculated as follows:

$$H_j = \sum_{i=1}^{n} s_i^2$$

where i is a roster of all firms operating in industry j, and s_i is the share of the total industry activity held by firm i. The minimum value of H is $1/n$ when there are n firms of

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[22] Advantages of the H index over a K-firm concentration ratio include that the H index (1) is sensitive to the number of firms in each industry, (2) depends on the share of each firm, and (3) is sensitive to the variances in activity levels across firms.

equal size; the maximum value is 1 (monopoly). The activity to be measured is client revenues.

Measuring the existence of proprietary information is not straight-forward. The approach adopted here is to rank firms based on levels of research and development expenditures. This is consistent with Skinner [1993] who notes that "investments in R&D yield expected payoffs that form part of managers' private information," and "the value of these investments is difficult for outsiders to measure reliably." (p.419) First, within each industry, firms are ranked in descending order based on their research and development expenditures scaled by sales. Sample firms not reporting research and development costs are assigned a value of zero. Second, a dummy variable, **RD**, is created by assigning firms a value of 1 if their scaled value of research and development costs is above the median and zero if below the median. This provides a crude proxy for firms with greater and lessor amounts of proprietary information. [23] The higher a firm's level of research and development expenditures the more averse the firm will be to the transfer of proprietary information. Firms with higher levels of **RD** will be less likely to choose a higher quality auditor. Therefore the coefficient on the level of research and development expenditures (**RD**) is predicted to be negative. Similar to the argument for **CONC**, the aversion to

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[23] I chose to classify **RD** as a dummy variable for the following reason. Splitting **RD** at the median treats firms not reporting research and development expenditures similar to firms reporting very small amounts of research and development expenditures. Ranking firms on scaled levels of research and development expenditures may distort the lack of economic significance between these two types of firms.

auditors of higher quality are greatest when a company is choosing between a Big Six

industry specialist and a Big Six nonspecialist auditor.

H5: The level of concentration in a company's primary business industry and the level
of a firm's research and development expenditures are negatively related to the
demand for increasing levels of auditor quality.

3.6 Auditor Industry Specializations

Industry audit specialists are typically identified by examining industry market

share data of CPA firms at an aggregate level (e.g. Palmrose [1984], Defond [1992], and

Craswell et al. [1995]). Industry specializations are determined for 1988 and 1990 by a

two stage process. First, in any given year (e.g. 1988) all industries (2-digit

COMPUSTAT SIC codes) with at least 30 companies reporting CPA firm data are

identified.[24] Then each CPA firm's size-weighted industry market share is calculated.

Each CPA firm's share of the total industry audit fees was approximated by using the

share of industry client revenues held by each accounting firm.[25] Similar to Palmrose

[1984], the largest supplier in each industry was designated as the industry specialist. In

addition, multiple industry specialists were designated if the top two suppliers were within

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[24] This is consistent with the calculation of industry specialists used in Craswell et al. [1995]. They
concluded that in general, industries with less than 30 companies were too small to provide a reliable
indicator of auditor specialization.

[25] Weighted CPA firm market shares were also calculated based on (1) the share of industry client market
values held by each CPA firm, and (2) the share of industry client total assets held by each CPA firm.
The optional market share metrics were significantly correlated ($\rho > 0.90$, $p \leq 0.01$) with the metric based on
client sales. Therefore all data presented is based on the client sales metric for CPA firm market shares.

1% of each other.[26] Based on this classification scheme the mean market share held by the

top four CPA firms in each SIC code are:

	CPA # 1	CPA # 2	CPA #3	CPA #4
1988 mean market share	0.33	0.20	0.15	0.10
1990 mean market share	0.35	0.21	0.16	0.11

Holding the dominant market share in an industry does not guarantee that a CPA

firm is an industry audit specialist, but it is consistent with the firm having a reputation for

a strong industry knowledge base and being paid in the marketplace as an industry

specialist. The mean market share held by the dominant CPA firm in 1988 (1990) is 13%

(14%) greater than the mean market share held by the second ranked firm. This difference

is substantially larger than the 5% difference in market shares for the second, third, and

fourth ranked CPA firms. Based on the sizeable differences in market share noted above it

appears reasonable to define the industry specialist as the CPA firm with the highest

market share. Table I-1 summarizes the designated industry audit specialists. Most

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[26] As a sensitivity analysis, industry specialists were recalculated as above except multiple industry specialists were designated if the top two suppliers were within 5% of each other. The results of the multivariate analysis were qualitatively similar to those presented in Table I-5 and are therefore not reported.

industries are represented by one audit specialist, and the majority of CPA firms designated as industry specialists are consistent from 1988 to 1990.[27]

3.7 Potential Omitted Variables

Two potential variables that deserve some discussion are levels of management ownership and the existence of bonus plans. Higher levels of management ownership and the existence of bonus plans can help mitigate agency problems between owners and managers. Prior research has made the following arguments (e.g. see Francis & Wilson [1988]): (1) As management ownership increases management's incentives become more aligned with outside shareholders. Managers therefore have less incentive to shirk and the companies need for a higher quality audit dissipates. (2) The creation of accounting based bonus plans for managers creates another contract which must be monitored. Therefore firms with relatively higher numbers of bonus plans would require more or higher quality audits to monitor these contracts. There are two reasons for not including these variables in this study. First, these variables have not been consistently significant in prior studies.[28] Second, using these variables generally results in smaller sample sizes as the necessary data are typically gathered from proxy statements.

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[27] A sensitivity test was performed using only the industries whose designated audit specialist was consistent from 1988 to 1990. The results for the agency cost variables were not qualitatively different from the reported results, and the results for the information transfer variables were slightly stronger than those reported.

[28] Defond [1992] reviews the general insignificance of these variables in prior research.

4. Methodology

4.1 Discussion of Multinomial Logit Model

A multinomial logit model is used to analyze the characteristics of firms that choose different levels of audit quality.[29] In this study a given company faces three choices of audit quality. A company can hire (1) a Big Six industry specialist, (2) a non-Big Six CPA firm, or (3) a Big Six nonspecialist.

The standard multinomial logit model can be motivated by a random utility model. In this approach the choice of audit quality reflects the maximization of a perceived utility. Suppose the utility of choice i is given by

$$W_i = \alpha_i X + u_i \qquad i = 1,2,3 \qquad (1)$$

where X represents the vector of k independent variables measuring the characteristics of firms choosing a given level of audit quality and α represents the vector of coefficients for the independent variables. That is, W_i is a linear function of a number of explanatory variables X and an error term. If a company makes choice i in particular, we can assume W_i is the maximum of the three possible utilities. We do not observe the utility of choice i (W_i) directly, only whether choice i is made or not. Let Y be a random variable indicating the choice made. Therefore Y is defined as follows:

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[29] An ordered logit model was initially estimated where the levels of **AUDITOR** were ordered as Big Six industry specialist, Big Six nonspecialist, and non-Big Six CPA firms based on fee rankings from audit pricing studies. Treating the dependent variable responses as ordinal in SAS leads to fitting a parallel lines model producing multiple intercepts and one set of common slope estimates. A test of the parallel lines assumption rejected the null hypothesis that the slopes were equal. Therefore, a multinomial logit model, which treats the dependent variable responses as qualitative, was estimated. The multinomial logit model is less restrictive than the ordinal logit model and it produces parameter estimates for separate slopes as well as for separate intercepts.

$$Y = i \text{ if } W_i > W_j, \forall j \neq i \qquad (2)$$

Let p_1, p_2, and p_3 be the probabilities associated with hiring a Big Six industry specialist, a non-Big Six CPA firm, and a Big Six nonspecialist respectively. The model for audit quality choice then becomes

$$p_i = \Pr(Y = i) = \Pr(W_i > W_j), \forall j \neq i \qquad (3)$$

If the error terms u_i from (1) are independently and identically distributed by a type I extreme value distribution then p_i is given by the general multinomial logit model[30]:

$$p_i = \frac{\exp(\alpha_i' X)}{\sum_{j=1}^{3} \exp(\alpha_j' X)} \qquad (i = 1,2,3) \qquad (4)$$

Equation (4) has too many parameters: the vectors α_i can be determined only up to an additive constant, as we can add γ to each α_i without affecting the probabilities. Therefore only the differences $(\alpha_i - \alpha_j)$ are determinant. A common normalization to solve the problem is to subtract α_3 from all α_i. Now define

$$\beta_i = \alpha_i - \alpha_3 \qquad (5)$$

(which implies $\beta_3 = 0$), and rewrite (4) as

$$p_i = \frac{\exp(\beta_i' X)}{1 + \sum_{j=1}^{2} \exp(\beta_j' X)} \qquad (i = 1,2) \qquad (6a)$$

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[30] For detailed discussions of the general multinomial logit model see Greene [1993] or Cramer [1991].

$$P_3 = \frac{1}{1 + \sum_{j=1}^{2} \exp(\beta'_j X)} \qquad (6b)$$

We can now analyze the characteristics of firms choosing between a non-Big Six CPA firm versus a Big Six nonspecialist CPA firm (using β_2), and choosing between a Big Six specialist versus a Big Six nonspecialist CPA firm (using β_1) because these two coefficients show the effects the regressors have on the utility associated with choice i (i = 1,2) relative to choosing the reference state of i = 3.

The following examples demonstrate how the estimated coefficients can be interpreted. First, assume we observe that β_{1k} is positive, and β_{2k} is negative (recall β_{3k} = 0 $\forall$ k). One can conclude that as X_k increases, relative to the utility of i = 3, the utility associated with choosing i = 1 goes up and the utility associated with choosing i = 2 goes down. Second, assume we observe that $\beta_{1k} > \beta_{2k} > \beta_{3k}$ = 0. One can conclude that as X_k increases, relative to the utility of i = 3, the utility associated with choosing i = 1 or i = 2 goes up; with the increase in utility being greater for choice 1 than choice 2. Third, assume we observe that $\beta_{1k} > 0$ and $\beta_{2k} = \beta_{3k}$ = 0. One can conclude that as X_k increases, relative to the utility of i = 3, the utility associated with choosing i = 1 goes up and the utility associated with choosing i = 2 remains constant. Finally, observing $\beta_{1k} = \beta_{2k}$ = 0 would indicate that the given X_k does not affect the relative levels of any of the utilities (nor, therefore, probabilities) of the audit quality choice.

4.2 Specification of Multinomial Logit Regression

A mulitnomial logit regression is estimated to test the associations presented above between the independent variables and the level of auditor quality. The dependent variable **AUDITOR** is assigned a value of 1 if the auditee hires the industry audit specialist, 2 if the auditee hires a non-Big Six auditor, or 3 if the auditee hires a Big Six non-specialist auditor. Using CPA firm market shares to define industry audit specialists is one method of approaching this research issue. It provides a reduced form, descriptive model of the demand for quality-differentiated audits. The model is in reduced form because it does not take into account all factors that determine industry specializations. In particular it ignores the supply-side characteristics of CPA firms. Using CPA firm market shares to define industry audit specialists results in the following circular argument. Companies demand audits with varying levels of industry specializations (i.e. quality). These levels of audit specialization are based on CPA firm market shares which are the result of the demands of audit clients.

One method of approaching this endogeneity is to implement a simultaneous equations procedure.[31] This approach would require that the definition of industry specializations be independent of CPA firm market shares. The data necessary to classify CPA firms as specialists based on their specific audit production functions and audit technologies are not publicly available. Therefore, for this study, industry audit specialists

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[31] A similar approach was used by Copley et al. [1994] to account for the endogeneity in the relationship between audit quality and audit fees.

are determined solely by the industry market shares held by individual CPA firms; and a reduced form, descriptive model of the demand for quality-differentiated audits is examined.

The multinomial logit regression for audit quality choice is specified as:

$$AUDITOR_i = \alpha_0 + \beta_1 AIP_i + \beta_2 DEBT_i + \beta_3 INV_i + \beta_4 REC_i + \beta_5 CONC_i + \beta_6 RD_i + \beta_7 SIZE_i + u_i$$

where

$$AUDITOR = \begin{cases} 1 \text{ if the auditee hires a Big Six industry audit specialist} \\ 2 \text{ if the auditee hires a non-Big Six auditor} \\ 3 \text{ if the auditee hires a Big Six nonspecialist auditor} \end{cases}$$

AIP = (book value of assets)/(market value of firm)
$DEBT$ = (long-term debt)/(total assets)
INV = (inventory)/(total assets)
REC = (accounts receivable)/(total assets)
$CONC$ = Herfindahl index for the auditee's industry
RD = 1 if (research and development costs)/(sales) is above the median
    0 otherwise.
$SIZE$ = ln(total assets)

5. Data and Sample Selection

The sample includes all companies that meet the following criteria:

(1) Listed on the 1991 COMPUSTAT database (PST, Full Coverage, and Research).

(2) Reported total assets, long-term debt, inventory, receivables, number of shares of common stock, price, and sales for 1988 or 1990.

(3) Not operating in a regulated industry.

(4) No auditor changes are made from 1987-1991.

(5) The industry represented by the companies 2-digit SIC code had at least 30 companies with auditor data so that a match with an industry specialist could be made.[32]

(6) The variables **DEBT, AIP** or (research and development expenditures)/(sales) are not an outlier in the top 3% of the distribution.

Criteria (2) allows me to study the proposed relationship between auditor quality, agency costs and information transfers in the last year before the Big Eight mergers, and in the first year after the Big Eight mergers. Data from 1989 is not included due to the two Big Eight mergers of Arthur Young and Ernst & Whinney, and Deloitte, Haskins, & Sells and Touche Ross. Criteria (3) exists because larger CPA firms have been argued to possess comparative advantages, through economies of scale, in handling clients in highly regulated industries (Eichenseher & Danos [1981] and Danos et al. [1989]). Tradeoffs in the context of this study are differences in asset structure and operating environment for firms in regulated industries relative to firms operating in unregulated industries. I chose not to include firms operating in regulated industries based on this tradeoff.[33] Criteria (4)

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[32] Per footnote 24, industries with less than 30 companies were judged to be too small to provide a reliable indicator of industry specialization.

