

## **INTRA-NON-BIG 4 AUDITOR QUALITY**

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## ABSTRACT

In recent years, BDO Seidman, Grant Thornton and the other non-Big 4 CPA firms have gained market share in the medium and small public company auditing services market. Thus, there is a greater need for information concerning relative auditor quality among the non-Big 4 CPA firms. In particular, there has been no research regarding whether BDO Seidman, as compared to the other non-Big 4 CPA firms, is a relatively higher quality auditor. Likewise, there has been no research regarding whether Grant Thornton, as compared to the other non-Big 4 CPA firms, is a relatively higher quality auditor as well. Also, there has been no research regarding whether sole practitioners, in the domain of public company auditing, are lower quality auditors.

Using an audit failure metric, based on 354 observed auditor outcomes in financial reporting litigation commenced from 1996 through 2007, this paper analyzes relative auditor quality for these firms. The quality levels within the non-Big 4 are hypothesized according to DeAngelo (1981). The results suggest that, as compared to the other non-Big 4 CPA firms, BDO Seidman is a relatively higher quality auditor. The results also suggest that, as compared to the other non-Big 4 CPA firms, Grant Thornton is a relatively higher quality auditor as well. Conversely, the results suggest that, as compared to the other non-Big 4 CPA firms, sole practitioners are relatively lower quality auditors.

## INTRA-NON-BIG 4 AUDITOR QUALITY

### I. Introduction

There is a societal interest in promoting high quality financial reporting. High quality financial reporting facilitates optimal capital allocation and motivates investment by reducing investors' information risk. Because high quality auditing promotes high quality financial reporting, there is a societal interest in promoting each of these quality outcomes. Thus, there has been enduring interest among investors, creditors, and the general public in better understanding audit quality.

Empirical research on differential auditor quality has been performed along many dimensions. One dimension, auditor size, is practicably motivated by its ease of observation and theoretically motivated principally by DeAngelo (1981), which posits that larger auditors provide higher quality audits because they have more reputation capital to protect. Subsequent empirical research has provided fairly strong support for DeAngelo (1981).

Empirical research on differential auditor quality has most frequently compared one category – the largest auditors – Big 8, 6, 5 or 4, depending on the time period – to another category – the non-Big X auditors. There also have been a few studies investigating within-category auditor quality. Today, though, the auditing services market has evolved into four fairly distinct size levels; there has been little differential auditor quality research investigating differences in auditor quality among the contemporaneous second, third and fourth firm levels.

The first (largest) size level is the Big 4. Compustat Research Insight indicates that 496 of the 500 companies that are included in the S&P 500 are currently audited by

the Big 4. The second auditor size level is the “Medium 2” (Cheng and Reichelt 2007) – BDO Seidman and Grant Thornton. Although the Big 4 dwarf them, they themselves dwarf the smaller auditors. In this paper, we decompose the smaller auditors into two size levels. The third auditor size level includes the CPA firms (excluding the Big 4 and the Medium 2) with two or more partners; we call these the “Small” CPA firms. Finally, the fourth (smallest) auditor size level includes sole practitioners, or one partner CPA firms.

Since 2002, more than 6,500 companies have changed auditors (Whitehouse 2007). Initial changes in auditors were attributed to the demise of Arthur Andersen. More recent changes, however, were tied to a shift toward the Medium 2 and the smaller auditors. These were motivated, in part, by changes to comply with independence rules that require more separation of non-audit services and audit services. The Medium 2 and the smaller auditors have significantly increased their share of the medium and small public company auditing services market as measured by the number of public company auditees. However, as measured by public company sales audited, the Medium 2 and the smaller auditors have had far less success in gaining market share.

BDO Seidman and Grant Thornton have become larger auditors in recent years. As indicated in Table 1, they have, among the ten largest auditors, increased their share of public company sales audited by over fifty percent, to 1.15%, and their share of public company auditees by 68%, to 13.64%, from 2000 (early in this study’s time period) to 2005 (late in this study’s time period).

The Small auditors increased their share of public company sales audited by 25%, to .2%, and their share of public company auditees by 133%, to 5.27%, from 2000 to 2005. More companies in the medium and small public company auditing services

market are choosing Medium 2 auditors and smaller auditors. Regulators, creditors, investors, and audit committees are especially concerned about relative auditor quality because they rely more heavily on audited financial statements than do stakeholders of Big 4 companies; in addition, smaller public companies have narrower analyst following and financial press coverage. But among the non-Big 4, is BDO Seidman a higher quality auditor? And among these firms, is Grant Thornton a higher quality auditor? Finally, among these firms, are sole practitioners lower quality auditors?

The relative auditor quality levels of BDO Seidman, Grant Thornton, and sole practitioners were hypothesized on the basis of the theory of DeAngelo (1981). Auditor quality was then measured using an audit failure metric on the basis of the observed outcomes of the auditors in financial reporting litigation. The literature of the law of business misconduct, as well as the literature of legal process, informs the meaning of these outcomes. The resulting empirical evidence suggests that, among the non-Big 4, BDO Seidman is a higher quality auditor. The evidence also suggests that, among this group, Grant Thornton is a higher quality auditor. Finally, the research suggests that sole practitioners are lower quality auditors.

The following section summarizes relevant theories and research findings in the sphere of differential auditor quality. Section 3 presents the research hypotheses. Section 4 describes the sample selection process. Section 5 presents the empirical model. Descriptive statistics and the results of our hypothesis tests are reported in Section 6. Section 7 discusses additional analyses to test the robustness of the results of the hypothesis testing. The conclusions are provided in Section 8. The limitations and suggestions for future research are discussed in Section 9.

## 2. Differences among CPA firms with regard to auditor quality.

### 2.1. *The DeAngelo (1981) theory of auditor quality*

DeAngelo (1981) articulated the prevailing audit quality theory.<sup>1</sup> Audit (or auditor) quality is comprised of independence and competence. Independence is the more important component with regard to understanding why the size of the CPA firm is a relevant factor. The larger the CPA firm, the greater the value of its reputation capital, and the less inclined the CPA firm is to place such value at risk by acquiescence in a single audit client's unethical or illegal financial reporting.

A larger CPA firm has greater reputation capital because the aggregate audit revenue of its other audit clients acts as larger and more effective collateral, or security, pledging the rendering of a higher quality audit. It thus would be more irrational for a larger CPA firm to fail to perform a higher quality audit than it would be for a smaller CPA firm to fail to perform a higher quality audit.<sup>2</sup>

Taken literally, DeAngelo (1981) suggests that a cardinal ordering of auditor size can be used to proxy the directly unobservable construct of auditor quality. However, with the exception of a few studies, normally only very clear and substantial auditor size differences, operationalized with indicator variables, have been successfully used in empirical auditor quality research, since Francis and Wilson (1988) found support for

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<sup>1</sup> Watts and Zimmerman (1981) also theorized, for different reasons, that larger CPA firms supply higher quality audits.

<sup>2</sup> Alchian and Demsetz (1972) noted that, the greater the number of partners, the greater the incentive for a partner to shirk. A partner in a 10 partner firm who is not caught only suffers 10 percent of the negative consequence of his shirking, but enjoys 100 percent of the benefit of his shirking. In other words, there is an agency problem. The individual partners must be effectively monitored by the CPA firm; this becomes increasingly difficult as the CPA firm increases in size (e.g. a partner in a 100 partner firm who does not get caught only suffers 1 percent of the negative consequence of his shirking, but enjoys 100 percent of the benefit of his shirking.). DeAngelo (1981) implies that, notwithstanding these intra-CPA firm transaction costs, auditor quality is positively associated with CPA firm size; this is because the larger the CPA firm, the more it will invest in monitoring its partners because the firm's reputation capital is so valuable. Coffee (2006, p. 325-326), though, discusses the deviation of Arthur Andersen LLP from this tendency.

what they termed a “brand name” dichotomous indicator variable model rather than a “continuous size” model.

Thus, DeAngelo (1981), as it is now understood in light of subsequent empirical research, suggests that among the non-Big 4 CPA firms, the largest are the relatively higher quality auditors. This raises the question of how “auditor size” should be measured. DeAngelo (1981) is focused on auditing. Thus, subsequent empirical research has used auditing metrics. Public company auditing metrics have most frequently been used, due to data availability constraints and the belief that public company auditing (with its standards set by the Public Company Accounting Oversight Board) constitutes a different auditing environment than private company auditing (with its standards set by the Auditing Standards Board, an AICPA committee). For example, Francis and Wilson (1988) used cumulative sales of public companies audited as the auditor size metric, whereas Fung and Gul (2005) used the number of public company auditees as the auditor size metric.