[33] A sensitivity analysis was performed by defining a variable **REG** which was assigned a value of 1 if the client operates in a regulated industry, and a value of 0 otherwise. Regulated industries were defined in a manner consistent with Eichenseher & Danos [1981]. Specifically, **REG** = 1 if a company is

was included to provide a data set representing a stable auditee/auditor alignment environment. Firms change auditors for a variety of reasons. Excluding firms that changed auditors in the years surrounding the sample period reduces the probability that an auditee/auditor alignment exists primarily for reasons other than agency cost reductions. Table I-2 shows the effects of the various sample selection criteria. The sample consists of 2,000 observations in 1988, and 1,996 observations in 1990 for a total of 3,996 observations in 33 industries.

6. Results

6.1 Univariate Tests

Descriptive statistics (mean, median, standard deviation, minimum value, and maximum value) for each independent variable are reported in Table I-3. Table I-4 provides a comparison of the mean values across auditor type for each of the independent variables. The comparisons reveal some directional support for the association of CPA firm type and the independent variables. A Kruskal-Wallis test was performed to test the null hypothesis that the 3 populations have identical probability distributions, versus the alternative that at least two of the populations differ in location. The last column of Table I-4 reports the Kruskal-Wallis statistic. Based on the Kruskal-Wallis test, the distributions of **DEBT**, **CONC**, and **SIZE** are not identical across the three groups of companies

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classified as operating in division E (transportation, communications, electric, gas, and sanitary services (SICs 40-49)), or division H (finance, insurance, and real estate (SICs 60-67)) by COMPUSTAT. **REG** was predicted to be positively related to the level of audit quality demanded. In general, the variable was not significant and the results were qualitatively the same as the results presented in the body of the paper.

choosing different levels of auditor quality for both 1988 and 1990. Distributional differences exist for **AIP** and **RD** in 1990 only.

Table I-4 also provides pair-wise tests of distributional differences between companies choosing different levels of auditor quality. Designations of significant distributional differences across adjacent columns (to the right) are noted with asterisks.[34]

6.1.1 Big Six Industry Specialists vs. Big Six Nonspecialists

Consistent with agency cost predictions, the mean value of **SIZE** for companies hiring Big Six specialist auditors is significantly higher than the mean value for companies hiring Big Six nonspecialist auditors. Variables not consistent with the agency cost predictions include **AIP** , **DEBT**, **INV** and **REC**. Consistent with the risk of information transfer predictions, the mean values of **CONC** and **RD** for companies hiring Big Six specialist auditors are significantly lower than the mean values for companies hiring Big Six nonspecialist auditors.

6.1.2 Big Six Nonspecialists vs. Non-Big Six CPA Firms

Comparisons of mean differences for companies choosing between a Big Six nonspecialist/non-Big Six CPA firm are also noted in Table I-4. Only the differences in distributions for **DEBT** and **SIZE** are consistent with the agency cost predictions. There

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[34] Significant differences of the variables are based on the Wilcoxon Rank Sum test. This nonparametric test was used since the distributions of multiple independent variables fail to meet characteristics of the normal distribution. In particular, multiple independent variables had values of skewness $\neq 0$ and kurtosis $\neq 3$. Values of these two parameters are often used to characterize departures from normality (Greene [1993]).

appears to be no consistent difference in the means for **INV**, **REC**, and **AIP**. The difference in the 1990 means for **AIP** is in the direction opposite that predicted. Neither of the variables for the risk of information transfer are significantly smaller for companies choosing Big Six nonspecialist auditors verses non-Big Six auditors. As these univariate results may not hold in a multivariate setting, further discussion is delayed until section 6.2.

6.2 Multivariate Tests

Multinomial logistic regression results are reported in Table I-5. The multivariate analysis is conducted using a multinomial logit regression with a 3-level dependent variable. In general, based on the likelihood ratio statistics reported in Table I-5, the hypothesis that all slope coefficients are zero is rejected. The regression results are generally consistent with the univariate results presented in Table I-4. The discussion of Table I-5 below focuses first on the results for the comparison of Big Six Industry Specialists vs. Big Six Nonspecialists, and then on the results for the comparison of Big Six Nonspecialists vs. Non-Big Six CPA Firms.

6.2.1 Big Six Industry Specialists vs. Big Six Nonspecialists

Hypotheses **H1**-**H4** predicted that firms with the highest levels of agency costs would contract with Big Six industry specialist auditors. Relative to companies hiring Big Six nonspecialists, companies hiring industry specialists were predicted to be larger (**H3**), have higher levels of assets-in-place (**H1**), debt (**H2**), and inventories and receivables (**H4**). The links between the transfer of proprietary information and the demand for

auditor quality were noted in **H5**. **H5** predicted that firms operating in highly concentrated industries and firms with high levels of research and development expenditures would be less likely to hire Big Six industry specialists.

The results are consistent with predictions in **H3** and **H5**. Companies hiring a Big Six industry specialist are larger, operate in less concentrated industries, and have lower levels of research and development expenditures than companies hiring a Big Six nonspecialist CPA firm. Each of these results can be stated in terms of utilities. First, as the agency costs associated with **SIZE** increase the utility associated with choosing a Big Six industry specialist increases relative to the utility associated with choosing a Big Six nonspecialist. Second, as the risk of proprietary information transfer associated with **CONC** and **RD** increases the utility associated with choosing a Big Six industry specialist decreases relative to the utility associated with choosing a Big Six nonspecialist.

The coefficients on **AIP**, **DEBT**, **INV**, and **REC** are not statistically different from zero. Therefore one can conclude that as any one of these four variables increases, the utility associated with choosing a Big Six industry specialist remains constant relative to the utility associated with choosing a Big Six nonspecialist.

6.2.2 Big Six Nonspecialists vs. Non-Big Six CPA Firms

Table I-5 also presents the regression results comparing firms that choose a Big Six nonspecialist versus a non-Big Six CPA firm. Hypotheses **H1-H4** predicted that firms with higher levels of agency costs would contract with Big Six nonspecialist auditors. Relative to companies hiring non-Big Six CPA firms, companies hiring Big Six

nonspecialists were predicted to be larger (**H3**), have higher levels of assets-in-place (**H1**), debt (**H2**), and inventories and receivables (**H4**). The links between the transfer of proprietary information and the demand for auditor quality were noted in **H5**. **H5** predicted that firms operating in highly concentrated industries and firms with high levels of research and development expenditures would be less likely to hire Big Six nonspecialists.

The results are consistent with predictions in **H2** (1988 only), **H3**, **H4** (1988 only), and **H5** (1990 only). As **DEBT**, **REC**, and **SIZE** increase the utility associated with choosing a non-Big Six CPA firm decreases relative to the utility associated with choosing a Big Six nonspecialist. As **CONC** increases the utility associated with choosing a non-Big Six CPA firm increases relative to the utility associated with choosing a Big Six nonspecialist. The results supporting **H5** are stronger in 1990 than in 1988. This may be due to the fact that by 1990 the set of higher quality auditors was reduced from eight to six. Because of this reduced set, contracting with auditors of higher quality in 1990 increased the risk of information transfer relative to 1988.

The coefficients on **INV** and **RD** are not statistically different from zero. Therefore one can conclude that as either of these variables increases, the utility associated with choosing a non-Big Six CPA firm remains constant relative to the utility associated with choosing a Big Six nonspecialist. Finally, the coefficient on **AIP** is opposite of that predicted, and hypothesis 1 (that companies hiring Big Six nonspecialists have higher levels of assets-in-place relative to companies hiring non-Big Six CPA firms) is not

supported. The positive sign indicates that as AIP increases the utility associated with choosing a non-Big Six CPA firm increases relative to the utility associated with choosing a Big Six nonspecialist.

7. Conclusion

The question addressed by this study is why do some firms hire industry specialist auditors while others do not? CPA firm audit quality is defined as having three levels: (1) Big Six industry specialization, (2) generic Big Six (no industry specialization), and (3) non-Big Six. The demand for higher quality audits was predicted to be positively associated with agency costs, and negatively associated with the risk of proprietary information transfers.

Preliminary results provide some support for predicted relationships between agency costs, the risk of proprietary information transfer, and the level of audit quality demanded. Companies contracting with Big Six industry specialist auditors are larger, operate in less concentrated industries, and have lower levels of research and development expenditures than companies hiring a Big Six nonspecialist. Companies contracting with Big Six nonspecialist auditors are larger, have higher levels of debt and receivables, and operate in less concentrated industries than companies hiring a non-Big Six CPA firm. The significant results of the association between demands for auditor quality and the risk of information transfers help to generalize the attraction/aversion results of Danos & Eichenseher [1988] and Kwon [1996]. The lack of consistent results for the agency cost

variables is consistent with the prior agency cost/auditor quality studies discussed in

section 2 (i.e., Defond [1992], Francis & Wilson [1988], and Palmrose [1984]).

The failure to find consistent, significant results for the predicted relationships

between the demand for auditor quality and agency costs is probably a function of multiple

factors. First, I do not attempt to answer the question of why auditor specializations

occur in some but not other industries. Assuming industry specializations are required for

audits across all industries may weaken the statistical tests. Testing the model at industry

specific levels may help to identify industries where the agency cost/auditor quality

relations hold. Second, designating CPA firms with dominant market shares as industry

specialists may misclassify Big Six industry specialists and Big Six nonspecialists. Third,

difficulties in properly defining and measuring proxies for agency costs could also lead to

insignificant results.

Table I-1
Designated Industry Audit Specialists

SIC Code	1988 Specialist(s)[a]	1990 Specialist(s)[b]	SIC Code	1988 Specialist(s)	1990 Specialist(s)
10	AA	PW	36	KPMG	KPMG
13	AA	AA	37	DHS	DT
15	CL	KPMG	38	KPMG	KPMG
20	CL	CL	39	EW	EY, KPMG
22	AA	EY	50	DHS	DT
23	EW	AA, EY	51	AA	AA
24	AA	AA	53	TR	DT
25	KPMG	CL	54	CL, KPMG	DT
26	AA	AA	56	KPMG	KPMG
27	EW	EY	57	TR	DT
28	PW	DT, PW	58	AA	EY
29	KPMG, PW	KPMG, PW	59	AA	AA, DT, KPMG
30	PW	PW	73	AA, KPMG	AA, KPMG
32	AA	AA	78	EW	EY
33	CL	CL	79	PW	PW
34	AA	AA	80	AA	KPMG
35	PW	PW	87	CL	CL

[a] AA = Arthur Andersen, AY = Arthur Young, CL = Coopers & Lybrand,
EW = Ernst & Whinney, DHS = Deloitte, Haskins & Sells,
KPMG = KPMG Peat Marwick, PW = Price Waterhouse, TR = Touche Ross

[b] AA = Arthur Andersen, CL = Coopers & Lybrand, EY = Ernst & Young,
DT = Deloitte & Touche, KPMG = KPMG Peat Marwick,
PW = Price Waterhouse

Table I-2
Sample Selection Criteria

	Number of Firm Years Remaining
(1) Listed on 1991 COMPUSTAT Annual tapes (PST, Full Coverage, and Research) for years 1988 or 1990	27,434
(2) Reported total assets, long-term debt, inventory, receivables, number of shares of common stock, price, and sales for 1988 or 1990	10,142
(3) Firms not operating in regulated industries	8,550
(4) Firms reporting CPA firm data for 1987-1991 and no auditor changes in this time frame	4,616
(5) Firm's industry has ≥ 30 companies with auditor data so that a match can be made with an industry audit specialist	4,381
(6) Firms whose DEBT, AIP, or (research and development costs)/(sales) are not outliers in the top 3% of the distribution	3,996

Table I-3
Descriptive Statistics By Group

Variable	Mean	Median	Std. Dev.	Minimum	Maximum
Panel A:	**Full Sample**				
	n = 3,996				
AIP	1.26	1.15	0.75	0.02	5.09
DEBT	0.17	0.15	0.15	0.00	0.63
INV	0.20	0.18	0.15	0.00	0.88
REC	0.21	0.13	0.13	0.00	0.88
CONC	0.096	0.067	0.102	0.025	0.625
RD	0.55	1.00	0.50	0.00	1.00
SIZE	4.67	4.60	2.20	-2.91	12.06

Variable	Mean	Median	Std. Dev.	Minimum	Maximum
Panel B:	**Companies Choosing Big Six Industry Specialist**				
	n = 780				
AIP	1.27	1.19	0.69	0.05	4.66
DEBT	0.18	0.16	0.15	0.00	0.63
INV	0.19	0.17	0.16	0.00	0.80
REC	0.20	0.19	0.13	0.00	0.72
CONC	0.085	0.064	0.079	0.025	0.625
RD	0.52	1.00	0.50	0.00	1.00
SIZE	5.39	5.18	2.24	0.32	11.94

Variable	Mean	Median	Std. Dev.	Minimum	Maximum
Panel C:	**Companies Choosing Big Six Nonspecialist**				
	n = 2,861				
AIP	1.25	1.13	0.74	0.05	5.09
DEBT	0.18	0.16	0.15	0.00	0.63
INV	0.20	0.19	0.15	0.00	0.88
REC	0.21	0.20	0.13	0.00	0.88
CONC	0.096	0.067	0.102	0.025	0.625
RD	0.56	1.00	0.50	0.00	1.00
SIZE	4.77	4.69	2.05	-1.22	12.06

Table I-3 – Continued

Variable	Mean	Median	Std. Dev.	Minimum	Maximum
Panel D:	**Companies Choosing Non-Big Six CPA Firm**				
	n = 355				
AIP	1.43	1.25	0.92	0.02	4.86
DEBT	0.12	0.08	0.13	0.00	0.62
INV	0.20	0.17	0.17	0.00	0.71
REC	0.21	0.18	0.16	0.00	0.88
CONC	0.118	0.067	0.137	0.025	0.625
RD	0.52	1.00	0.50	0.00	1.00
SIZE	2.27	1.91	1.73	-2.91	10.92

Table I-4
Comparison of Mean Values of
Independent Variables Across Auditor Type

	Big Six Industry Specialist[a]	Big Six Nonspecialist[a]	Non-Big Six Nonspecialist	KW Statistic[b]
Number of Companies Audited				
1988	359	1467	174	
1990	421	1394	181	
Total	780	2861	355	
AIP				
1988	1.11	1.07	1.22	5.71
1990	1.40	1.43	1.64	5.97+
DEBT				
1988	0.18	0.17**	0.11	39.46++
1990	0.19	0.18**	0.13	25.23++
INV				
1988	0.19	0.21	0.21	5.42
1990	0.19	0.20	0.19	3.22
REC				
1988	0.20	0.21	0.21	4.76
1990	0.20	0.21	0.22	2.77
CONC				
1988	0.085**	0.094	0.117	7.99+
1990	0.085**	0.098	0.119	10.77++

Table I-4 – Continued

	Big Six Industry Specialist[a]	Big Six Nonspecialist[a]	Non-Big Six Nonspecialist	KW Statistic[b]
RD				
1988	0.53	0.56	0.52	1.65
1990	0.51*	0.56	0.51	5.06+
SIZE				
1988	5.27**	4.71**	2.20	243.42++
1990	5.48**	4.84**	2.32	249.49++

[a] Table values with *'s are significantly different from the adjacent table value (to the right) based on a Wilcoxon Rank Sum test. Level of significance for one-tailed tests:

    ** $p \leq 0.01$

    * $p \leq 0.05$

[b] Kruskal-Wallis statistic levels of significance:

    ++ $p \leq 0.01$

    + $p \leq 0.05$

Table I-5

Multinomial Logistic Regression Results[a,b]

	AUDITOR	AIP	DEBT	INV	REC	CONC	RD	SIZE
Predicted Sign		(+)	(+)	(+)	(+)	(−)	(−)	(+)
1988	Big 6 Spec.	0.15	-0.19	-0.60	-0.36	-1.13	-0.16	0.12
p-value[c]		(.101)	(.671)	(.928)	(.766)	(.065)	(.100)	(.000)
Predicted Sign		(−)	(−)	(−)	(−)	(+)	(+)	(−)
1988	Non-Big 6	0.69	-1.20	0.46	-1.20	0.98	-0.13	-0.84
p-value		(1.00)	(.042)	(.808)	(.037)	(.109)	(.741)	(.000)
Predicted Sign		(+)	(+)	(+)	(+)	(−)	(−)	(+)
1990	Big 6 Spec.	-0.01	-0.23	0.06	0.03	-1.81	-0.33	0.14
p-value		(.542)	(.723)	(.441)	(.472)	(.007)	(.003)	(.000)
Predicted Sign		(−)	(−)	(−)	(−)	(+)	(+)	(−)
1990	Non-Big 6	0.18	0.28	-0.48	-0.54	1.25	-0.17	-0.74
p-value		(.980)	(.671)	(.187)	(.181)	(.050)	(.798)	(.000)

[a] Coefficients show the effects the regressors have on the utility associated with the designated choice of AUDITOR relative to choosing a Big Six Nonspecialist CPA firm (i.e., Reference AUDITOR level is Big Six nonspecialist CPA firm).

[b]

	1988	1990
Likelihood Ratio Statistic	2,645	2,846
(p-value)	(.000)	(.000)

[c] p-values are for one sided tests

CHAPTER II
INVOLUNTARY AUDITOR CHANGES: CPA FIRM AND AUDIT CLIENT REALIGNMENTS AFTER THE 1989 MERGERS THAT REDUCED THE BIG EIGHT TO THE BIG SIX

1. Introduction

The large-CPA firm business environment underwent considerable changes in the late 1980's. Many CPA firms held merger discussions and during 1989 the set of CPA firms known as the "Big Eight" became the "Big Six" via two mergers. Deloitte, Haskins & Sells merged with Touche, Ross & Co. to form Deloitte & Touche and Ernst & Whinney merged with Arthur Young to form Ernst & Young. [35]

One effect of these mergers was a substantial change in the CPA firm choice set available to audit clients. While all companies faced a new CPA firm choice set, audit clients were partitioned into those who could make voluntary auditor changes and those forced to make involuntary auditor changes. In particular, 100% of the clients of the four merging Big Eight CPA firms faced involuntary auditor changes to a newly merged CPA firm (i.e. Ernst & Young or Deloitte & Touche). These involuntary auditor changes were

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[35] The Big Eight were Arthur Andersen, Arthur Young, Coopers & Lybrand, Deloitte, Haskins & Sells, Ernst & Whinney, KPMG Peat Marwick, Price Waterhouse, and Touch, Ross & Co. The Big Six are Arthur Andersen, Coopers & Lybrand, Deloitte & Touche, Ernst & Young, KPMG Peat Marwick, and Price Waterhouse.

a result of the prior years' CPA firm ceasing to exist. Merger-forced realignments of CPA firms and audit clients were not desired by some companies and hence many audit clients were induced into switching to one of the other Big Six CPA firms or a lower-tier CPA firm.

This paper focuses on the above mentioned involuntary auditor changes rather than auditor choice per se because of the unique opportunity to examine involuntary auditor changes on a much larger scale than would normally be observed in any given year.[36] In general, examining "clean," involuntary auditor changes is preferable to studying voluntary auditor changes. Rather than being driven by direct economic forces such as the costs/benefits of higher quality audits and the costs associated with potential proprietary information transfers, voluntary auditor changes may be driven by indirect forces such as auditor-client disputes, auditor rotation policies, and opinion shopping.

Auditor change studies generally attempt to explain why companies switch from one CPA firm to another CPA firm. To provide further insight into this line of research, the tests in this study concentrate more on clients who switched away from the newly merged CPA firms than clients who chose to remain with the newly merger CPA firm. This paper investigates involuntary auditor changes by examining the shifts in the major-supplier audit market after two mergers formed the Big Six from the Big Eight in the late

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[36] I calculated the relevant auditor change rates for companies on COMPUSTAT with the 1988 financial data required for this study. The auditor change rate for Big Eight audit clients not directly affected by the 1989 mergers was 9.8%. The auditor change rate for Big Eight audit clients directly affected by the 1989 mergers was 13.1%. The change rate for the involuntary auditor changes is significantly higher than the change rate for voluntary auditor changes ($\chi^2_{(1)}$, p < 0.01).

1980's; And attempts to explain why audit clients chose to realign themselves with a particular CPA firm.[37]

The remainder of this paper is organized as follows. Section 2 discusses the audit market prior to the 1989 Big Eight CPA firms mergers. Predictions about auditor changes after the mergers are developed in section 3. Section 4 discusses the methodology employed and section 5 presents the results and conclusions.

2. Pre-Merger Audit Market Equilibrium

The audit market is generally characterized by a low auditor switching rate. A low auditor switching rate is consistent with the audit market being in an audit client - CPA firm alignment equilibrium. Alignments develop when companies select an auditor from their CPA firm choice set that matches their quality demands and budget constraints. A stable audit client - CPA firm relationship provides for cost effective, efficient audits. Repeat engagements allow for cost efficiencies because the auditor is familiar with the operations and accounting system of the client. In addition, auditor changes are not costless endeavors. Costs of switching include disclosure requirements and the start-up costs of initial audit engagements. Audit start-up costs can be significant due to the auditor's need to verify both the beginning balances of balance sheet accounts and the underlying details of balance sheet accounts with a permanent nature, and the fact that the auditor is not familiar with the clients operations (DeAngelo [1991b]). Therefore it is in a

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[37] Healy & Lys [1986] examine economic incentives for clients to remain with a Big Eight auditor after the Big Eight CPA firm merged with the client's non-Big Eight CPA firm.

client's best interest to maintain a stable relationship with a given audit firm. After establishing an equilibrium relationship with a CPA firm, audit clients will take note of their business environment and prepare plans of action needed if the stable environment is disrupted. Two components of such plans involve maintaining a consistent level of service from a CPA firm and limiting the dissemination of company specific proprietary data.

2.1 Existence of Demand for Quality-Differentiated Audits

The perceived level of service (i.e. quality of auditing) received by audit clients has received both theoretical and empirical attention in the accounting literature. DeAngelo [1981a] and Dopuch & Simunic [1982] argue that audit quality is positively related to CPA firm size. The positive relationship exists because larger firms must maintain their established name brand reputation for high audit quality. Larger investments in a brand name imply that "(1) investors' information costs of assessing audit quality are lower for a Big Eight firm than for a non-Big Eight firm; and (2) contracting parties have greater assurance that they will receive contracted-for quality from a Big Eight firm than from a non-Big Eight firm, since the Big Eight firm has a higher potential reputation loss from failing to supply this level of quality" (Healy & Lys [1986], p. 254).

In addition, empirical evidence regarding audit fee premiums is consistent with the demand for different levels of audit quality. Fee premiums accrue to auditors who have invested in a brand name and/or industry specialization. The levels of quality range from services provided by a second-tier auditor, to a first-tier (Big Six) non-specialist auditor, and finally to a first-tier industry specialist auditor. Francis and Simon [1987] and

Palmrose [1986] (among others) report brand name price premiums accrue to first-tier CPA firms relative to second-tier firms. Craswell et al. [1995] provide evidence consistent with an audit fee premium accruing to first-tier CPA firms investing in industry specializations. This industry specialization premium exists above and beyond the documented brand name audit fee premium. The demand for audits of higher quality has also been linked to the reduction of agency costs (e.g. see Defond [1992] and Francis & Wilson [1988]) and improved returns on the issuance of common stock (e.g. see Beatty [1989], Feltham et al. [1991], and Menon & Williams [1991]).

I assume that the audit clients of the Big Six were satisfied with the services of their auditor prior to the mergers of 1989. That is, the audit market was in an audit client - CPA firm alignment equilibrium prior to the mergers of 1989. After the mergers, clients of the merging firms were forced to reevaluate their choice of auditor as their prior CPA firm no longer existed. Changes to the old firms came about when the newly merged firms reexamined their audit philosophies, the desired number of partners holding a stake in the CPA firm, and the assignment of audit staff to specific audit engagements. As a result of the changes in the CPA firms, each of the merger affected clients had the incentive to contract with another CPA firm that would provide audit services whose quality was consistent with their prior auditor's quality. After reviewing their updated CPA firm choice set, each client facing an involuntary change in auditor chose a new auditor by either retaining the newly merged CPA firm or switching to one of the other Big Six CPA firms or a lower-tier CPA firm.

2.2 Existence of Information Risk

A factor which complicates auditor choice is an audit client's assessment of the risk that their auditor will inadvertently transfer private information to an industry competitor. Dye [1986] notes a manager's array of private information consists of both proprietary and nonproprietary information. Proprietary information is defined to be information whose *disclosure* reduces the present value of cash flows of the firm endowed with the information (emphasis in original). The dissemination of any private information, whether proprietary or nonproprietary, may lead to reductions in a firm's competitive standing.

Intra-industry information transfers have been studied from a number of perspectives. These studies include the effect of one firm's earnings announcements on the share price of nonannouncing firms (e.g. Clinch & Sinclair [1987]), the effect of management earnings forecasts on the share price of nonforecasting firms (e.g. Baginski [1987]), and the effect of the dissemination of valuable information by auditors on a firm's competitive standing (Danos & Eichenseher [1988] and Kwon [1996]). Danos & Eichenseher [1988] and Kwon [1996] develop and test theories that companies have an aversion to the auditors of their industry peers. A company's aversion to certain CPA firms is driven by the potential dissemination of valuable information which could affect the company's competitive standing. Danos & Eichenseher's tests of auditor-client alignments in the U.S. banking industry indicate a general aversion to the auditors of peer banks. Kwon studies how auditor/client alignments are affected by the competition within

a client's industry. Kwon's results demonstrate that audit clients are less likely to engage the same auditor as the concentration in the clients' industry increases.

In the arena of auditor choice, a critical amount of conflict of interest may be perceived to exist if a given CPA firm audits client A and A's chief rival client B. During an auditor/auditee relationship, auditors accumulate client specific data about product development, inventory status, contracting conditions, and other private information. As an auditor's general knowledge of industry conditions is augmented by servicing multiple intra-industry clients, the potential for inadvertent circulation of a company's private data to other industry members increases.

If companies are concerned about the transfer of private information they will strategically align themselves with an auditor after examining the client portfolios of available CPA firms. After noting who audits their major competitors, firms will reduce their opportunity set of potential CPA firms by eliminating the CPA firms employed by their primary competitors. Even if the audit services of a CPA firm with industry audit expertise are desired, companies may choose not to hire a specialist. The existence of very few industry audit specialists, in a concentrated and highly competitive client product industry, may deter companies from hiring one of the specialists if their major competitors already employ the specialists. In this scenario the risk of private information transfers via the auditor will outweigh the benefits provided by an industry audit specialist. However if all available industry audit specialists are not engaged, competitive clients can hire

different industry audit specialists and reap all of the associated benefits without losing any private information.[38]

Since fewer first-tier CPA firms existed after the mergers, the probability of sharing an auditor with a major competitor increased. Therefore, each of the audit clients who faced an involuntary auditor switch after the 1989 mergers was required to reevaluate the potential for the transfer of private information via their auditor. One example of companies being affected by the formation of the Big Six is the realignment of CPA firms with PepsiCo and Coca-Cola. Prior to the 1989 merger of Arthur Young and Ernst & Whinney, PepsiCo's auditor was Arthur Young and Coca-Cola's auditor was Ernst & Whinney. For their 1990 fiscal year audits Coca-Cola retained Ernst & Young and PepsiCo hired KPMG Peat Marwick. One of the major concerns for the parties involved was maintaining an adequate level of information independence as noted in the following comments:

> In New York, Morton Meyerson, director of public communications for Ernst & Young, said the choice was made by the accounting firm. 'We chose not to stand for re-election for the 1990 audit [of PepsiCo] because we understood Coca-Cola's concerns about full and open communications with us as auditors of both companies,' he said (*The Wall Street Journal*, February 26, 1990).

> Ernst & Young was forced to drop the audit of PepsiCo after another Ernst & Young audit client, Coca-Cola Co., put pressure on the accounting firm to drop one of the two soft-drink giants because of alleged confidentiality problems (*The Wall Street Journal*, March 22, 1990).

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[38] See essay I, *Quality-Differentiated Auditing and the Demand for Industry Specialized Audit Services*, for a more complete description of the trade-offs associated with the risk of information transfers via auditors versus the benefits provided by an industry audit specialist.