This study is based on litigation commenced during the period 1996 through 2007. *Who Audits America* (2000), providing data early in the study period, ranks (excluding the Big 4) Grant Thornton first and BDO Seidman second, both as to cumulative sales of public companies audited and the number of auditees, as shown in Table 1. However, *Who Audits America* (2005), providing data late in the study period, ranks (excluding the Big 4) BDO Seidman first and Grant Thornton second, as to cumulative sales of public companies audited, and Grant Thornton first and BDO Seidman second, as to the number of auditees. Thus, these two auditors appear to be

indistinguishable with respect to size; thus, they logically comprise their own size category. This category is termed the “Medium 2” by Cheng and Reichelt (2007).

The Medium 2 are six to eight times as large as measured by cumulative sales of public companies audited, and three times as large as measured by number of auditees, as the next auditor, McGladrey & Pullen, in both editions of *Who Audits America*.

McGladrey & Pullen is only ten to fifteen percent larger than the next largest auditor in both editions, as to either cumulative sales of public companies audited or the number of auditees. Thus, logically, McGladrey & Pullen and the other CPA firms with two or more partners comprise their own size category. We call this the “Small” category. Finally, the obviously smallest size category is that of sole practitioners, or single partner CPA firms.

The DeAngelo (1981) theory therefore suggests that, among the non-Big 4, the higher quality auditors are the Medium 2: BDO Seidman and Grant Thornton.

Conversely, the DeAngelo (1981) theory also suggests that, among the non-Big 4, the lower quality auditors are sole practitioners.

## *2.2. Genres of empirical research showing auditor quality differences*

Most studies have found support for the DeAngelo (1981) theory. However, direct observation of auditor quality is not possible. Thus, various indirect measures of auditor quality have been used; there is often controversy regarding the use of these measures.

IPO underpricing, stock market reactions to announcements of auditor changes, and earnings response coefficients have all been used to indirectly measure auditor quality (Francis 2004; Moizer 1997; Teoh and Wong 1993). These are all measures of stock market participants’ perceptions of auditor quality.<sup>3</sup> The accuracy of stock market

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<sup>3</sup> Earnings response coefficients are also a measure of financial reporting quality.

participants' perceptions of auditor quality is subject to debate, as their perceptions are often formed without the benefit of any evidence of management's financial reporting quality or the CPA firm's auditor quality.

Discretionary accruals, earnings response coefficients, and financial statement restatements have all been used to indirectly measure auditor quality (Francis 2004; Teoh and Wong 1993). These are all measures of financial reporting quality. Because financial reporting is the responsibility of management and auditing is the responsibility of the auditor, these are all very indirect measures of auditor quality.

Other metrics have been used to indirectly measure auditor quality; they each have their pros and cons. Whisenant (2006) suggests that “[a]udit failure rates could be used to document whether differences in failure rates are associated with audit firm size.” Francis (2004) states that “the most convincing evidence of an outright audit failure occurs when there is litigation against auditors,” citing Palmrose (1988), an early work on audit quality using audit failures measured via auditor litigation.

Usually, the largest CPA firms have been found to be the higher quality auditors. “Largest” has been considered globally, nationally, city-specific (office), and by industry (SIC code) market share, using all of the above mentioned metrics and more. Most studies have, as noted above, used a “brand name” dichotomous indicator variable model where all of the auditors within one size category were compared to each other. The most popular of these is, depending on the time period, Big 8, 6, 5 or 4 versus other CPA firm auditors. However, Beatty (1989), a Big 8 time period IPO underpricing study, found support for a trichotomous partition and three hierarchical levels of auditor quality: largest 5, next largest 6, and then the smaller auditors.

Francis et al. (1999), a discretionary accruals Big 8 or 6 (1975-1994 data was used) study, used a “brand name” indicator variable model. It found support for three hierarchical levels of auditor quality: Big 8 or 6, “second-tier national” (its term for Grant Thornton, Kenneth Leventhal, Laventhol & Horwath, Main Hurdman, McGladrey & Pullen, Pannell Kerr Forster, Seidman & Seidman, and Spicer & Oppenheim, in the aggregate), and “third-tier local.” Albring et al. (2007), a study of non-Big 6 CPA firm (1990-1998 data was used) IPO underpricing and audit fees, found that the “national” category (BDO Seidman, Grant Thornton, McGladrey & Pullen, and Kenneth Leventhal, in the aggregate) of CPA firms had higher quality levels than the “non-national” category of CPA firms and sole proprietors.

Colbert and Murray (1998) created an auditor quality metric based on the results of AICPA Private Company Practice Section peer reviews. These were reviews of very small CPA firms<sup>4</sup> that only performed audits for private companies. Conversely, our sample is based only on the results of audits of public companies. Notwithstanding these caveats, Colbert and Murray (1998) found that sole practitioners were lower quality auditors.

This study differs from prior research in several ways. First, it extends previous investigations involving one category of public company CPA firm auditors by specifically investigating whether the auditor quality of BDO Seidman is higher than that of the other (including Grant Thornton) non-Big 4 CPA firms. Likewise, it also specifically investigates whether the auditor quality of Grant Thornton is higher than that

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<sup>4</sup> The largest quartile of CPA firms in the Colbert and Murray (1998) study consisted of firms with more than six CPAs.

of the other (including BDO Seidman) non-Big 4 CPA firms.<sup>5</sup> Second, it investigates whether the auditor quality of sole practitioners, in the domain of public company auditing, is lower than that of the other non-Big 4 CPA firms. Third, much more recent data (1996 through 2007) is used. Fourth, as advocated by Whisenant (2006) and Francis (2004), an estimated audit failure rate measured by using auditor litigation outcomes is the auditor quality metric used in this study. This metric is the polytomous response variable of the empirical model and is discussed in detail in Section 5.

### **3. The hypotheses**

DeAngelo (1981) and prior auditor quality differentiation research studies provide the basis for the following three hypotheses:

H<sub>1</sub>: BDO Seidman is a relatively higher quality auditor than the other (including Grant Thornton and sole practitioners) non-Big 4 CPA firms.

H<sub>2</sub>: Grant Thornton is a relatively higher quality auditor than the other (including BDO Seidman and sole practitioners) non-Big 4 CPA firms.

H<sub>3</sub>: Sole practitioners are relatively lower quality auditors than the other (including BDO Seidman and Grant Thornton) non-Big 4 CPA firms.

### **4. The sample selection process**

The first stage of the data collection yielded 2,050 observations of private securities class actions commenced during the period 1996 through 2007. These were found in the *Securities Class Action Alert* (“SCAA”) monthly periodical or the *Securities*

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<sup>5</sup> Albring et al. (2007) compared the category of National CPA firms to Small CPA firms, implicitly assuming that all of the National CPA firms are similar in auditor quality. This study is the first to specifically investigate whether BDO Seidman is a higher quality auditor, compared to all of the non-Big 4 firms, including Grant Thornton. Likewise, it is also the first to specifically investigate whether Grant Thornton is a higher quality auditor, compared to all of the non-Big 4 firms, including BDO Seidman.

*Class Action Services* (“SCAS”) database.<sup>6</sup> Each of these 2,050 lawsuits concerns allegedly deficient financial disclosure by companies. Some of the *SCAA/SCAS* lawsuits have related government civil or criminal prosecutions.

After the collection of observations from *SCAA/SCAS*, SEC Accounting and Auditing Enforcement Releases (“AAERs”) were read to identify observations of auditor defendants (if not already found in *SCAA/SCAS*) to add to the sample. Then the material hyperlinked to the Justice Department Office of the Deputy Attorney General Significant Criminal Cases and Charging Documents website at <http://www.usdoj.gov/dag/cftf/cases.htm> was read to identify additional observations of auditor defendants (if not already found) to add to the sample. Finally, LEXIS NEXIS was searched for additional government civil or criminal auditor defendants.

These additional searches increased the sample size from 2,050 observations to 2,173 observations, with all litigation commenced during the 1996 through 2007 period. Culling the auditees of the Big 4 from this list, the sample was then reduced to 354 observations.

## 5. The empirical model

### 5.1. The model and its three variations

The hypotheses were tested using a cumulative logit (proportional odds) model. The model is  $OUTCOME = \beta_0 + \beta_1 BDO + \beta_2 GT + \beta_3 SOLO + \beta_4 BANKRUPT + \beta_5 IND1000 + \beta_6 IND2000 + \beta_7 IND3000 + \beta_8 IND4000 + \beta_9 IND5000 + \beta_{10} IND6000 + \beta_{11} IND7000 + \beta_{12} IND8000 + \beta_{13} TOTALASSETS + \beta_{14} US$  and the variables are defined as follows:

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<sup>6</sup> December 2002 was the last issue of *SCAA*. The internet based *SCAS* database was searched for 2003 and 2004. Also, for lawsuits that settled, each settlement notice posted to the *SCAS* database (or elsewhere on the internet) was searched to determine if the auditor paid to settle the suit.

OUTCOME is a polytomous, six level, ordinal response variable, coded as follows:

- = 0 = auditor was never a defendant in a private action; or
- = 100 = auditor is (or was) a defendant in a private action; or
- = 200 = auditor paid to settle a private action; or
- = 300 = auditor is (or was) a defendant or respondent in a government nonfraud civil lawsuit or SEC administrative proceeding; or
- = 400 = auditor is alleged to have committed fraud and is (or was) a defendant in a government civil lawsuit; or
- = 500 = auditor is (or was) a defendant in a criminal prosecution.

- BDO = 1 = BDO Seidman auditor; 0 = otherwise
- GT = 1 = Grant Thornton auditor; 0 = otherwise
- SOLO = 1 = Sole practitioner or single partner auditor; 0 = otherwise
- BANKRUPTCY = 1 = auditee bankruptcy 1 year before (or after) lawsuit filing; 0 = otherwise
- IND1000 = 1 = Mineral Industries (SIC 1000-1999); 0 = otherwise
- IND2000 = 1 = Construction Industries (SIC 2000-2999); 0 = otherwise
- IND3000 = 1 = Manufacturing (SIC 3000-3999); 0 = otherwise
- IND4000 = 1 = Transportation, Communications and Utilities (SIC 4000-4999); 0 = otherwise
- IND5000 = 1 = Wholesale Trade (SIC 5000-5999); 0 = otherwise
- IND6000 = 1 = Retail Trade (SIC 6000-6999); 0 = otherwise

IND7000	= 1 = Finance, Insurance and Real Estate (SIC 7000-7999); 0 = otherwise
IND8000	= 1 = Service Industries (SIC 8000-8999); 0 = otherwise
TOTALASSETS	= natural log of auditee total assets in thousands of US dollars
US	= 1 = US auditee (defined by principal executive office); 0 = non-US auditee

Three variations of this model were used for the empirical hypothesis testing. Allison (1999) notes that the cumulative logit model “won’t work for rank-ordered data in which no two individuals have the same rank – there would be more parameters to estimate than observations in the sample. As a very rough rule of thumb, I would say that it’s reasonable to estimate a cumulative logit model if there are at least 10 observations for each category on the dependent variable.” As shown in Table 2, there are 6 observations in the 500 category and 24 observations in the 400 category. An argument can be made for not combining these categories, as such combinations cause a loss of information. Allison (1999) posits, however, that the 500 category, with very few observations, should be combined with the observations in the 400 category. Thus, for the second variation of this model, the 30 observations in the 400 and 500 categories are combined. Likewise, for the third variation of this model, the 89 observations in the 300, 400 and 500 categories are combined.

### *5.2. The six levels of the polytomous response variable*

“Audit quality is inversely related to audit failures: the higher the failure rate, the lower the quality of auditing ... the most convincing evidence of an outright audit failure occurs when there is litigation against auditors...” (Francis 2004). A prerequisite or

corequisite of an allegation against an auditor for legally deficient auditing is an allegation against a company and its management for preparing legally deficient financial statements. Thus, Carcello and Palmrose (1994) and Bonner et al. (1998) analyzed a sample of private lawsuits to compare those that did not include an auditor defendant (i.e. a metric for higher audit quality because of lower likelihood of audit failure) to those that did include an auditor defendant (i.e. a metric for lower audit quality because of higher likelihood of audit failure).

One concern regarding this dichotomous litigation measure for auditor quality is that it implicitly assumes that all occurrences of the auditor being named a defendant in private litigation are equally meaningful measures of lower audit quality because of higher likelihood of audit failure. In contrast, the law of business misconduct literature and the legal process literature provide the theory for OUTCOME, a six level hierarchy of increasingly negative auditor litigation outcomes. Thus, auditor litigation resolutions in this paper are conceptualized as a theoretical continuum ranging from very low audit quality (because of a very high likelihood that an audit failure has occurred) to very high audit quality (because of a very low likelihood that an audit failure has occurred). The literature discussed below provides the theoretical basis for the six categories of OUTCOME.

#### *5.2.1. OUTCOME=500: The auditor is (or was) a defendant in a criminal prosecution*

Criminal prosecutions are only by the government and are reserved for the most culpable, harmful and wrongful perpetrators of business misconduct (Green 2006). An individual can be imprisoned only upon criminal conviction. Furthermore, only a

criminal conviction can make a CPA firm felonious, causing an automatic bar from the auditing profession.

In civil law, the lack of intent does not always exculpate the law violator from liability. However, intent must always be found to be present to secure a criminal conviction. The Securities Exchange Act of 1934 (“Exchange Act”) contains intent requirements for all actions – criminal, government civil, and private civil – but a more stringent intent requirement for criminal prosecutions: “Any person who *willfully* violates any provision ... or any rule or regulation thereunder, shall upon conviction be fined not more than \$5,000,000, or imprisoned not more than 20 years, or both...” Section 32(a) of the Exchange Act, 15 USC 78ff (a) (2004) (emphasis added).

Greater evidentiary certainty is required for a criminal conviction than for an imposition of civil liability. For example, in a criminal proceeding, the burden of proof is on the state and the standard of proof is “beyond a reasonable doubt.” In a civil proceeding, though, the burden of proof may sometimes be on the defendant (for example, under the Securities Act of 1933) and the standard of proof is merely “a preponderance of the evidence.”

*5.2.2. OUTCOME=400: The auditor is alleged to have committed fraud and is (or was) a defendant in a government civil lawsuit*

“White-collar crime” (Sutherland 1940), as understood by sociologists, criminologists, and Sutherland himself (Sutherland 1945), includes both criminally prosecuted business misconduct and other similar deviances. Some argue against treating such business misconduct more leniently than street crime. Conversely, some argue that all such misconduct should be criminally prosecuted. Sutherland attributed fining for

white-collar crime, in contrast to more onerous incarceration for street crime, to the power of the business classes to protect themselves from the full force of criminal sanctions directed at blue-collar criminals.

Therefore, the next most severe category of auditor legal outcomes is the portion of white-collar crime cases that, but for prosecutorial discretion, could possibly be criminally prosecuted. These are the cases in which the government (usually, but not always, the SEC) alleges that the auditor committed fraud. If the government can allege the fraud to have been pursuant to willful intent, then it can undertake a criminal prosecution. In contrast, the government cannot possibly criminally prosecute a nonfraud allegation.

*5.2.3. OUTCOME=300: The auditor is (or was) a defendant or respondent in a government nonfraud civil lawsuit or SEC administrative proceeding*

Nonfraud government lawsuits and administrative proceedings against auditors are the next level down in severity. They lack the potential to be brought as criminal prosecutions. This distinguishes them from government civil fraud prosecutions. Yet, these are still serious matters for several reasons. First, these are exercises of governmental (federal or state) power with the potential for far more severe consequences than private civil lawsuits. For example, the SEC has the power under its Rule 102(e) to bar an auditor from any future auditing of SEC registrants, even for a nonfraud infraction. Additionally, alleged lying, document destruction, or other obstructions of justice, during the course of an SEC investigation, can be grounds for a Justice Department criminal prosecution.