A second example, although not directly linked to the 1989 Big Eight mergers, further conveys that the issue of information transfers via an auditor is not an uncommon concern. *The Wall Street Journal* (March 17, 1994) reported General Electric Co.'s GE Capital unit made a $2.2 billion takeover bid for Kemper Corp. Both of these companies were audited by KPMG Peat Marwick. Concerned about "due diligence" work related to the takeover for GE or Kemper, Herbert Finkston, head of the American Institute of Certified Public Accountants professional ethics division, made the following comments: "Peat has to be very careful about the services it performs for both clients in this situation to avoid any independence or ethics conflicts." It was also later noted in the same article that "Peat's biggest worries may come after GE's bid succeeds or fails. Both companies are major Peat clients and the fees Peat receives would probably decline if the companies combined. If the bid fails, Kemper may *seek another auditor to preserve its confidentiality*, accountants say." (emphasis added)

2.3 Demands by Small Clients

Auditee size is positively associated with the level of audit quality demanded (e.g. see Francis & Wilson [1988],and Healy & Lys [1986]). Despite this association, prior to the 1989 Big Eight audit mergers many small companies were willing to pay higher fees to a first-tier auditor in return for receiving special attention and a higher quality service. On the margin their benefits of hiring a Big Eight auditor were greater than the costs. As noted in section *2.1*, the benefits a smaller company receives from a first-tier auditor

include "(1) investors' information costs of assessing audit quality are lower for a Big Eight firm than for a non-Big Eight firm; and (2) contracting parties have greater assurance that they will receive contracted-for quality from a Big Eight firm than from a non-Big Eight firm, since the Big Eight firm has a higher potential reputation loss from failing to supply this level of quality" (Healy & Lys [1986], p. 254). However, as soon as this cost/benefit position reverses, small companies have the incentive to return to a second-tier auditor.

The 1989 Big Eight CPA firm mergers may have created such a cost/benefit reversal for some small audit clients. Merging CPA firms were forced to pay less attention to some of their smaller clients during the merger process and in the near future after the mergers as they attempted to once again become efficient operations. Therefore, after the mergers, small audit clients had the incentive to reexamine their choice of audit firm from their CPA firm choice set. If they determined they would not receive the same "product" post-merger as they were receiving pre-merger, small clients would have had the incentive to switch to a lower cost, second-tier CPA firm or a different first-tier auditor that was able to meet their needs. Two anecdotal examples of the issues associated with the 1989 Big Eight mergers and small audit clients are given below.

First, many smaller clients have stated the amount of quality service they have received has declined since the two Big Eight mergers, as these smaller clients have lost importance in the CPA firms' portfolio of clients:

> In big-time accounting, where mergers and slow revenue growth have intensified cost cutting, many small clients are so irritated they are leaving, shifting to regional and local firms. In the past two years, the Big Six

accounting firms lost 239 public audit clients to local firms, while gaining only 159 such clients.

Mark Feinstein says he hired Arthur Young & Co. six years ago because he heard that the big accounting firm gave small businesses "dynamite service."

"In the first two years, I'd get a call back the same day when I had questions," Mr. Feinstein says. "After the merger, it took up to a week to get a response.

Six months ago, Mr. Feinstein's Lincoln, R.I., video-rental company, Northeast Management Inc., switched from Ernst & Young, the nation's second biggest accounting firm, to Kahn, Litwin & Co., a Providence, R.I., firm with one office and a staff of only 17. "I got tired of being ignored," Mr. Feinstein says. (*The Wall Street Journal*, April 21, 1994)

The second example comes via a 1995 customer service survey of small businesses by Cicco & Associates. Cicco's report summarizing the survey states that only 16% of the respondents feel the accounting profession has large firms that seem responsive to their needs. The ratings of the accounting firms have steadily dropped from first in 1988-1989 to last in 1995. John Cicco stated that the Big Eight mergers seem to have prompted the decline and notes, "There is a certain confusion among small businesses as to who is responsible for them." (*Accounting Today* September 11-24, 1995)

3. Hypotheses Development

The Big Eight audit market of 1988 is now examined to determine effects of the 1989 Big Eight CPA firm mergers. The 1988 audit market is taken as a basis of comparison. It is assumed that audit clients in 1988 are aligned with CPA firms in a

manner that satisfies an audit client/CPA firm alignment equilibrium. Based on their direct involvement with the mergers, particular attention will be given to the 1988 audit clients of Deloitte, Haskins and Sells, Touche, Ross & Co., Arthur Young, and Ernst & Whinney. Each of these clients had the opportunity to either stay with the new accounting firm (Ernst & Young or Deloitte & Touche) or to switch to another CPA firm. This choice is a function of at least three factors: (1) The level of audit quality provided pre- versus post-merger, (2) A client's fear of private information transfers, and (3) audit client size. The immediate discussion considers each of these factors.

3.1 Risk of Proprietary Information Transfer

Clients who fear the transfer of private information to competitors via the audit process are more likely to change auditors if a CPA firm merger places them in an environment where the same CPA firm audits the given client and any of its major competitors. Four variables are used to measure the risk of information transfer for any given audit client and each is predicted to be related to the client switching away from the merged CPA firm: (1) The client's 1988 level of research and development expenditures (**RD**), (2) The client's 1988 level of growth opportunities versus assets-in-place (**AIP**), (3) The 1988 level of concentration in the client's product market/industry (**CONC**), and (4) The pro forma market share held by an audit client's 1988 CPA firm and its merging partner (**SHARE**). For example, if the client was audited by Touche Ross & Co. before the 1989 Big Eight CPA firm mergers, **SHARE** would be the sum of the 1988 audit

market share of the client's industry held by Touce Ross & Co. and Deloitte, Haskins & Sells.

RD is an indirect measure of a company's potential future innovations. Skinner [1993] notes that "investments in R&D yield expected payoffs that form part of managers' private information," and "the value of these investments is difficult for outsiders to measure reliably." (p.419) RD is defined using the following process. First, within each industry, firms are ranked in descending order based on their research and development expenditures scaled by sales. Sample firms not reporting research and development costs are assigned a value of zero. Second, a dummy variable, RD, is created by assigning firms a value of 1 if their scaled value of research and development costs is above the median and zero if below the median. This provides a crude proxy for firms with greater and lessor amounts of proprietary information.[39] The higher a firm's level of research and development expenditures the more averse the firm will be to the transfer of proprietary information. Therefore firms with higher levels of RD will be less likely to remain with the merged CPA firm. This results in the prediction that the coefficient on the level of research and development expenditures (RD) will be positive.

H1:   RD is positively related to the likelihood that an audit client switches away from a merged Big Eight CPA firm.

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[39] I chose to classify RD as a dummy variable for the following reason. Splitting RD at the median treats firms not reporting research and development expenditures similar to firms reporting very small amounts of research and development expenditures. Ranking firms on scaled levels of research and development expenditures may distort the lack of economic significance between these two types of firms.

Companies with multiple growth opportunities have more at risk from transfers of proprietary information than companies with few growth opportunities. **AIP** is a common measure of the portion of a firm's market value attributable to assets-in-place. A company's level of **AIP** is defined as the ratio of the accounting book value of total assets to the market value of the firm. The market value of the firm is proxied by the market value of common equity plus the book value of total debt and preferred stock. This definition follows the argument in Myers [1984] that book values represent assets-in-place (tangible assets and working capital) and market values reflect intangibles and growth options as well as assets-in-place. If firms with a greater number of growth opportunities are more averse to the transfer of proprietary information, the coefficient on **AIP** should be negative.

H2:   AIP is negatively related to the likelihood that an audit client switches away from a merged Big Eight CPA firm.

Industries where the dissemination of private information will affect a company's competitive standing include industries with high levels of concentration. These industries are represented by fewer key competitors in which the dissemination of private information has a higher probability of affecting the company's competitive standing. For example, when multiple auditees choose higher quality auditors they increase the probability that competing firms will be audited by the same CPA firm. This provides an opportunity for information transfers to occur. Therefore, it is hypothesized that auditor choice will be affected by the overall level of client industry concentration. **CONC** is a

measure of the level of concentration in a company's product market. The level of

concentration in a company's product market (**CONC**) is measured using the Herfindahl,

or H index, defined as the sum of the squared values of firms' shares.[40] For any given

industry j, H is calculated as follows:

$$H_j = \sum_{i=1}^{n} s_i^2$$

where i is a roster of all firms operating in industry j, and s_i is the share of the total

industry activity held by firm i. The minimum value of H is $1/n$ there are n firms of equal

size; the maximum value is 1 (monopoly). The activity to be measured is sales revenue for

the product industry.

The higher the level of concentration in the auditee's primary business industry, the

more averse the firm will be to the transfer of private information and hence the less likely

it will be that multiple auditees in an industry choose the same auditor. Therefore the

coefficient on the level of industry concentration is predicted to be positive.

H3:   CONC is positively related to the likelihood that an audit client switches away
        from a merged Big Eight CPA firm.

SHARE is the pro forma market share held by an audit client's 1988 CPA firm

and its merging partner. **SHARE** is used to measure the likelihood that a Big Eight CPA

firm merger will cause two rival companies to be audited by the same CPA firm. The

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[40] Advantages of the H index over a K-firm concentration ratio include that the H index (1) is sensitive to the number of firms in each industry, (2) depends on the share of each firm, and (3) is sensitive to the variances in activity levels across firms.

higher the market share of the merging partner CPA firm, the more likely the merger will provide an initial, involuntary auditor change forcing two competitors to be temporarily audited by the merged CPA firm. Therefore, as **SHARE** increases, the risk of proprietary information transfers increases, and the probability of an audit client changing away from a merged CPA firm increases. **SHARE** is defined as follows:

$$SHARE_i = \frac{\sum_i R_{ijk} + \sum_i R_{ij'k}}{\sum_j \sum_i R_{ijk}}$$

Where R_{ijk} = annual sales revenue for client i of audit firm j in industry k, and j and j' represent any two merging CPA firms.

The variable **SHARE** can also be associated with changes in auditor quality. In the setting of this paper, involuntary changes of audit quality could occur via CPA firm mergers. When an audit client's 1988 auditor was not an industry specialist and it merged with an industry specialist, the audit client could see a change in audit quality. As an audit client moves from a nonspecialist auditor to a specialist auditor, the client will potentially receive a different product and a higher audit fee Craswell et al. [1995]. If a client is not likely to receive the same level of audit quality after the CPA- firm mergers as before the mergers, the client is predicted to switch away from the merged CPA firm to another auditor so that it can reestablish a relationship which provides the desired quality level of audit services.

Audit specialist definitions are usually tied to the CPA firm's market share. An increase in an auditor's market share reflected by an increase in **SHARE**, is also consistent with a change in auditor quality due to a nonspecialist merging with an industry specialist. Therefore, the higher the level of **SHARE** associated with an audit client, the more likely the audit client will switch away from the merged CPA firm.

H4:   SHARE is positively related to the likelihood that an audit client switches away from a merged Big Eight CPA firm.

3.2 Size of Audit Client

Finally, smaller clients are predicted to change auditors after the mergers at a much higher rate than larger clients. These switches are linked to the smaller clients' fear of reduced service quality after the merger. Client size (**SIZE**) is measured using the natural logarithm of the pre-merger (fiscal year 1988) level of total assets. As **SIZE** decreases, the probability of an audit client changing away from a merged CPA firm increases.

H5:   SIZE is negatively related to the likelihood that an audit client switches away from a merged Big Eight CPA firm.

The effects of these independent factors are summarized in Figure 1, Panels A and B.

4. Methodology

Due to the CPA firm mergers in 1989 the number and types of firms supplying audits changed, without necessarily increasing or decreasing the demand for auditing. Therefore, audit clients of the merging firms had to make new auditor choices. The tests

that follow focus more on the audit clients that switched away from the newly merged

CPA firms than those that chose to remain. Let p_i be the probability associated with an

audit client changing away from a merged CPA firm. The following probability model is

used to test the audit client - CPA realignment predictions outlined in Figure 1:

$$p_i = \frac{\exp(\beta_i' X)}{1 + \exp(\beta_i' X)}$$

where p_i represents the probability of an auditor change after the 1989 CPA firm mergers,

X represents the vector of k independent variables measuring the characteristics of firms

choosing a given level of audit quality and β represents the vector of coefficients for the

independent variables. I then use a binary response logit model to estimate the model

parameters.

$$CHOICE_i = \alpha_0 + \beta_1 RD_i + \beta_2 AIP_i + \beta_3 CONC_i + \beta_4 SHARE_i + \beta_5 SIZE_i + \varepsilon_i$$

where:

	Predicted Sign
CHOICE = 1 if the client switches away from the merged CPA firm 0 if the client retains the merged CPA firm	N/A
RD = 1 if (research and development costs)/(sales) is above the median 0 otherwise[41]	(+)
AIP = pre-merger (book value of total assets)/(market value)	(−)
CONC = pre-merger Herfindahl index for audit client's product industry	(+)

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[41] **RD** was also calculated as a continuous variable defined by a companies research and development expenditures scaled by sales. Using this continuous definition did not affect the results reported.

SHARE = The pro forma market share held by the audit client's 1988   (+)
CPA firm and its merging partner CPA firm

SIZE = pre-merger ln(total assets)   (−)

5. Results

5.1 Data and Sample Selection

The sample for the analysis includes all companies that meet the following criteria:

(1) Listed on the 1991 COMPUSTAT database (PST, Full Coverage, and

Research).

(2) Reported CPA firm and audit opinion, total assets, number of shares of

common stock, price, and sales for 1988-1990.

(3) Audited by a CPA firm involved in the 1989 Big Eight mergers (i.e. audited by

Arthur Young, Ernst & Whinney, Deloitte Haskins & Sells or Touche Ross & Co.

in 1988).

Table II-1 shows the effects of the various sample selection criteria. The sample consists

of 1,599 companies audited in 1988 by one of the four merging Big Eight CPA firms.