Nonfraud government lawsuits and administrative proceedings against auditors can also be regarded as somewhat severe outcomes because of selective prosecutions necessitated by inadequate funding of the SEC during the period of this study. This caused inadequate staffing of sufficiently experienced lawyers, accountants, and examiners, as well as inadequate technology and security resources (Seligman 2003; Maremont and Solomon 2003; and Grundfest 2002). Apparently, as a consequence of these inadequacies, the SEC enforcement division was forced to settle certain cases on terms more lenient to the defendants than the facts and circumstances warranted; in addition, the SEC simply declined to bring cases at all if they were not relatively egregious and thus were not relatively easy to win.

#### *5.2.4. Private actions: OUTCOME=200, 100 or 0*

In the United States and Canada, private actions (especially private securities class actions) comprise the bulk of the economically significant litigation against auditors. There are two reasons for the prevalence of private actions as compared to criminal court actions, government civil court actions, and administrative proceedings. First, private sector attorneys are motivated by economic self-interest to bring private actions on behalf of shareholders and creditors who allege that they have been wronged. Private sector attorneys are awarded an average of twenty-five percent of the settlement, contingent on one being obtained, as compensation for their labor and risk-taking (Eisenberg and Miller 2004). Second, as noted above, government entities (including both the Justice Department and the SEC) refrain from prosecuting certain meritorious cases. This prosecutorial discretion necessitates a partial reliance upon the private sector for enforcement of the securities laws related to financial reporting.

With regard to private actions, the legal process literature (also called the suit, settlement and trial literature) suggests that there are meaningful (in terms of auditor quality) distinctions among the various possible outcomes within private actions (Shavell 1982; Cooter and Rubinfeld 1989; Hay and Spier 1997). A private legal dispute features the following sequential stages. Two parties experience a dispute. One (called the plaintiff, or, in the context of this paper, the plaintiff class of investors or creditors who are users of the company's financial reports) demands money from the other (called the defendant or defendants). The plaintiff then files a lawsuit against the defendant or defendants. In the context of this paper, the plaintiff class typically does not immediately file a lawsuit against the auditor, requiring six months to a year to decide on a course of action. In the next stage, the plaintiff files an additional complaint, or an amended complaint, adding the auditor as a defendant in the lawsuit.

The remaining stages will vary from case to case, depending upon whether the case is dismissed. If the case is dismissed, the plaintiffs may appeal. If the case is not dismissed, a trial may be held. The loser of the trial may appeal the verdict.

At each stage, decisions are made by the litigants on the basis of economic self-interest. Each litigant decides whether (and on what terms) to settle, based on an estimate of the expected value (i.e. the likelihood of prevailing and the estimate of the recovery from this expectation) of the legal claim, net of the expected costs of continuing the litigation. Agency problems, risk aversion, strategic bargaining, and other problems may complicate the analysis, but they do not defeat the use of legal economics theory to make auditor quality-indicative conclusions, depending on the severity of the outcomes for the auditors.

Among all of the private action outcomes, the most severe outcome occurs when the auditor must pay the plaintiffs in order to settle the private action (= 200 = auditor paid to settle a private action). The second most severe outcome occurs when the auditor is simply named a defendant (= 100 = auditor is (or was) a defendant in a private action). The best outcome for the auditor occurs when the auditor is never named a defendant (= 0 = auditor was never a defendant in a private action).

### *5.3. The explanatory variables*

BANKRUPTCY has been found to be significant in numerous prior studies differentiating lawsuits with auditor defendants from lawsuits without auditor defendants. It was also found significant in Bonner et al. (1998), which differentiated between AAER-related lawsuits with auditor defendants and those without auditor defendants. Thus, it is used as a control variable in this study's model.

IND1000, IND2000, IND3000, IND4000, IND5000, IND6000, IND7000, and IND8000 are all used as industry indicator variables. IND1000 is an auditee whose SIC code is from 1000 to 1999, IND2000 is an auditee whose SIC code is from 2000 to 2999, etc. Each of these four digit SIC code industry sectors has at least 20 observations in the sample.

Each era tends to experience its own financial reporting crisis. The crises in the early 2000's, for instance, involved telecommunications and the internet (Ante 2007), and those in the 1980's involved savings and loans (Jones and Weingram 1996a, 1996b); today's crises involve mortgage backed securities. It is plausible that auditors of certain industry sectors, in certain time periods, when their auditees are sued, are more likely, *ceteris paribus*, to themselves be named defendants, even though this phenomenon is

difficult to explain.<sup>7</sup> Because certain auditors specialize in (and thus have client portfolios concentrated in) certain industry sectors, they may be exposed to more financial reporting litigation and/or auditor litigation, *ceteris paribus*, than other auditors; these industry sector variables control for this effect.

TOTALASSETS is also used as a control variable. TOTALASSETS may differentiate between governmental civil prosecutions, which are levels 300 and 400 of OUTCOME, and less severe levels, based on the findings of Beasley et al. (1999, 2000). In their samples of AAERs, although there was no formal hypothesis testing, company size appeared to be negatively associated with the inclusion of the auditor as an SEC defendant. TOTALASSETS, consistent with prior litigation research, is measured as the natural log of a company's total assets, in thousands of US dollars.

With regard to accounting practices, non-US companies tend to use the more principles-based financial reporting of the International Financial Reporting Standards ("IFRS") issued by the International Accounting Standards Board, rather than the US GAAP of the Financial Accounting Standards Board. Also, as Coffee (2006) describes, a typical non-US company is characterized by relatively less dispersed share ownership. The greater risk of fraud is likely to involve majority shareholder extraction of private benefits (i.e. "tunneling") at the expense of the minority shareholders, rather than managerial manipulation of financial reporting at the expense of all of the shareholders.

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<sup>7</sup> Jones and Weingram (1996a, 1996b), in their samples, provided evidence that companies in the high technology and financial services sectors experienced more financial reporting litigation. This they "explained" (in a regression sense) for the high technology sector by the sector's relatively high estimated cumulative turnover of shares traded, leading to relatively high estimated shareholder damages and concomitant settlements. However, they could not explain why the financial services sectors, which were not characterized by relatively high estimated cumulative turnover of shares traded, experienced more financial reporting litigation. Their results were not replicated in empirical studies based on more recent data. Most importantly, their results were not replicated in this study's context, which addresses the risk that an auditor, conditioned on financial reporting related litigation being commenced against the auditee, may experience a negative outcome.

Also, the auditor is likely to be less independent (in terms of requiring disclosure of any activities that are unfair to minority shareholders) because the board of directors may be a conduit for the majority shareholder to oppress the minority shareholders. In other words, the fraud that the auditor needs to prevent, as well as the corporate governance environment that influences the independence of the auditor, may be different in a non-US company. Thus, the control variable US represents a company with its principal executive office located in the United States.

## **6. The empirical results**

The far left column of Table 2 lists the six levels of auditor litigation outcomes. The most favorable outcome, in terms of suggestive auditor quality, is 0. This occurs when the auditor is not named a defendant in the private litigation; it was by far the most frequent outcome for the auditor, occurring in 53.11% of the 354 lawsuits. Among the auditors, BDO Seidman and Grant Thornton were best with regard to their frequency of lawsuits in which they were not named a defendant, at 80% and 66.67%, respectively. The Solo (sole practitioner) auditors were worst with regard to their frequency of lawsuits in which they were not named a defendant, at 14.63%.

The worst outcome, in terms of suggestive audit quality, is 500. This occurs when the auditor is criminally prosecuted. This was the least frequent outcome for the auditor, occurring in 1.69% of the 354 lawsuits. BDO Seidman was best with regard to its frequency of lawsuits in which it was, in related criminal proceedings, prosecuted, at 0%. The Solo auditors were worst with regard to their frequency of lawsuits in which they were, in related criminal proceedings, prosecuted, at 9.76%.

There were relatively few (i.e. six in the 1996 through 2007 period) criminal prosecutions of auditors. Merle S. Finkel (a sole practitioner) pleaded guilty to a criminal information charging him with conspiracy to commit securities fraud and bank fraud with regard to his audits of (1) Systems of Excellence, (2) Twenty First Century Health, and (3) Combined Companies International. Herbert E. Woll (a sole practitioner) was convicted of committing perjury; he testified in an SEC investigation of the fraudulent financial statements of his auditee, (4) Genesis Insurance & Financial Services, Inc. Two partners of Werblin, Cassucio & Moses were criminally prosecuted with regard to the fraudulent financial statements of (5) Apponline.com; Joseph Casuccio pleaded guilty to wire and securities fraud but Jeffrey Schneider was acquitted. In Italy, Grant Thornton SpA and two of its partners, Maurizio Bianchi and Lorenzo Penca, were indicted with regard to their audits of (6) Parmalat.<sup>8</sup>

In terms of mean scores, the best auditor was BDO Seidman (32), followed by Grant Thornton (57.14). The Solo auditors earned the worst mean scores (282.93). Each of these mean scores suggest support for this study's three hypotheses. Nevertheless, the hypothesis testing in this study employs polytomous multiple regression with control variables, which is a more rigorous mode of analysis.

Data on each CPA firm's auditee SIC codes are shown in Table 3. Some of the CPA firms have a specialization (i.e. a high percentage of its clients in a single industry) in certain industry sectors. For instance, BDO specializes in Manufacturing (28%) and Finance, Insurance and Real Estate (26%). Grant Thornton specializes in Finance, Insurance and Real Estate (26.32%) and Retail Trade (22.81%). The Solo auditors

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<sup>8</sup> Following in the convention of prior auditor litigation research, we count a company's lawsuit as "one observation" and we count a scenario where two auditors are defendants with regard to a company's lawsuit as "two observations."

specialize in Manufacturing (29.27%) and Finance, Insurance and Real Estate (26.83%). The Small auditors specialize in Finance, Insurance and Real Estate (21.36%).

Some of the same information from Table 3 is repeated in Table 3a. However, the industries in Table 3a, as well as in Figure 1, are ordered from: (a) the lowest risk of a negative OUTCOME for the auditor to (b) the highest risk of a negative OUTCOME for the auditor, if financial reporting related litigation is commenced against the auditee. Also, the clustering of OUTCOME scores is shown in Table 3a and Figure 1. According to Table 3a and Figure 1, the highest risk of a negative OUTCOME for the auditor, if financial reporting related litigation is commenced against the auditee, is in the Agriculture, Forestry, and Fisheries industries (SIC 1-999), followed by the Public Administration and Nonclassifiable Establishments industries (SIC 9000-9999). The lowest risk of a negative OUTCOME for the auditor, if financial reporting related litigation is commenced against the auditee, is in the Transportation, Communications and Utilities industries (SIC 4000-4999).

Table 4 presents the nationalities of the auditee firms. All of the CPA firms have strong specializations (i.e. a high percentage of its clients in a specific country) in United States auditees, ranging from BDO Seidman's 90% to the Solo auditors' 97.56%. The 15 Canadian auditees were slightly more frequently audited by the Small auditors. The Small auditors also audited five out of the six Chinese auditees and both of the Israeli auditees.

Statistics on the control variables BANKRUPTCY and TOTALASSETS are shown in Table 5. The percentage of auditees that filed for bankruptcy ranged from 12.2% for the Solo auditors to 22.81% for Grant Thornton. The auditor's OUTCOME

score for bankrupt auditees was 168.42, far more negative than in the overall sample (118.08). The auditee mean total assets ranged from \$115,820,000 for the Solo auditors to \$5,089,242,000 for Grant Thornton. The Grant Thornton auditees were larger than the BDO Seidman auditees: twelve times larger as measured by means and almost fifty percent larger as measured by medians.

Table 6 presents the results of the cumulative logit (proportional odds) six category model. The results support the first hypothesis. BDO Seidman has a significant ( $p=.0005$ ) negative association with OUTCOME. Because OUTCOME is scaled so that a lower score occurs when a more positive outcome for the auditor in the litigation occurs, this association implies that BDO Seidman is a significantly higher quality auditor. The results support the second hypothesis. Grant Thornton has a significant ( $p=.0044$ ), negative association with OUTCOME. The results also support the third hypothesis. SOLO has a significant ( $p=.0001$ ) positive association with OUTCOME.

Each of the industry indicator control variables is negative; this is not surprising, when considered in tandem with the data presented in Table 3a and Figure 1. From these, it is evident that each of the four digit SIC industry sectors for which there are at least 20 observations (i.e. each that is assigned an indicator variable) is a low risk, below average risk, or average risk industry, with the exception of Mineral Industries (SIC 1000-1999) and Retail Trade (SIC 6000-6999). By chance, the four digit SIC industry sectors for which there are fewer than 20 observations (i.e. the sectors that are not assigned an indicator variable) are the two highest risk industries: Public Administration and NonClassifiable Establishments (SIC 9000-9999) and Agriculture, Forestry and Fisheries

(1-999). Thus, each of the industry variables is negative. The one industry variable that is not significant, IND6000 (Retail Trade), is the third most risky industry.

BANKRUPT is positive and significant ( $p=.0002$ ). TOTALASSETS ( $p=.2311$ ) is not a significant control variable. US ( $p=.8936$ ) also is not a significant control variable. Based on the likelihood ratio statistic, the model in its entirety is significant at  $p=.0001$  and the adjusted pseudo  $R^2$  for the model is .3202.

Table 7 presents the results of the cumulative logit (proportional odds) five category model. The results again support all three hypotheses. BDO Seidman has a significant ( $p=.0005$ ) negative association with OUTCOME. Grant Thornton has a significant ( $p=.0046$ ) negative association with OUTCOME. SOLO has a significant ( $p=.0001$ ) positive association with OUTCOME.

BANKRUPT is positive and significant ( $p=.0002$ ). Each of the industry indicator variables is negative and each is significant, with the exception of IND6000 (Retail Trade). Neither TOTALASSETS ( $p=.2271$ ) nor US ( $p=.9115$ ) is a significant control variable. Based on the likelihood ratio statistic, the model in its entirety is significant at  $p=.0001$  and the adjusted pseudo  $R^2$  for the model is .3197.

Table 8 presents the results of the cumulative logit (proportional odds) four category model. The results, once again, support all three hypotheses. BDO Seidman has a significant ( $p=.0007$ ) negative association with OUTCOME. Grant Thornton has a significant ( $p=.0052$ ) negative association with OUTCOME. SOLO has a significant ( $p=.0001$ ) positive association with OUTCOME.

BANKRUPT is positive and significant ( $p=.0013$ ). Each of the industry indicator variables is negative and each is significant, with the exception of IND6000 (Retail

Trade). Neither TOTALASSETS ( $p=.1183$ ) nor US ( $p=.9349$ ) is a significant control variable. Based on the likelihood ratio statistic, the model in its entirety is significant at  $p=.0001$  and the adjusted pseudo  $R^2$  for the model is .3169.

Each of the three variations of the cumulative logit (proportional odds) model provides consistent support for all three of the hypotheses. There is consistency with regard to the other results as well. The control variables BANKRUPT, IND2000, IND3000, IND4000, IND5000, and IND7000, are each consistently significant at a one percent level, and the control variable IND1000 is consistently significant at a five percent level. The largest correlation coefficients (not shown in a table) are produced by the relationship between SOLO and TOTALASSETS ( $r=-.28$ ,  $p=.0001$ ), and the relationship between Grant Thornton and TOTALASSETS ( $r=.25$ ,  $p=.0001$ ).