Mergers generally lead to higher market shares. This idea is key to the risk of

information transfers argument noted above. As the market share of a CPA firm

increases, the probability of two competitive clients being audited by the same CPA

increases. 1988 market share data for the four merging Big Eight CPA firms are

presented in Table II-2 by 2-digit SIC code. The market share for each of the four CPA

firms is presented separately along with the 1988 pro forma market shares for Deloitte &

Touche and Ernst & Young. The average pro forma increase faced by clients of each of the four firms is as follows: Deloitte, Haskins, & Sells = 8%, Touch Ross & Co. = 9%, Ernst & Whinney = 8%, and Arthur Young = 11%.[42] These average market share increases should provide a substantial number of opportunities for the risk of information transfers to affect the audit client - CPA realignments after the 1989 Big Eight CPA firm mergers.

A second item that is key to the risk of information transfers argument noted above is that alternative auditors with smaller industry market shares exist. So a relevant question is how does the pro forma market share of the newly merged CPA firm compare to the CPA firm eventually engaged by the 183 clients making a change in auditor? The pro forma market share was greater than the market share of the new auditor in 123 (67.2%) of the 183 cases. The problem of finding an alternative auditor with a smaller market share is greatest for those clients wishing to maintain a relationship with a Big Six CPA firm. 142 (77.6%) of the 183 clients switching away from the newly merged CPA firm engaged another Big Six CPA firm. In this subsample, the pro forma market share was greater than the market share of the new Big Six auditor in 81 (57.7%) of the 142 cases. It appears that the 183 clients seeking alternative auditors had the ability to engage a new auditor with a market share less than the newly merged CPA firm if they desired.

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[42] The average pro forma increase was calculated as the mean of (pro forma merged market share - CPA firm market share). For example, the mean of (pro forma DT market share - DHS market share) = 8% is the average pro forma increase faced by clients of DHS reported above.

5.2 Univariate Tests

Descriptive statistics (mean, median, standard deviation, minimum value, and maximum value) for each independent variable are reported in Table II-3. Table II-4 provides a comparison of the mean values across audit client type for each of the independent variables. The comparisons reveal some directional support for the association of involuntary choice and the independent variables.

Consistent with the risk of information transfer predictions in **H3**, the mean value of **CONC** for companies that switched away from the merged CPA firm is larger than the mean value for companies that retained the merged CPA firm. Variables not consistent with the risk of information transfer predictions include **RD**, **AIP**, and **SHARE**. Consistent with the size of audit client predictions in **H5**, the mean value of **SIZE** for companies switching away from the merged CPA firm was smaller than the mean value for companies that retained the merged CPA firm.

5.3 Multivariate Tests

The binomial logistic regression results are reported in Table II-5. In general, the hypothesis that all slope coefficients are zero can be rejected based on the resulting likelihood ratio statistic. For individual coefficients, the regression results are consistent with the univariate results presented in Table II-4.

Hypotheses H1-H4 predicted that companies with the highest risk of information transfers would choose not to retain a merged Big Eight CPA firm for future audits. Companies most likely to have high risks of information transfers were predicted to have

larger levels of research and development expenditures (**H1**); have lower levels of assets-in-place (**H2**); operate in industries with relatively higher levels of concentration (**H3**); and face higher pro forma CPA firm market shares (**H4**). **H5** predicted that smaller firms would be less likely to retain a merged Big Eight CPA firm for future audits.

The results are consisted with predictions in **H3** and **H5**. Companies choosing to switch away from a merged Big Eight CPA firm operated in the more concentrated industries and were smaller in size.[43] The coefficients on **RD**, **AIP**, and **SHARE** are not consistent with the respective hypotheses.[44]

6. Conclusion

This paper has focused on the involuntary auditor changes that resulted from the 1989 mergers within the Big Eight CPA firms. Merger-forced realignments of CPA firms and audit clients were not desired by some companies and hence many audit clients were induced into switching to one of the other Big Six CPA firms or a lower-tier CPA firm.

The act of switching away from a merged CPA firm was predicted to be positively associated with an audit client's risk of information transfers, and negatively associated with an audit client's size. The evidence is consistent with smaller clients being more likely to switch away from the merged CPA firm, and there is some evidence that clients

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[43] The 183 companies that switched away from a merging Big Eight CPA firm were ranked based on **SIZE**. 70% of the companies in the smallest decile switched from a merging Big Eight CPA firm to a non-Big Eight CPA firm. 57% of the companies in the smallest quintile switched from a merging Big Eight CPA firm to a non-Big Eight CPA firm.

[44] The logistic regression was reestimated after deleting 5 potentially influential observations. These 5 observations were identified via regression diagnostics including scores for HAT diagonals and DFBETAS. The results were not affected by the elimination of these 5 observations.

concerned with proprietary information transfers were more likely to switch away from the merged CPA firm. Specifically, there is a positive association between companies operating in highly concentrated industries and switching away from the merging Big Eight CPA firms. This latter result helps to generalize the attraction/aversion results of Danos & Eichenseher [1988] and Kwon [1996]. The positive association between higher levels of concentration in client industries and the desire for competing clients to have different auditors is consistent between the Kwon study and this study. The generalization of results is primarlily due to Kwon's sample being oriented towards an auditor/client alignment equilibrium, while this study's sample is oriented towards changes to auditor/client alignments.

Figure II-1
Auditor Change Environments

Panel A: **Environment where the likelihood of an auditor change after the 1989 CPA firm mergers is highest.**

- The audit client's pre-merger research and development expenditures are high (**RD**)

- The audit client's pre-merger growth opportunities are high (**AIP**)

- The audit client's product industry is concentrated pre-merger (**CONC**)

- The 1988 market share held by the merging partner of the audit client's CPA firm is high (**SHARE**)

- The audit client is of small size (**SIZE**)

Panel B: **Environment where the likelihood of an auditor change after the 1989 CPA firm mergers is lowest.**

- The audit client's pre-merger research & development expenditures are low (**RD**)

- The audit client's pre-merger growth opportunities are low (**AIP**)

- The audit client's product industry is *not* concentrated pre-merger (**CONC**)

- The 1988 market share held by the merging partner of the audit client's CPA firm is low (**SHARE**)

- The audit client is of large size (**SIZE**)

Table II-1
Sample Selection Criteria

	Number of Firm Years Remaining
(1) Listed on 1991 COMPUSTAT Annual tapes (PST, Full Coverage, and Research) for years 1988-1990	41,151
(2) Reported total assets, CPA firm data, number of shares of common stock, price, and sales	15,433
(3) Company's 1988 auditor was involved in the 1989 Big Eight mergers (i.e., audited by Arthur Young, Ernst & Whinney, Deloitte, Haskins & Sells, or Touche Ross & Co. in 1988)	4,797

This selection process results in a sample of 1,599 (4,797 ÷ 3) companies audited in 1988 by one of the four merging Big Eight CPA firms.

Table II-2
CPA Firm Industry Market Shares
Pre- and Post-Merger

SIC Code	1988 CPA Firm Market Share				1988 Proforma Market Share	
	DHS	TR	EW	AY	DT	EY
1	0.00052	0.0000	0.00372	0.00202	0.00052	0.00574
10	0.05832	0.01541	0.13659	0.01499	0.07373	0.15158
13	0.02034	0.00532	0.01503	0.16477	0.02566	0.1798
15	0.02481	0.04477	0.07187	0.06403	0.06958	0.1359
16	0.02766	0.00082	0.00000	0.41913	0.02848	0.41913
17	0.00000	0.32534	0.27079	0.00000	0.32534	0.27079
20	0.00835	0.08122	0.09934	0.07065	0.08957	0.16999
22	0.13028	0.00709	0.10663	0.26235	0.13737	0.36898
23	0.00000	0.15905	0.27473	0.04128	0.15905	0.31601
24	0.01907	0.19715	0.03671	0.00302	0.21622	0.03973
25	0.05271	0.01678	0.15911	0.02153	0.06949	0.18064
26	0.06987	0.03890	0.05311	0.00042	0.10877	0.05353
27	0.12955	0.02264	0.22826	0.06448	0.15219	0.29274
28	0.19044	0.04808	0.04503	0.01375	0.23852	0.05878
29	0.00510	0.00218	0.10719	0.12451	0.00728	0.2317
30	0.01617	0.09069	0.05419	0.03200	0.10686	0.08619
31	0.00623	0.04463	0.55334	0.06806	0.05086	0.6214
32	0.02931	0.03506	0.07397	0.10747	0.06437	0.18144
33	0.05939	0.02324	0.21330	0.04909	0.08263	0.26239
34	0.13055	0.03375	0.17525	0.05271	0.1643	0.22796
35	0.05990	0.02069	0.04230	0.07298	0.08059	0.11528
36	0.00661	0.03634	0.04977	0.13837	0.04295	0.18814
37	0.29068	0.11326	0.07274	0.03947	0.40394	0.11221
38	0.17330	0.04875	0.04958	0.01557	0.22205	0.06515
39	0.03557	0.03776	0.31770	0.00028	0.07333	0.31798
40	0.15847	0.00143	0.18257	0.00360	0.1599	0.18617
42	0.02681	0.00098	0.37719	0.02406	0.02779	0.40125
44	0.14858	0.15714	0.07813	0.02024	0.30572	0.09837
45	0.00168	0.01414	0.17754	0.19639	0.01582	0.37393
47	0.05254	0.00000	0.00034	0.41913	0.05254	0.41947
48	0.01475	0.06540	0.00976	0.09067	0.08015	0.10043
49	0.00297	0.20933	0.07405	0.06347	0.2123	0.13752

Table II-2 – Continued

SIC Code	1988 CPA Firm Market Share				1988 Proforma Market Share	
	DHS	TR	EW	AY	DT	EY
50	0.78027	0.01632	0.03212	0.02236	0.79659	0.05448
51	0.14972	0.24507	0.07253	0.03554	0.39479	0.10807
52	0.22515	0.02651	0.21072	0.00000	0.25166	0.21072
53	0.01183	0.28514	0.08800	0.09519	0.29697	0.18319
54	0.10857	0.09356	0.19347	0.00594	0.20213	0.19941
55	0.00022	0.17664	0.06155	0.00000	0.17686	0.06155
56	0.01203	0.20196	0.06549	0.00000	0.21399	0.06549
57	0.00690	0.33858	0.06067	0.03070	0.34548	0.09137
58	0.14301	0.04865	0.10002	0.20238	0.19166	0.3024
59	0.09683	0.16369	0.03323	0.02405	0.26052	0.05728
60	0.07018	0.13459	0.01727	0.04174	0.20477	0.05901
61	0.21536	0.15730	0.11369	0.02892	0.37266	0.14261
62	0.19433	0.04205	0.01160	0.50906	0.23638	0.52066
63	0.03682	0.00000	0.04572	0.27913	0.03682	0.32485
64	0.21558	0.05767	0.01768	0.06209	0.27325	0.07977
65	0.02043	0.01194	0.03839	0.01296	0.03237	0.05135
67	0.15080	0.31281	0.08460	0.06476	0.46361	0.14936
70	0.07536	0.02893	0.02295	0.10570	0.10429	0.12865
72	0.52999	0.14379	0.00000	0.10435	0.67378	0.10435
73	0.07329	0.10273	0.08226	0.05219	0.17602	0.13445
75	0.00000	0.03437	0.01119	0.00000	0.03437	0.01119
78	0.03496	0.03724	0.45383	0.05002	0.0722	0.50385
79	0.02499	0.00521	0.00761	0.22918	0.0302	0.23679
80	0.02953	0.02159	0.17846	0.09125	0.05112	0.26971
82	0.06131	0.00000	0.01018	0.07154	0.06131	0.08172
87	0.10565	0.02851	0.03645	0.00753	0.13416	0.04398
99	0.00000	0.34657	0.00021	0.21368	0.34657	0.21389

The average pro forma increase in auditor market share faced by the clients of each of the four merging firms is as follows[a]:

DHS = 8%   TR = 9%   EW = 8%   AY = 11%

[a] The average pro forma increase was calculated as the mean of (pro forma merged market share - CPA firm market share). For example, the mean of (pro forma DT market share - DHS market share) = 8% is the average pro forma increase faced by clients of DHS reported above.

Table II-3
Descriptive Statistics By Group

Variable	Mean	Median	Std. Dev.	Minimum	Maximum
Panel A:	**Full Sample**				
	n = 1,599				
RD	0.46	0	0.50	0	1
AIP	1.37	1.09	1.41	0.02	17.06
CONC	0.121	0.090	0.128	0.021	0.776
SHARE	0.18	0.15	0.14	0.01	0.80
SIZE	4.39	4.29	2.13	-0.82	11.87

Variable	Mean	Median	Std. Dev.	Minimum	Maximum
Panel B:	**Companies Choosing To Leave Merged Big Eight CPA Firm**				
	n = 1,599				
RD	0.38	0	0.49	0	1
AIP	1.50	1.11	1.54	0.02	12.10
CONC	0.147	0.096	0.161	0.021	0.776
SHARE	0.17	0.15	0.15	0.01	0.80
SIZE	3.59	3.24	2.21	-0.03	9.79

Variable	Mean	Median	Std. Dev.	Minimum	Maximum
Panel C:	**Companies Choosing To Retain Merged Big Eight CPA Firm**				
	n = 1,416				
RD	0.47	0	0.50	0	1
AIP	1.35	1.09	1.40	0.03	17.06
CONC	0.118	0.090	0.120	0.021	0.776
SHARE	0.18	0.15	0.14	0.01	0.80
SIZE	4.49	4.40	2.10	-0.82	11.87

Table II-4
Comparison of Mean Values of Independent Variables
Across Client Type

	Companies That Leave Merged CPA Firm	Companies That Retain Merged CPA Firm	Test Statistic[a] (p-value)[b]
N	183	1416	
RD	0.38	0.47	-2.30 (0.989)
AIP	1.50	1.35	0.56 (0.712)
CONC	0.147	0.118	1.78 (0.037)
SHARE	0.17	0.18	-1.53 (0.936)
SIZE	3.59	4.49	-5.59 (0.000)

[a] The test statistic is based on a Wilcoxon Rank Sum test.

[b] p-values are for one sided tests.