None of the three variations of the model features a condition number greater than 9.2. Thus, the condition number threshold of 20 (Belsley et al. 1980) or 30 (Judge et al. 1988) is not exceeded. However, the variance inflation factor thresholds of 2.5 (Allison 1999), 5 (Judge et al. 1988) or 10 (Myers 1990) are exceeded for several of the industry indicator variables. For example, the variance inflation factors for IND7000, IND3000, and IND6000, are 11.5, 10.6, and 9.5, respectively. These high variance inflation factors suggest that multicollinearity may be an issue.<sup>9</sup>

## 7. Additional analyses

Industry effects can be controlled in various ways. It is appropriate, in this study, to determine if the robustness of the results could have been influenced by the manner of

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<sup>9</sup> As the term “variance inflation” implies, standard errors may be higher than they would otherwise be, and probability values higher than they would otherwise be, in the absence of multicollinearity. In other words, certain variables that appear to be insignificant would otherwise be significant, in the absence of multicollinearity. See Allison (1999).

control. Thus, the polytomous regression was run again with three industry sector variables: INDLOW, INDBELOW, and INDAVERAGE. As shown in Table 3a and Figure 1, there are differences among industries with regard to the auditor's propensity to experience a negative OUTCOME, conditioned on the commencement of financial reporting litigation against the auditee. These differences manifest themselves in four clusters which serve as the basis for the four levels of OUTCOME risk (low risk, below average risk, average risk, and high risk) associated with different industries, as well as the three following industry indicator control variables INDLOW, INDBELOW and INDAVERAGE:

INDLOW = 1 = Industries with low risk of negative OUTCOME for the auditor: SIC 4000-4999 (see Table 3a and Figure 1); 0 = otherwise

INDBELOW = 1 = Industries with below average risk of negative OUTCOME for the auditor: SIC 2000-3999, 5000-5999, and 8000-8999 (see Table 3a and Figure 1); 0 = otherwise

INDAVERAGE = 1 = Industries with average risk of negative OUTCOME for the auditor: SIC 7000-7999 (see Table 3a and Figure 1); 0 = otherwise

Table 9 presents the results of the cumulative logit (proportional odds) six category model for additional analysis. The results support all three hypotheses. BDO Seidman has a significant ( $p=.0006$ ) negative association with OUTCOME. Grant Thornton has a significant ( $p=.0062$ ) negative association with OUTCOME. SOLO has a significant ( $p=.0001$ ) positive association with OUTCOME.

BANKRUPT is positive and significant ( $p=.0002$ ). INDLOW is negative and significant ( $p=.0039$ ). INDBELOW is negative and significant ( $p=.0001$ ).

INDAVERAGE is negative and significant ( $p=.0009$ ). Neither TOTALASSETS nor US is a significant control variable. Based on the likelihood ratio statistic, the model in its entirety is significant at  $p=.0001$  and the adjusted pseudo  $R^2$  for the model is .3087.

Table 10 presents the results of the cumulative logit (proportional odds) five category model. The results again support all three hypotheses. BDO Seidman has a significant ( $p=.0006$ ) negative association with OUTCOME. Grant Thornton has a significant ( $p=.0062$ ) negative association with OUTCOME. SOLO has a significant ( $p=.0001$ ) positive association with OUTCOME.

BANKRUPT is positive and significant ( $p=.0003$ ). INDLOW is negative and significant ( $p=.0038$ ). INDBELOW is negative and significant ( $p=.0001$ ). INDAVERAGE is negative and significant ( $p=.0009$ ). Neither TOTALASSETS nor US is a significant control variable. Based on the likelihood ratio statistic, the model in its entirety is significant at  $p=.0001$  and the adjusted pseudo  $R^2$  for the model is .3091.

Table 11 presents the results of the cumulative logit (proportional odds) four category model. The results again support all three hypotheses. BDO Seidman has a significant ( $p=.0007$ ) negative association with OUTCOME. Grant Thornton has a significant ( $p=.0068$ ) negative association with OUTCOME. SOLO has a significant ( $p=.0001$ ) positive association with OUTCOME.

BANKRUPT is positive and significant ( $p=.0015$ ). INDLOW is negative and significant ( $p=.0043$ ). INDBELOW is negative and significant ( $p=.0001$ ). INDAVERAGE is negative and significant ( $p=.0005$ ). Neither TOTALASSETS nor US is a significant control variable. Based on the likelihood ratio statistic, the model is significant at  $p=.0001$  and the adjusted pseudo  $R^2$  for the model is .3048.

In the model used for additional analysis, there is no condition number greater than 2.2. Thus the condition number threshold of 20 (Belsley et al. 1980) or 30 (Judge et al. 1988) is not exceeded. Also, there is no variance inflation factor greater than 1.7. Thus, even the most stringent variance inflation factor threshold of 2.5 (Allison 1999) is not exceeded. These diagnostic measures indicate that multicollinearity is not a potential concern in the model used for additional analysis. Thus, the results in all three variations of the model used for additional analysis support the robustness of the results of the main model.

## **8. Conclusions**

The resulting empirical evidence suggests that, among the non-Big 4 firms, BDO Seidman is a higher quality auditor. Likewise, the evidence also suggests that (among these firms) Grant Thornton is a higher quality auditor. Conversely, the evidence also suggests that (among these firms), sole practitioners are lower quality auditors. These findings, though consistent with the DeAngelo (1981) theory and suggested by the Francis et al. (1999), Albring et al. (2007), and Colbert and Murray (1998) results, are empirically demonstrated for the first time in this paper. The implication of these results for audit committees, investors, and other stakeholders in public companies is that the choice among the possible non-Big 4 CPA firms is an important one; each of the Medium 2 auditors is individually characterized by relatively higher auditor quality. Conversely, sole practitioners, in the aggregate, are characterized by relatively lower auditor quality.

## **9. Limitations and suggestions for future research**

This is the first study to attempt to ascertain whether BDO Seidman is a higher quality auditor, as compared to the other non-Big 4 CPA firms. Likewise, it is also the

first to attempt to ascertain whether Grant Thornton is a higher quality auditor, as compared to the other non-Big 4 CPA firms. It also is the first to determine if sole practitioners, in the domain of public company auditing, are lower quality auditors. This research is motivated by recent attention given to these firms, considering that their share of the small and medium public company auditing services market has substantially increased in the aftermath of the demise of Arthur Andersen and the enactment of the Sarbanes Oxley Act and its increased restrictions on the provision of nonaudit services.

Litigation often occurs several years after audits have been completed. Thus, these conclusions concerning auditor quality differences among the non-Big 4 firms are based on litigation that commenced during the period 1996 through 2007. The related audits were actually performed during the period 1993 through 2005. Future researchers might wish to reperform this research on a periodic basis to provide current auditor quality information. Because the non-Big 4 firms are continuing to increase their market share in the public company auditing services markets, updated information might assume elevated levels of importance in the future.

In addition, alternative auditor quality measures and approaches (some of which were mentioned above in Section 2.2) may be informative as well. Will they support the research results reported herein? Audit committees, shareholders, and other stakeholders in public companies who depend on financial reporting or who are interested in public policy questions related thereto may require the most accurate and current information concerning the relative quality of the non-Big 4 auditor firms.

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**Table 1:**  
**Top Ten Auditors Ranked by Size**  
**Who Audits America December 2000 and December 2005**

<b>2000 Rank</b>	<b>2000 CPA Firm</b>	<b>\$ Sales Audited (Millions)</b>	<b>Percent Sales</b>	<b>Big 5 % Sales</b>	<b>Auditees</b>	<b>Percent Auditees</b>	<b>Big 5 % Auditees</b>
1	PricewaterhouseCoopers	2,285,242	30.89%	99.08%	1,617	20.54%	89.61%
2	Ernst & Young	1,448,451	19.58%		1,574	19.99%	
3	Deloitte & Touche	1,361,743	18.41%		1,091	13.86%	
4	Arthur Andersen	1,230,192	16.63%	Medium 2	1,448	18.39%	Medium 2
5	KPMG	1,004,408	13.58%	% Sales	1,325	16.83%	% Auditees
6	Grant Thornton	31,712	0.43%	0.76%	347	4.41%	8.13%
7	BDO Seidman	24,583	0.33%		293	3.72%	
8	McGladrey & Pullen	4,538	0.06%	Small	96	1.22%	Small
9	Ciulla Smith & Dale	3,768	0.05%	% Sales	2	0.03%	% Auditees
10	Crowe Chizek & Co.	3,413	0.05%	0.16%	80	1.02%	2.26%
	<b>Total</b>	<b>7,398,050</b>	<b>100.00%</b>		<b>7,873</b>	<b>100.00%</b>	

<b>2005 Rank</b>	<b>2005 CPA Firm</b>	<b>\$ Sales Audited (Millions)</b>	<b>Percent Sales</b>	<b>Big 5 % Sales</b>	<b>Auditees</b>	<b>Percent Auditees</b>	<b>Big 5 % Auditees</b>
1	PricewaterhouseCoopers	3,171,278	31.03%	98.65%	948	19.59%	81.10%
2	Ernst & Young	2,637,133	25.81%		1,206	24.92%	
3	Deloitte & Touche	2,478,223	24.25%	Medium 2	847	17.50%	Medium 2
4	KPMG	1,793,726	17.55%	% Sales	924	19.09%	% Auditees
5	BDO Seidman	61,175	0.60%	1.15%	303	6.26%	13.64%
6	Grant Thornton	56,817	0.56%		357	7.38%	
7	McGladrey & Pullen	7,398	0.07%	Small	99	2.05%	Small
8	Crowe Chizek & Co.	6,951	0.07%	% Sales	88	1.82%	% Auditees
9	Amper Politziner Mattia	2,964	0.03%	0.20%	21	0.43%	5.27%
10	Moss Adams & Co.	2,830	0.03%		47	0.97%	
	<b>Total</b>	<b>10,218,495</b>	<b>100.00%</b>		<b>4,840</b>	<b>100.00%</b>	

**Table 2:**  
**Outcomes for Auditors in Litigation**  
**1996 through 2007, n=354**

<b>OUTCOME</b>	<b>BDO Seidman</b>	<b>Grant Thornton</b>	<b>Solo auditors</b>	<b>Small auditors</b>	<b>Total</b>
0	40	38	6	104	188
	80%	66.67%	14.63%	50.49%	53.11%
100	6	12	3	18	39
	12%	21.05%	7.32%	8.74%	11.02%
200	3	4	2	29	38
	6%	7.02%	4.88%	14.08%	10.73%
300	0	1	15	43	59
	0%	1.75%	36.59%	20.87%	16.67%
400	1	1	11	11	24
	2%	1.75%	26.83%	5.34%	6.78%
500	0	1	4	1	6
	0%	1.75%	9.76%	.49%	1.69%
<b>Total</b>	<b>50</b>	<b>57</b>	<b>41</b>	<b>206</b>	<b>354</b>
	100%	100%	100%	100%	100%
Mean	32	57.14	282.93	125.05	118.08
Rank	First (best)	Second	Fourth (worst)	Third	

*OUTCOME (Lower OUTCOME scores = higher auditor quality)*

0 = Auditor was never a defendant in a private litigation

100 = Auditor is (or was) a defendant in a private litigation

200 = Auditor paid to settle a private litigation

300 = Auditor is (or was) a defendant or respondent in a government nonfraud civil lawsuit or SEC administrative proceeding

400 = Auditor is alleged to have committed fraud and is (or was) a defendant in a government civil lawsuit

500 = Auditor is (or was) a defendant in a criminal prosecution

**Table 3:**  
**Auditee SIC Codes**  
**1996 through 2007, n=354**

<b>Industries &amp; SIC Codes</b>	<b>BDO Seidman</b>	<b>Grant Thornton</b>	<b>Solo auditors</b>	<b>Small auditors</b>	<b>Total</b>	<b>Mean OUTCOME</b>
Agriculture, Forestry, & Fisheries 01-999	0 0%	0 0%	0 0%	2 .97%	2 .56%	300
Mineral Industries 1000-1999	2 4%	1 1.75%	5 12.2%	12 5.83%	20 5.65%	165
Construction Industries 2000-2999	6 12%	6 10.53%	1 2.44%	22 10.68%	35 9.89%	88.57
Manufacturing 3000-3999	14 28%	8 14.04%	12 29.27%	40 19.42%	74 20.9%	97.3
Transportation, Communications & Utilities 4000-4999	6 12%	7 12.28%	1 2.44%	10 4.85%	24 6.78%	62.5
Wholesale Trade 5000-5999	4 8%	4 7.02%	3 7.32%	19 9.22%	30 8.47%	93.33
Retail Trade 6000-6999	3 6%	13 22.81%	5 12.2%	41 19.9%	62 17.51%	182.26
Finance, Insurance & Real Estate 7000-7999	13 26%	15 26.32%	11 26.83%	44 21.36%	83 23.45%	113.25
Service Industries 8000-8999	1 2%	2 3.51%	3 7.32%	14 6.8%	20 5.65%	90
Public Administration & Nonclassifiable 9000-9999	1 2%	1 1.75%	0 0%	2 .97%	4 1.13%	200
<b>Total</b>	<b>50</b>	<b>57</b>	<b>41</b>	<b>206</b>	<b>354</b>	<b>118.08</b>

**Table 3a:**  
**Auditee SIC Codes**  
**1996 through 2007, n=354**  
*(ordered by risk of negative OUTCOME for the auditor)*

Industries & SIC Codes	Total	Percent	Mean OUTCOME
<b>Low Risk Industries</b>			
Transportation, Communications & Utilities, 4000-4999	24	6.78%	62.5
<b>Below Average Risk Industries (n = 159; mean OUTCOME = 93.71)</b>			
Construction Industries, 2000-2999	35	9.89%	88.57
Service Industries, 8000-8999	20	5.65%	90.00
Wholesale Trade, 5000-5999	30	8.47%	93.33
Manufacturing, 3000-3999	74	20.9%	97.3
<b>Average Risk Industries</b>			
Finance, Insurance and Real Estate, 7000-7999	83	23.45%	113.25
<b>High Risk Industries (n = 88; mean OUTCOME = 181.82)</b>			
Mineral Industries, 1000-1999	20	5.65%	165.00
Retail Trade, 6000-6999	62	17.51%	182.26
Public Administration & Nonclassifiable, 9000-9999	4	1.13%	200.00
Agriculture, Forestry, and Fisheries, 0001-0999	2	0.56%	300.00
<b>Total</b>			
Total	354	100.00%	118.08

**Table 4:**  
**Auditee Nationality**  
**1996 through 2007, n=354**

Nationality	BDO	GT	Solo auditors	Small auditors	Total
Belgium	1	0	0	0	1
	2%	0%	0%	0%	.28%
British Virgin Islands	0	0	0	1	1
	0%	0%	0%	.49%	.28%
Canada	2	2	1	10	15
	4%	3.51%	2.44%	4.85%	4.24%
China	1	0	0	5	6
	2%	0%	0%	2.43%	1.69%
Ghana	0	0	0	1	1
	0%	0%	0%	.49%	.28%
Israel	0	0	0	2	2
	0%	0%	0%	.97%	.56%
Italy	0	1	0	0	1
	0%	1.75%	0%	0%	.28%
Japan	1	0	0	0	1
	2%	0%	0%	0%	.28%
Thailand	0	1	0	0	1
	0%	1.75%	0%	0%	.28%
United Kingdom	0	1	0	1	2
	0%	1.75%	0%	.49%	.56%
United States	45	52	40	186	323
	90%	91.23%	97.56%	90.29%	91.24%
Total	50	57	41	206	354
	100%	100%		100%	100%

NOTE: Auditee nationality is defined by the principal executive office. Aggregate results per domicile of incorporation were reviewed and are similar in nature.

**Table 5:**  
**Auditee Bankruptcy and Total Assets**  
**1996 through 2007, n=354**

	<b>BDO</b>	<b>GT</b>	<b>Solo auditors</b>	<b>Small auditors</b>	<b>Total</b>
BANKRUPTCY	7	13	5	32	57
Percent	14%	22.81%	12.2%	15.53%	16.1%
Standard Deviation	.347	.4196	.3272	.3622	.3675
TOTALASSETS					
Mean	418,919	5,089,242	116,820	138,232	972,206
Median	65,514	95,231	3545	24,108	27,753
Standard Deviation	1,326,118	26,858,463	427564	719,881	10,953,888

BANKRUPT: 1 = auditee bankruptcy 1 year before (or after) lawsuit filing; 0 = otherwise  
TOTALASSETS: Auditee total assets in thousands of US dollars

**Table 6:**  
**Polytomous Regression Results**  
**1996 through 2007, n=354**  
**Six Category Cumulative Logit (Proportional Odds) Model**