Table II-5
Logistic Regression Results

	RD	AIP	CONC	SHARE	SIZE
Predicted Sign	(+)	(−)	(+)	(+)	(−)
Coefficients	-0.38	0.09	1.07	-0.50	-0.23
p-value[a]	(0.986)	(0.968)	(0.024)	(0.817)	(0.000)

A binary response logit model was used to estimate the model parameters.

$$CHOICE_i = \alpha_0 + \beta_1 RD_i + \beta_2 AIP_i + \beta_3 CONC_i + \beta_4 SHARE_i + \beta_5 SIZE_i + \varepsilon_i$$

where:

CHOICE = 1 if the client switches away from the merged CPA firm
         0 if the client retains the merged CPA firm

RD = 1 if (research and development costs)/(sales) is above the median
     0 otherwise

AIP = pre-merger (book value of total assets)/(market value)

CONC = pre-merger Herfindahl index for audit client's product industry

SHARE = The pro forma market share held by the audit client's 1988
        CPA firm and its merging partner CPA firm

SIZE = pre-merger ln(total assets)

[a] p-values are for one sided tests.

Table II-6
Matrix of Simple Correlation Coefficients

	AIP	SIZE	RD	CONC	SHARE

Panel A: Pearson Correlation Coefficients[a]

	AIP	SIZE	RD	CONC	SHARE
AIP	1.00	0.17*	-0.14*	0.09*	0.10*
SIZE		1.00	-0.09*	-0.01	0.13*
RD			1.00	-0.26*	-0.16*
CONC				1.00	0.19*
SHARE					1.00

	AIP	SIZE	RD	CONC	SHARE

Panel B: Spearman Correlation Coefficients[a]

	AIP	SIZE	RD	CONC	SHARE
AIP	1.00	0.17*	-0.18*	0.20*	0.06
SIZE		1.00	-0.09*	0.03	0.15*
RD			1.00	-0.32*	-0.13*
CONC				1.00	0.02
SHARE					1.00

[a] Table values with *'s are significantly correlated at a significance level of 0.01

CHAPTER III
MARKET REACTION TO AUDITOR SWITCHES AS
A TEST OF QUALITY-DIFFERENTIATED AUDITING

1. Introduction

A number of papers in the accounting literature have examined the notion of perceived audit quality.[45] Some empirical studies have documented evidence consistent with the existence of Big Six product differentiation in the audit market.[46] Studies finding evidence consistent with audit quality differences have examined audit fees (e.g., Craswell et al. [1995], Francis and Simon [1987], Palmrose [1986]) and litigation rates (e.g. Palmrose [1988]). There are also a number of studies which examine the notion of perceived audit quality as reflected in market reactions to auditor switches (e.g., Eichenseher et al. [1989], Fried and Schiff [1981], Johnson and Lys [1990], and Nichols and Smith [1983]). These studies have met with only limited success in finding an association between auditor changes and security prices. The present study attempts to shed light on the issue of perceived audit quality by reexamining the capital market consequences of auditor switches.

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[45] DeAngelo (1981a) defines audit quality to be 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.

[46] In late 1989, Touche Ross merged with Deloitte Haskins & Sells, and Arthur Young merged with Ernst & Whinney to form Deloitte & Touche and Ernst & Young respectively. As a result the Big Eight have come to be known as the Big Six. I use the phrase "Big Six" throughout the paper.

I examine auditor switches for a sample of Over-the-Counter (OTC) firms. In the context of market reactions to auditor switches, there are a number of reasons why examining auditor switches for smaller (OTC) firms may be more fruitful than studying auditor switches of larger firms. First, large companies require large CPA firms, and as a result it is difficult to separate CPA firm size and audit quality effects. Large CPA firms develop specializations in audit technologies (e.g., branch offices and SEC compliance) which provide economies of scale and scope in rendering services (Johnson and Lys [1990]). As a result, large CPA firms are more capable of handling large clients whose operations are geographically dispersed and involve a large number of complex accounting transactions.[47]

Second, perceived audit quality may be more important for smaller companies because there are fewer substitutes available for external auditing in this environment. In the large-client market, CPA firms must not only compete against each other, but also against various company substitutes for external auditing services. Large clients are characterized by complex corporate governance systems that include audit committees, internal auditors and strong internal control structures, any of which potentially substitute (in part) for external audit services (Anderson et al. [1993], Yardley et al. [1992]).

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[47] A small CPA firm's resources may not be adequate to meet the demands of auditing a large client, or such an audit may require a disproportionate amount of the small CPA firm's resources. By accepting large clients, small CPA firms may invoke a large amount of risk by having their client portfolio dominated by a few large firms. While several small CPA firms could cooperate in conducting such an audit, the cost of coordination is likely to be less for a single, large firm which already has multiple, geographically dispersed offices established. A single firm has a comparative advantage over a consortium of firms by prescribing uniform audit procedures, exercising greater authority over auditors who are employees or partners, using a monitoring mechanism already in place, and presenting the client with a single, continuing firm rather than with a consortium that might be unsuitable (Benston [1985]).

A third reason for examining the OTC market is to increase the sample size and the power of statistical tests over prior studies. Studies which only consider auditor changes by NYSE and AMEX firms often have weak tests due to small sample sizes of auditor switches across auditor types (from Big Six to non-Big Six CPA firms and vice versa). McConnell [1984] shows that the market share of Big Six firms is increasing for NYSE and AMEX companies. However, inter-tier auditor changes by OTC companies are as likely to be away from a Big Six CPA firm as toward a Big Six CPA firm. Given the large population of smaller OTC-listed corporations, one should be able to observe an adequate number of auditor changes from the Big Six to the non-Big Six and vice versa.

The remainder of this paper is organized as follows. Section 2 discusses the market for quality differentiated audits. Prior market studies of auditor switches are reviewed in section 3. Section 4 contains the development of the hypotheses. The sample is discussed in Section 5. Section 6 details the returns and model and test statistics. Empirical tests and results are reported in sections 7 and 8. Section 9 summmarizes and concludes the study.

2. The Market for Quality-Differentiated Audits

Dopuch and Simunic [1982] argue that the market for audits is characterized by product differentiation. To provide credibility, audit firms must provide an observable signal of audit quality to the public. Given that details of audits are not made public, Dopuch and Simunic argue that audit firms can build a reputation based on the firm's brand name. Developing and maintaining this reputation is costly, hence one need not perceive an equal level of credibility across the set of all audit firms. Based on the existing structure of the audit

industry, Dopuch and Simunic argue that the large, international Big Six audit firms are more credible than non-Big Six audit firms.

De Angelo [1981a] also argues that audit quality is positively related to auditor size. She shows that when incumbent auditors earn client-specific quasi-rents, these rents serve as collateral against the auditor "cheating," i.e. providing a lower quality audit. Hence, the larger the auditor, the less incentive the auditor has to behave in an opportunistic manner, and the higher the perceived quality of the audit.

Empirical studies have documented evidence consistent with the existence of Big Six product differentiation in the U.S. audit market. In terms of audit fees, Palmrose [1986] reports the existence of a Big Six price premium with respect to non-Big Six firms for a sample of small client firms. Similarly, Francis and Simon [1987] document the existence of a Big Six price premium with respect to both non-Big Six national (second-tier) firms and local/regional firms for a sample of small client firms.

In another attempt to establish quality distinctions between Big Six and non-Big Six auditors, Palmrose [1988] analyzes the level of litigation activities across auditor types (Big Six, non-Big Six). She develops a framework which enables financial statement users to judge the quality of audit suppliers based on their level of litigation activity. Audit firms with relatively low (high) litigation activity are labeled as higher (lower) quality suppliers. The results of the study indicate that non-Big Six firms as a group have relatively higher litigation activity than Big Six firms, and are interpreted as supporting the Big Six as quality-differentiated auditors.

Prior research has also considered why there exists a demand for quality-differentiated audits. Dopuch and Simunic [1982] argue that the demand for audit services flows from two related sources: (1) The audit process is an element of an organization's control system and (2) audit firms attest to the fairness of a firm's presented financial statements. Auditing is one function of an organization's control system which helps to reduce agency costs. As agency costs increase there is a demand for higher quality audits (De Fond [1992], Francis and Wilson [1988]).[48] Choosing a more credible auditor will reduce the need for price protection in the presence of agency costs and should lead to an increase in the firm's value, all other factors held constant.

Audit reports by credible auditors also serve the purpose of reducing information asymmetries that exist between management and current and potential investors. Credible auditors will reduce the probability that management is able to conceal self-serving behavior (e.g., intentional misrepresentations of financial statement information). Therefore, investors will use the signal of a credible auditor to infer that management will make better production/investment decisions (increase the expected future cash flows of the firm) which will increase the market value of the firm (Dopuch and Simunic [1982]).

The demand for higher quality audits has also been examined in the market for initial public offerings (IPOs). It has been argued that hiring a more credible auditor when undertaking an IPO will benefit the owners by allowing them to signal their knowledge of

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[48] Auditor changes are not costless undertakings. Therefore changes to more credible auditors are not undertaken by all companies. The marginal benefits (here reduced agency costs) must be greater than or equal to the marginal costs of switching and paying a higher audit fee.

favorable future earnings/cash flows, and engage credible investment bankers which will lead to

reduction in possible underpricing of the stock at its initial offering. (e.g., Beatty [1989],

Feltham et al. [1991], Menon and Williams [1991]).

In addition to the demand for brand name (Big Six) auditors in general, there is also

evidence consistent with the demand for Big Six industry specialization. Craswell et al. [1995]

document evidence consistent with an audit fee premium accruing to audit firms which invest in

industry specializations. This industry specialization premium exists above and beyond the

documented brand name audit fee premium.

3. Prior Capital Market Studies of Auditor Switches

Nichols and Smith [1983] conduct a test of Big Six product differentiation using firms

listed on the New York and American stock exchanges.[49] They examine whether positive

abnormal returns accrue to firms which move from a non-Big Six audit firm to a Big Six firm,

and negative abnormal returns accrue to firms which move in the opposite direction. Nichols

and Smith's results provide no support for Big Six product differentiation. The magnitude of

the difference in the reactions was not statistically different from zero.

Eichenseher et al. [1989] argue that the product differentiation effects suggested by

Dopuch and Simunic may be more pertinent to the auditor selections of smaller corporations.

Eichenseher et al. test the product differentiation hypothesis for a small sample of OTC firms

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[49] Two other empirical tests related to market reactions of audit switches are Fried and Schiff [1981] and Johnson and Lys [1990]. As in the Nichols and Smith study, their samples consist primarily of companies listed on the New York and American stock exchanges. These two papers examine the market reactions to firms changing auditors and find only limited support for the theorized relationships.

that changed auditors. They hypothesized that the market reaction to auditor changes by corporations moving from a non-Big Six to a Big Six auditor will be greater than the market reaction for firms changing from one auditor to another auditor in the same size class, and this in turn will be greater than the market reaction for firms changing from a Big Six to a non-Big Six auditor.

The sample used by Eichenseher et al. consisted of 87 companies who reported an auditor change in *Who Audits America?* between the dates of July, 1980 and December, 1982. By examining *Who Audits America?* Eichenseher et al. identified the old and new auditors, and the month of auditor change. Weekly abnormal returns were calculated using regression parameters from the 52-week period before the month of auditor change. The weekly abnormal returns were then summed over the five-week period ending with the first full week after the month in which the company reported the auditor change.

Using a one-way analysis of variance test, Eichenseher et al. found weak support (significant at the 0.10 level) for the market reaction hypothesis. Specifically, the mean market reaction was positive for a change from a non-Big Six to a Big Six audit firm and statistically distinguishable from the negative reaction for both a change from a Big Six to a non-Big Six and a change within an audit firm size class.

The current study extends the Eichenseher et al. study in the following ways. First a larger sample of 254 auditor switches is used compared to 87 auditor switches; second, daily returns are used instead of weekly returns; third, I have a more precise identification of the event date using the date the company filed a Form 8-K with the SEC (or the Form 8-K SEC

stamp date when available). Eichenseher et al. identify only the month of the auditor switch; fourth, given the larger sample I condition the market reaction to the auditor change on the level of industry audit complexity and provide additional tests regarding the market reaction to auditor switches related to audit firms with industry audit specializations.

4. Hypotheses Development

The first hypothesis tests the brand name hypothesis in a manner similar to the extant literature. As argued in section II, from the stockholder's point of view, hiring a more credible auditor can lead to reduced agency costs and/or better signals of the firm's expected earnings/cash flows. If the general brand name argument holds regarding higher quality Big Six audits, a change from a non-Big Six to a Big Six auditor should lead to a positive market reaction (MR_{B6}). Similarly, the market reaction due to a change from a Big Six to a non-Big Six audit firm (MR_{NB6}) should be negative. Finally, there should be no significant market reaction to a change of auditors within the same audit firm class (MR_S).[50] This first hypothesis is stated below in the alternative:

H1: $MR_{B6} > 0$

        $MR_{NB6} < 0$

        $MR_S = 0$

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[50] This hypothesis assumes there are no quality differences within auditor classes. Later in the paper I test for within class quality differences based on the degree of audit firm industry specialization.

The development of hypotheses two and three considers the effects of audit firm industry specialization, separately and possibly distinctly from the general brand name test (i.e., Big Six versus non-Big Six). Switching to an auditor with an industry specialization should provide benefits beyond those suggested by the brand name hypothesis. That is, switching to (from) an audit firm which is an industry specialist should provide an incremental positive (negative) market reaction over and above the market reaction from switching to (from) a brand name auditor. I posit that the ease/difficulty of performing an audit is not homogenous across industries of client firms. Audits in particular industries will fall on a continuum which range from straight-forward audits to difficult, highly specialized audits. The quality of audits at the straight-forward end of the continuum should vary less across auditor type than those at the complex end of the continuum. On average, Big Six firms should be able to produce higher quality audits than non-Big Six firms when the nature of the industry requires a complex audit. This competitive advantage is due to the level and depth of specialization that a large CPA firm can afford to establish. Larger public accounting firms enjoy an economy of scale in the development and support of expertise required for specialized services. This advantage is due to large firms' opportunities to more completely utilize their expenditures on training and other aspects of developing and maintaining expertise (Benston, [1985]).

Consistent with this reasoning, prior research has considered the notion of audit product differentiation on levels finer than auditor type. Based on a survey of business executives George and Solomon [1980] indicate ten factors which firms use in selecting an

auditor. This list of factors includes: (1) the firm is one of the largest international firms; (2) the CPA firm has offices near the business; and (3) specialization in the industry by the firm.

The second hypothesis examines the notion that Big Six auditors are perceived as providing higher quality audits, above and beyond a general brand name, in industries which require a complex audit. That is, the magnitude of the market reactions considered in H1 will be influenced by the level of audit complexity in the industry. Industry audit complexity is inferred from the extent to which an industry is audited by the group of Big Six audit firms.[51] I calculate the market share per industry collectively held by the Big Six and non-Big Six audit firms. The more an industry is dominated by the Big Six firms, the more likely (ex ante) that the industry is one which requires a more complex audit, holding size effects constant.[52]

If this argument holds true, the market reaction due to a change from a non-Big Six to a Big Six audit firm should be positive and increasing in the level of industry audit complexity. Similarly, the market reaction due to a change from a Big Six to a non-Big Six audit firm should be negative and decreasing in the level of industry audit complexity. This idea is formalized in hypothesis two:

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[51] Product differentiation has similarly been addressed via the audit firm's market share in a given industry (Shockley and Holt [1983]; Palmrose [1986]).

[52] One argument for examining auditor changes in the OTC market was that large companies require large CPA firms and as a result it is difficult to separate CPA firm size from audit quality effects. Using a sample of companies from the OTC market should mitigate the likelihood of the current sample suffering from size effects concurrent with auditor changes.

H2: $CMR_{B6} > SMR_{B6} > 0$

        $CMR_{NB6} < SMR_{NB6} < 0$

where CMR_{B6} is the market reaction to an upgrade to a Big Six audit firm in a complex

industry; SMR_{B6} is the market reaction to an upgrade in a straight-forward industry;

CMR_{NB6} is the market reaction to a downgrade to a non-Big Six audit firm in a complex

industry, and SMR_{NB6} is the market reaction to a downgrade in a straight-forward

industry.

The final hypothesis considers a test of market reactions to auditor switches in

conjunction with firm-level industry specialization. A subset of the sample used in testing

the first two hypotheses is used in the tests of the third hypothesis. H3A examines auditor

switches between specialist and nonspecialist CPA firms. Industries having auditor

specialists are determined by calculating the annual market share held by individual CPA

firms in each 2-digit SIC code. A CPA firm is designated as an industry specialist if the

CPA firm is the largest supplier in the given industry as in Palmrose [1984]. Multiple

industry specialists are designated if the top two suppliers are within 1% of each other.

H3A predicts a positive market reaction when companies switch from a nonspecialist

auditor to a specialist auditor, and a negative reaction when companies switch from a

specialist auditor to a nonspecialist auditor.

H3A: $MR_{SP} > 0 > MR_{NS}$

Where MR_{SP} is the market reaction due to switching from a nonspecialist to an industry specialist, and MR_{NS} is the market reaction due to switching from an industry specialist to a nonspecialist as measured by industry market share.

Hypothesis H3B is strictly a test of auditor switches within the set of Big Six CPA firms. By choosing to specialize in certain industries a given Big Six firm can build an advantage over its Big Six competitors. This advantage can be achieved by concentrating funds available for developing and maintaining expertise on a few select industries. Firms with such an advantage will attain a larger market share in their specialized industries than some of their Big Six competitors. Therefore one can make predictions about market reactions to auditor switches within the Big Six.

H3B predicts a positive market reaction when the new Big Six auditor has a larger market share than the prior Big Six auditor (MR_{INC}); and a negative market reaction when the new Big Six CPA firm has a smaller market share than the prior Big Six CPA firm (MR_{DEC}).

H3B: $MR_{INC} > 0 > MR_{DEC}$

5. Sample

Candidate firms for the initial sample are collected from the 1991 COMPUSTAT Full-Coverage and Research tapes. A firm is selected for the sample if it changed auditors during the COMPUSTAT data years of 1988-1991. Auditor switches are identified from

changes in the COMPUSTAT auditor code variable.[53] In order to remain in the sample,

an auditor change observation is required to meet the following additional criteria:

(1)   Returns data are available on the 1991 Daily CRSP tape (NASDAQ) for the time period of 200 days before the auditor switch through 30 days after the auditor switch.

(2)   A filing date (or SEC stamp date) is available for the Form 8-K which disclosed the announcement of the auditor change.

(3)   The Form 8-K does not contain disclosures in addition to the change in auditor.

(4)   No earnings announcements or other significant events were reported in the Wall Street Journal (WSJ) during the event window surrounding the Form 8-K filing.

(5)   The auditor switch involved the firm's principal auditor (rather than the auditor of a subsidiary).

(6)   The switch was not a change away from Laventhol and Horwath (LH) around the time of LH's dissolution.

A possible sample of 338 audit switches satisfying sample criteria (1) and (2) were

initially identified. Form 8-K filing dates were identified by examining financial statement

data included on the Compact D/SEC database covering the period of 1987-1991. The

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[53] Changes in CPA firms due to the merger of audit firms are not considered to be auditor switches for this study.

financial statement data contained on the Compact D/SEC database includes the date of the Form 8-K filing, the types of items disclosed on the Form 8-K, and the identities of the new and former auditors. Whenever possible, I also collected the Form 8-K SEC stamp date from the Lexis/Nexis Information Services database.[54]

29 observations were deleted from the sample because disclosures other than (or in addition to) the auditor change were made in the Wall Street Journal during the event period. Another 29 observations were deleted because the 8-K disclosed items in addition to a change in auditors. No observations were deleted due to the auditor switch involving someone other than the firm's principal auditor. Finally, 26 switches were eliminated because of their link with the dissolution of Laventhol & Horwath. This sample screening resulted in a final sample of 254 auditor changes by 248 different companies (i.e., some companies had multiple auditor changes over the 1988-1991 period). The effects of the screening process are summarized in Panel A of Table III-1.

Panel B of Table III-1 provides a breakdown of the sample into the calendar year in which the auditor change took place, and the direction of the auditor switch. Consistent with McConnell's [1984] analysis of the OTC market, it appears inter-tier auditor changes were as likely to be away from a Big Six auditor (58) as toward a Big Six auditor (44).

Further descriptive statistics for the sample are provided in Table III-2 and Table III-3. Table III-2 reports the mean total assets and mean sales for the OTC market

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[54] I originally intended to use the Form 8-K SEC stamp date exclusively, but the Form 8-K collection at the Chicago Regional SEC Office was very incomplete. The alternative strategy of using the Form 8-K filing date, when necessary, was undertaken as the next best option.

overall, the current sample, and the Eichenseher et al. [1989] sample. Both the current

sample and the Eichenseher et al. sample include firms which are much smaller than the

mean OTC firm. Table III-3 discloses the frequency of sample items per 2-digit SIC code.

48 different SIC codes are represented in the sample. Auditor changes from 6 of the 48

SIC codes collectively comprise 54% of the sample (SIC's 28, 35, 36, 38, 50, and 73).

6. Returns Model and Test Statistics

Abnormal returns around the date of the auditor switch are estimated by the

deviation of observed returns from the following model:

$$\widetilde{R}_{it} = \alpha_i + \beta_i \, \widetilde{R}_{mt} + \varepsilon_{it} \qquad i = 1,...N$$

When R_{it} is the expected return to security i for period t, R_{mt} is the return to the equally

weighted market portfolio, and α_i and β_i are the market model parameters for security i

estimated over a 190 day period which ends at day -11 (i.e. ten days before the Form 8-K

filing/SEC stamp date).[55]

To test H1, the significance of the daily abnormal returns is assessed by examining

the cross -sectional differences by type of auditor switch for each day in the test period.

Three types of audit switches are tested:

UP = a switch from a non-Big Six auditor to a brand name, Big Six

auditor.

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[55] The market model parameter estimation period is terminated at day -11 to allow the flexibility of starting the event window at ten or fewer days prior to the event date.

DOWN = a switch from a brand name, Big Six auditor to a non-Big Six

auditor.

LATERAL = a switch to an auditor in the same class as the previous auditor (Big

Six to Big Six, non-Big Six to non-Big Six).

A daily cross-sectional t-statistic is computed using the following specification:

$$T_k = \frac{\sum u_i}{\sqrt{\hat{\sigma}}} \sim t(T-1) \quad (k = Up, Down, Same)$$

Where the numerator is the cross-sectional risk adjusted return on day t, and the

denominator is the estimated cross-sectional standard deviation. T-1 is the degrees of

freedom for the t-statistic and is based on the 190 day estimation period.[56]

In order to further test the effects of audit firm industry expertise, I assume a

continuous metric for industry audit complexity based on total Big Six market shares per

industry. I calculate the market share of the Big Six audit firms as a group within 2-digit

SIC codes. The level of Big Six concentration within an industry is defined as follows:

$$CON_j = \frac{\sum_k R_{kj}}{\sum_n R_{nj}}$$

Where j denotes an industry (using the 2-digit SIC code), k is a company audited by a Big

Six audit firm, n is the number of firms in an industry, and R is annual sales revenue.[57] H2

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[56] T is based on the test statistic in Brown and Warner [1985] and Chandra et al. [1990] which is shown to be properly specified when the event dates are not clustered.

[57] I also calculate the level of Big Six concentration within an industry (CON_j) and the industry market share for each audit firm (MS_{ij}) (see p. 100) using the number of audit clients per industry.

is tested using the following regression:

$$CAR_i = \alpha + \beta_1 UP_i + \beta_2 DOWN_i + \beta_3 UP_i * CON_j + \beta_4 DOWN_i * CON_j + v_i$$

Where: UP_i is a dummy variable assigned the value of one if company i switches

from a non-Big Six CPA firm to a Big Six CPA firm.

$DOWN_i$ is a dummy variable assigned the value of one if company i

switches from a Big Six CPA firm to a non-Big Six CPA firm.

UP_i*CON_j and $DOWN_i*CONj$ capture the interaction of auditor change

direction and the level of industry audit complexity.

Parameters β_3 and β_4 are the primary coefficients of interest for H2. Under H2 the

predicted signs are positive for β_3 and negative for β_4.

I use a similar metric for H3 to test the market perceptions of differential industry

specialization across audit firms. Over the period of 1987-1991 I define the year-specific

industry market share for audit firm i as follows:

$$MS_{ij} = \frac{\sum_k R_{ijk}}{\sum_i \sum_k R_{ijk}}$$

Where MS_{ij} = market share for audit firm i in industry j.

R_{ijk} = annual sales revenue for client k of audit firm i

in industry j.

Industry specializations are determined by a two stage process. First, in any given

year (e.g. 1988) all industries (2-digit COMPUSTAT SIC codes) with at least 30

companies are identified. Then each CPA firm's size-weighted industry market share is calculated. Each CPA firm's share of the total industry audit fees is approximated by using the share of industry client revenues held by each accounting firm. Similar to Palmrose [1984], the largest supplier in each industry is designated as the industry specialist. Multiple industry specialists are designated if the top two suppliers are within 1% of each other. H3A is tested on a subsample of the 254 auditor switches used in tests of H1 and H2 which attempts to control for market reactions predicted by the general Big Six production hypothesis. The subsample consists of 163 switches between specialists and nonspecialists.[58] The following regression is used to test H3A:

$$CAR_i = \gamma_0 + \gamma_1 EXP_i + \gamma_2 NOEXP_i + \eta_i$$

Where EXP_i is a dummy variable assigned the value of one if company i switches from a nonspecialist to a specialist audit firm; and $NOEXP_i$ is a dummy variable assigned the value of one if company i switches from a specialist to a nonspecialist audit firm. If a company switches to a specialist auditor from a nonspecialist auditor, the market reaction is predicted to be positive. Likewise, if a company switches to a nonspecialist auditor from a specialist auditor, the market reaction is predicted to be negative. Hence, H3 predicts the parameter γ_1 is positive and γ_2 is negative.

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[58] The remaining 91 changes are deleted because they are either changes from a non-Big Six auditor to a nonspecialist Big Six auditor or changes from a nonspecialist Big Six auditor to a non-Big Six auditor (i.e., I excluded upgrades and downgrades that did not involve Big Six specialists (as defined above). These switches are considered in the general name brand tests of hypothesis H1).

The test of H3B uses s subsample of 131 switches from one Big Six CPA firm to another Big Six CPA firm. H3B is tested using the following regression:

$$CAR_i = \lambda_0 + \lambda_1 DIFF_i + \eta_i$$

where $DIFF_i$ = the market share of the new auditor minus the market share of the prior auditor. If a client switches to an auditor with a relatively higher industry market share, the market reaction is predicted to be positive. Hence H3B predicts that parameter λ_1 is positive.

7. Results

Firm specific daily abnormal returns were calculated for a 14 day event window. A 14 day event window was used for two reasons. Prior to 1989, reports on Form 8-K regarding changes of accountants were required to be filed within 15 days after the occurrence of the switch. In 1989 the time period for filing a Form 8-K announcing such a change was reduced from 15 to 5 business days. Days −4 to −1 are included to capture any early news of the auditor change before a Form 8-K was filed. Day zero is the day the company filed the Form 8-k (or the SEC stamp date). Days +1 to +9 are included to allow time for the Form 8-K to be processed and made available to the public by the SEC.[59]

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[59] I chose to use days +1 to +9 after conversations with SEC representatives and verifying the SEC stamp date directly with a representative for a small sample of the 254 auditor changes. For the auditor changes directly verified with the SEC, the stamp date was generally within seven days of the Form 8-K filing date.

Table III-4 presents the mean abnormal returns for the time period surrounding the event date. Panel A presents the daily, mean abnormal returns. The abnormal returns for the full sample are provided for descriptive purposes only. The abnormal returns for the three subsamples pertain to the predictions of hypothesis H1. Although two days for the upgrade and downgrade subsamples have significant abnormal returns in the predicted direction, the abnormal returns are generally not significant in the hypothesized direction. Consistent with H1, 13 of the 14 abnormal returns for the lateral subsample are not significantly different from zero.

Panel B of Table III-4 contains the cumulative abnormal returns (CAR) for the 14 day event window (−4 to +9). Each of the 14 day CARs for the upgrade (3.4%), downgrade (1.46%), and lateral (−0.48%) subsamples fail to reach levels that are significantly different from zero.[60]

The results of the test for H2 are presented in Table III-5. The primary parameters of interest are the coefficients on the two interaction terms β_3 and β_4. β_3 is predicted to be positive and β_4 is predicted to be negative. Neither of these coefficients is significantly different from zero. In addition to the results for β_3 and β_4, the parameter estimates for upgrades (β_1) and downgrades (β_2) are not significantly different from zero. Based on the results presented in Table III-5, it does not appear that market reactions to auditor changes between a Big Six and a non-Big Six CPA firm are influenced by the portion of

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[60] Forward or backward adjustments to the event window did not affect the significance of the CARs for the upgrade and downgrade subsamples.

the industry which is collectively audited by the Big Six firm (i.e., a proxy for industry complexity).

Results for the industry specialization tests of H3 are presented in Table III-6. The predictions for hypothesis H3A were that γ_1 and γ_2 be positive and negative respectively. As shown in panel A of Table III-6 neither coefficient is significantly different from zero. Based on panel A of Table III-6, it does not appear that the market reaction to a change in auditors is influenced by the prior or current auditor's industry specialization.

Panel B of Table III-6 presents the results for the test of hypothesis H3B. The value of the coefficient for the variable **DIFF** (λ_1) is not consistent with hypothesis H3B. Switching to (from) a Big Six auditor with a relatively larger industry market share than the previous (current) Big Six auditor was predicted to be positively associated with the firm's market reaction. However, λ_1 is not significantly different from zero in the direction predicted by hypothesis H3B.

8. Sensitivity Analysis

8.1 Alternative Measures of Industry Concentration

A number of alternative industry concentration metrics were examined. None of these alternatives had an effect on the qualitative conclusions from the analysis. First, as noted in footnote 13 (p.15) CON_j was also calculated based on the number of clients that were audited by the Big Six collectively, and MS_{ij} was also calculated based on the number of clients that were audited by each individual firm.

Second, hypothesis H2 was also retested after measuring Big Six industry concentrations on a binary basis. The market shares held by the Big Six collectively were ranked in descending order. Industries with a Big Six concentration above the median concentration level were coded as complex industries. Likewise, industries with a Big Six concentration below the median concentration level were coded as a straight-forward industry.

Third, hypothesis H2 was also retested using only the auditor switches from industries whose Big Six concentration levels fell in the upper or lower quartile of the distribution of the concentration levels.

8.2 Infrequent and Nonsynchronous Trading

Since the entire sample consists of OTC firms, I replicated the analysis attempting to control for the effects of infrequent and nonsynchronous trading. These characteristics of smaller firms may lead to errors in estimation of the market model parameters which are used to calculate abnormal returns. Aggregated coefficient estimates (Dimson [1979]) were calculated and used in place of the market model parameters.[61] The results obtained when using the Dimson procedure are not reported as they remained qualitatively the same as those reported here.

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[61] Dimson's aggregated coefficients method calls for running a multiple regression of security returns against lagged, matching, and leading market terms. A consistent beta is obtained by aggregating the slope coefficient from this regression.

8.3 Subsample Analyses

Each of the tests were also calculated over subsets of the sample of 254 auditor changes. Each subset attempted to determine if there existed a "cleaner" sample of auditor switches.

8.3.1 Low Share Prices

Low share prices are one source of bias in beta estimates for firms whose stocks are infrequently traded (Dimson [1979]). Price rounding for stocks with a low price may hide any reaction that the market may have to auditor changes. To consider this possibility, I deleted any auditor change in the sample if the firm had a share price of less than one dollar and then retested the hypotheses (N=149). The results of this analysis are qualitatively similar to those of the full sample and are therefore not reported.

8.3.2 Opinion Shopping

Conflicts in an auditor/client relationship may lead to the client switching auditors. These conflicts, rather than the switch itself, may affect the market value of the firm. Levinthal & Fichman [1988] provide evidence consistent with the general contention that a qualified opinion is an indicator of conflict between client firms and their auditors. In an attempt to control for the effects of any such conflicts, all three hypotheses were retested after deleting 20 auditor switches which followed a qualified, adverse, or no opinion. The results for this subsample were qualitatively similar to the results presented here.

8.3.3 Financial Distress

Firms in financial distress may switch auditor types for different reasons than other firms. For example they may downgrade to a non-Big Six auditor to pay a lower audit fee or may upgrade to a Big Six auditor to benefit from the auditor's bankruptcy expertise. A simple check for such activity was performed by deleting all firms reporting a net loss for two consecutive years within the sample period. The three hypotheses were retested on a reduced sample of N=91 and the results were qualitatively similar to the results reported here.

8.3.4 Big Six vs. Local and Regional Auditors

It is possible that the market does not significantly differentiate the services of Big Six auditors from second-tier national auditors. Significant market reactions may only occur for switches to (from) a Big Six auditor from (to) a regional or local auditor. To examine this possibility auditor changes to and from a second tier national auditor were deleted and the three hypotheses were retested on a reduced sample of N=212. The results for this subsample were qualitatively the same as the results for the whole sample and are not reported.

9. Discussion and Conclusion

This study examines auditor switches for a sample of Over-the-Counter (OTC) firms. The market reactions to auditor changes are examined along with (1) measures of industry audit complexity and (2) measures of industry specialization by the old versus new auditor.

The analyses performed in this study do not fair any better than previous studies of the market reaction to auditor changes. It does not appear that market reactions to auditor changes between a Big Six and a non-Big Six audit firm are influenced by the level of the industry which is collectively audited by the Big Six firms (a proxy for industry audit complexity) nor are the market reactions influenced by the prior or current auditor's industry specialization.

It is possible that the power of the market-based research employed is not sufficient to test for the effects of auditor switches. All of the benefits of having a more credible audit most likely do not accrue to the auditee. CPA firms that provide higher quality audits may receive a substantial portion of the benefits through higher audit fees. This reasoning is consistent with the audit pricing literature which documents a Big Six brand-name premium (e.g., Francis & Simon [1987] and Palmrose [1986]), and a Big Six industry specialist premium (Craswell et al. [1995]). Another factor that hinders the analyses is the uncertainty of the 'true' event date, i.e., the date at which the knowledge of the auditor change is first made public.

A second issue which may explain the lack of hypothesized results is that auditor changes may be more heterogeneous than modeled in this paper. A more careful identification of the motivation for auditor switches, while difficult, may be necessary for specific effects such as those predicted in this study.

Table III-1
Sample Data

	Number of Firms Remaining

Panel A: Sample Selection

(1) Firms on CRSP and COMPUSTAT with an 8-K date for auditor change	338
(2) Firms mentioned in Wall Street Journal during event window	(29)
(3) Firms with non-auditor change events on Form 8-K	(29)
(4) Switches away from Laventhol & Horwath near LH's dissolution	(26)
Final Sample	254

Panel B: Type of Auditor Switch[a]

CALENDAR YEAR	UP	DOWN	WITHIN BIG SIX	WITHIN NON-BIG SIX	TOTAL
1988	7	4	18	2	31 (12.2%)
1989	11	11	37	9	68 (26.8%)
1990	15	18	41	5	79 (31.1%)
1991	11	25	38	2	76 (29.9%)
	44 (17.3%)	58 (22.8%)	134 (52.8%)	18 (7.1%)	254 (100.0%) (100.0%)

[a] UP = a switch from a non-Big Six to a Big Six audit firm. DOWN = a switch from a Big Six to a non-Big Six audit firm. WITHIN BIG SIX = a switch from one Big Six to another Big Six audit firm. WITHIN NON-BIG SIX = a switch from one non-Big Six to another Non-Big Six audit firm.

Table III-2
Descriptive Statistics

	Mean Total Assets	Mean Sales
OTC Market	$615.3 MM	$443.7 MM
(Standard Deviation)	(4443.5)	(3635.3)
Current Sample[a]		
Overall	30.03	43.3
	(61.6)	(108.2)
Up	24.0	52.1
	(38.3)	(157.9)
Down	9.2	9.2
	(10.0)	(10.0)
Within Class	38.5	51.8
	(73.8)	(107.3)
Eichenseher et al. Sample [1989]		
Overall	100.7	_[b]
	(310.9)	
Up	36.8	–
	(93.5)	
Down	25.7	–
	(62.7)	
Within Class	145.0	–
	(387.7)	

[a] UP = a switch from a non-Big Six to a Big Six audit firm. DOWN = a switch from a Big Six to a non-Big Six audit firm. WITHIN BIG SIX = a switch from one Big Six to another Big Six audit firm. WITHIN NON-BIG SIX = a switch from one non-Big Six to another Non-Big Six audit firm.

[b] Mean sales data were not reported by Eichenseher et al. [1989].

Table III-3
SIC Codes Represented in Sample[a]

SIC CODE	Big 6 Conc	Sample Freq	%	SIC CODE	Big 6 Conc	Sample Freq	%
1	0.77	1	0.4	48	0.99	3	1.2
10	0.92	4	1.6	49	0.90	4	1.6
13	0.99	7	2.8	50	0.96	15	5.9
15	0.93	1	0.4	51	0.97	6	2.4
17	0.99	1	0.4	52	0.99	1	0.4
20	0.98	4	1.6	56	0.96	2	0.8
22	0.93	1	0.4	57	0.95	1	0.4
23	0.90	2	0.8	58	0.98	5	2.0
24	0.88	2	0.8	59	0.97	6	2.4
26	0.99	2	0.8	60	0.83	1	0.4
27	0.86	2	0.8	62	0.99	2	0.8
28	0.99	15	5.9	64	0.99	1	0.4
29	0.99	1	0.4	65	0.89	1	0.4
30	0.96	6	2.4	67	0.75	6	2.4
32	0.99	2	0.8	70	0.85	1	0.4
33	0.99	1	0.4	73	0.98	29	11.4
34	0.99	5	2.0	75	0.99	1	0.4
35	0.99	24	9.4	78	0.94	3	1.2
36	0.96	28	11.1	79	0.97	1	0.4
37	0.92	4	1.6	80	0.99	8	3.1
38	0.99	27	10.6	82	0.91	2	0.8
39	0.97	3	1.2	83	0.99	1	0.4
42	0.99	2	0.8	87	0.98	7	2.8
47	0.99	1	0.4	99	0.93	1	0.4
Total						254	100.0

[a] The level of Big Six concentration within an industry is defined as follows:

$$CON_j = \frac{\sum_k R_{kj}}{\sum_n R_{nj}}$$

Where j denotes an industry (using the 2-digit SIC code), k is a company audited by a Big Six audit firm, n is the number of firms in an industry, and R is annual sales revenue. This variable is based on all firms reporting an auditor code variable for the years 1988-1991 on the 1991 COMPUSTAT tapes.

Table III-4
Mean Abnormal Returns Over 14 Day Event Window

Trading Day	Full Sample (N=254) (%)	Upgrade Subsample (N=44) (%)	Downgrade Subsample (N=58) (%)	Lateral Subsample (N=152) (%)
Panel A: Daily Abnormal Returns				
−4	0.27	0.22	−0.76	0.67
−3	−0.51	0.50	0.60	−1.23#
−2	−0.26	0.50	−1.00	−0.19
−1	−0.50	0.32	−1.74*	−0.26
0[a]	−0.34	−1.15	0.69	−0.50
1	0.01	−0.02	−0.15	0.08
2	0.00	−0.13	−0.44	0.21
3	0.53	0.55	0.70	0.45
4	0.51	2.20**	0.78	−0.09
5	0.54	−0.27	2.14	0.15
6	0.34	0.23	0.20	0.43
7	−0.30	0.28	−1.71*	0.07
8	−0.48	−1.29	0.42	−0.59
9	0.83#	1.43*	1.74	0.31

Trading Day	Full Sample (N=254) (%)	Upgrade Subsample (N=44) (%)	Downgrade Subsample (N=58) (%)	Lateral Subsample (N=152) (%)
Panel B: Cumulative Abnormal Returns				
−4 to +9	0.64	3.40	1.46	−0.48

[a] Day 0 is the filing date of the Form 8-K as disclosed in the financial statement data included on the Compact D/SEC database, or the SEC Form 8-K stamp date, when available, as disclosed in the Lexis/Nexis Information Services database.

* Significant at $\alpha=0.05$, one tail distribution

** Significant at $\alpha=0.01$, one tail distribution

Significant at $\alpha=0.05$, two tail distribution

Table III-5

Abnormal Returns and Industry Audit Complexity[a]

Predicted Sign α	(+) β_1	(−) β_2	(+) β_3	(−) β_4	N
−0.005[b] (−0.303)[c]	0.454 (0.602)	0.304 (0.322)	−0.428 (−0.551)	−0.293 (−0.301)	254

$Model: CAR_i = \alpha + \beta_1 UP_i + \beta_2 DOWN_i + \beta_3 UP_i * CON_j + \beta_4 DOWN_i * CON_j + v_i$

[a] UP is a dummy variable assigned the value of 1 if a company switches from a non-Big Six audit firm to a Big Six audit firm. DOWN is a dummy variable assigned the value of 1 if a company switches from a Big Six audit firm to a non-Big Six audit firm. UP_i*CON_j and $DOWN_i*CON_j$ capture the interaction of auditor change direction and the level of industry audit complexity.

[b] Parameter estimate

[c] t-statistic

Table III-6
Abnormal Returns and Industry Audit Specialization

Predicted Sign	(+)	(−)	
γ_0	γ_1	γ_2	N

Panel A: Abnormal Returns and CPA Firm Industry Audit Specialization[a]

-0.013[b]	0.001	0.028	163
(-0.701)[c]	(0.036)	(0.872)	

$$Model: CAR_i = \gamma_0 + \gamma_1 EXP_i + \gamma_2 NOEXP_i + \eta_i$$

Predicted Sign	(+)	
λ_0	λ_1	N

Panel B: Abnormal Returns and Big Six CPA Firm Industry Audit Specialization[d]

-0.007[b]	-0.107	131
(-0.428)[c]	(-1.683)	

$$Model: CAR_i = \lambda_0 + \lambda_1 DIFF_i + \eta_i$$

[a] EXP is a dummy variable assigned the value of one if a company switches from a nonspecialist to a specialist audit firm; and NOEXP is a dummy variable assigned the value of one if a company switches from a specialist to a nonspecialist audit firm.

[b] Parameter estimate

[c] t-statistic

[d] Diff = the market share of the new Big Six audit firm minus the market share of the prior Big Six audit firm.

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