<b>Explanatory Variable Term</b>	<b>Explanatory Variable Description (See Table 2 for OUTCOME codes)</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>Wald Chi-Sq.</b>	<b>Two Sided Prob Value</b>
Intercept1		-2.3307	1.0192	5.2292	.0222
Intercept2		-.4525	.9531	.2255	.6349
Intercept3		1.1964	.9477	1.5938	.2068
Intercept4		1.8868	.951	3.9363	.0473
Intercept5		2.4942	.9551	6.8195	.009
BDO	1 = BDO Seidman; 0 = otherwise	-1.4352	.4144	11.9956	.0005
GT	1 = Grant Thornton; 0 = otherwise	-.9639	.3385	8.1083	.0044
SOLO	1 = Sole practitioner; 0 = otherwise	2.3522	.3522	44.5965	.0001
BANKRUPT	1 = auditee bankruptcy 1 year before (or after) lawsuit filing; 0 = otherwise	1.0659	.2829	14.1958	.0002
IND1000	Mineral Industries	-1.8596	.8569	4.7093	.03
IND2000	Construction Industries	-2.381	.8255	8.3199	.0039
IND3000	Manufacturing	-2.4192	.785	9.4963	.0021
IND4000	Transportation, Communications and Utilities	-2.6295	.885	8.8274	.003
IND5000	Wholesale Trade	-2.3636	.8385	7.9458	.0048
IND6000	Retail Trade	-1.0438	.7777	1.8015	.1795
IND7000	Finance, Insurance and Real Estate	-2.1393	.7782	7.5581	.006
IND8000	Service Industries	-2.5663	.8823	8.4604	.0036
TOTALASSETS	Auditee total assets in thousands of US dollars (natural log used for regression)	-.0554	.0463	1.434	.2311
US	1 = US auditee; 0 = otherwise. Per corporation's principal executive office.	-.0525	.3925	.0179	.8396

Chi-Square Statistic for the Proportional Odds Assumption (56 d.f.) = 294, p = .0001

Deviance Goodness of Fit Statistic (1,711 d.f.) = 840, p = .9999

Pearson Goodness of Fit Statistic (1,711 d.f.) = 1,801, p = .0635

Likelihood Ratio Statistic for Model, excluding intercepts (14 d.f.) = 126, p = .0001

Pseudo R squared = .2995

Adjusted Pseudo R squared = .3202

**Table 7:**  
**Polytomous Regression Results**  
**1996 through 2007, n=354**  
**Five Category Cumulative Logit (Proportional Odds) Model**

<b>Explanatory Variable Term</b>	<b>Explanatory Variable Description (See Table 2 for OUTCOME codes)</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>Wald Chi-Sq.</b>	<b>Two Sided Prob Value</b>
Intercept1		-.4383	.9559	.2102	.6466
Intercept2		1.2152	.9506	1.6342	.2011
Intercept3		1.9054	.9539	3.9901	.0458
Intercept4		2.5119	.958	6.8749	.0087
BDO	1 = BDO Seidman; 0 = otherwise	-1.434	.4142	11.9867	.0005
GT	1 = Grant Thornton; 0 = otherwise	-.9594	.3383	8.0424	.0046
SOLO	1 = Sole practitioner; 0 = otherwise	2.3201	.3541	42.928	.0001
BANKRUPT	1 = auditee bankruptcy 1 year before (or after) lawsuit filing; 0 = otherwise	1.0462	.2842	13.5547	.0002
IND1000	Mineral Industries	-1.8207	.8589	4.4937	.034
IND2000	Construction Industries	-2.39	.8276	8.3392	.0039
IND3000	Manufacturing	-2.4463	.7878	9.6421	.0019
IND4000	Transportation, Communications and Utilities	-2.6405	.8869	8.8626	.0029
IND5000	Wholesale Trade	-2.3772	.8413	7.984	.0047
IND6000	Retail Trade	-1.07	.7807	1.8783	.1705
IND7000	Finance, Insurance and Real Estate	-2.1527	.7808	7.6017	.0058
IND8000	Service Industries	-2.5783	.8844	8.5	.0036
TOTALASSETS	Auditee total assets in thousands of US dollars (natural log used for regression)	-.0561	.0464	1.4592	.2271
US	1 = US auditee; 0 = otherwise. Per corporation's principal executive office.	-.0436	.3927	.0123	.9115

Chi-Square Statistic for the Proportional Odds Assumption (42 d.f.) = 295, p = .0001

Deviance Goodness of Fit Statistic (1,366 d.f.) = 814, p = .9999

Pearson Goodness of Fit Statistic (1,366 d.f.) = 1,472, p = .0236

Likelihood Ratio Statistic for Model, excluding intercepts (14 d.f.) = 125, p = .0001

Pseudo R squared = .2972

Adjusted Pseudo R squared = .3197

**Table 8:**  
**Polytomous Regression Results**  
**1996 through 2007, n=354**  
**Four Category Cumulative Logit (Proportional Odds) Model**

<b>Explanatory Variable Term</b>	<b>Explanatory Variable Description (See Table 2 for OUTCOME codes)</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>Wald Chi-Sq.</b>	<b>Two Sided Prob Value</b>
Intercept1		1.4937	1.0216	2.1378	.1437
Intercept2		2.1855	1.0252	4.544	.033
Intercept3		2.7929	1.0296	7.3576	.0067
BDO	1 = BDO Seidman; 0 = otherwise	-1.4033	.4156	11.3994	.0007
GT	1 = Grant Thornton; 0 = otherwise	-1.9553	.342	7.8015	.0052
SOLO	1 = Sole practitioner; 0 = otherwise	2.2643	.3954	32.793	.0001
BANKRUPT	1 = auditee bankruptcy 1 year before (or after) lawsuit filing; 0 = otherwise	.953	.2964	10.3369	.0013
IND1000	Mineral Industries	-1.9617	.9317	4.4337	.0352
IND2000	Construction Industries	-2.5445	.8961	8.0624	.0045
IND3000	Manufacturing	-2.5864	.8583	0.0816	.0026
IND4000	Transportation, Communications and Utilities	-2.6386	.9455	7.7877	.0053
IND5000	Wholesale Trade	-2.3468	.9071	6.6933	.0097
IND6000	Retail Trade	-1.0636	.8536	1.5526	.2127
IND7000	Finance, Insurance and Real Estate	-2.2641	.8516	7.0689	.0078
IND8000	Service Industries	-2.5391	.9456	7.2101	.0072
TOTALASSETS	Auditee total assets in thousands of US dollars (natural log used for regression)	-.0759	.0486	2.4395	.1183
US	1 = US auditee; 0 = otherwise. Per corporation's principal executive office.	-.0326	.3997	.0067	.9349

Chi-Square Statistic for the Proportional Odds Assumption (28 d.f.) = 87, p = .0001

Deviance Goodness of Fit Statistic (1,021 d.f.) = 706, p = .9999

Pearson Goodness of Fit Statistic (1,021 d.f.) = 1,057, p = .209

Likelihood Ratio Statistic for Model, excluding intercepts (14 d.f.) = 119, p = .0001

Pseudo R squared = .2861

Adjusted Pseudo R squared = .3169

**Table 9:**  
**Polytomous Regression Results**  
**1996 through 2007, n=354**  
**Six Category Cumulative Logit (Proportional Odds) Model for Additional Analysis**

<b>Explanatory Variable Term</b>	<b>Explanatory Variable Description (See Table 2 for OUTCOME codes)</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>Wald Chi-Sq.</b>	<b>Two Sided Prob Value</b>
Intercept1		-3.4572	.7606	20.6627	.0001
Intercept2		-1.5788	.6648	5.6396	.0176
Intercept3		.0655	.6459	.0103	.9192
Intercept4		.7464	.6463	1.3337	.2481
Intercept5		1.3421	.6493	4.273	.0387
BDO	1 = BDO Seidman; 0 = otherwise	-1.3999	.4089	11.7213	.0006
GT	1 = Grant Thornton; 0 = otherwise	-.9181	.3353	7.4987	.0062
SOLO	1 = Sole practitioner; 0 = otherwise	2.2119	.3443	41.2734	.0001
BANKRUPT	1 = auditee bankruptcy 1 year before (or after) lawsuit filing; 0 = otherwise	1.0467	.28	13.9729	.0002
INDLOW	Industries with low risk of negative OUTCOME for the auditor: SIC 4000-4999 (see Table 3a and Figure 1)	-1.4962	.5184	8.3282	.0039
INDBELOW	Industries with below average risk of negative OUTCOME for the auditor: SIC 2000-3999, 5000-5999, and 8000-8999 (see Table 3a and Figure 1)	-1.2815	.2651	23.3652	.0001
INDAVERAGE	Industries with average risk of negative OUTCOME for the auditor: SIC 7000-7999 (see Table 3a and Figure 1)	-1.0016	.303	10.9289	.0009
TOTALASSETS	Auditee total assets in thousands of US dollars (natural log used for regression)	-.0596	.0458	1.6928	.1932
US	1 = US auditee; 0 = otherwise. Per corporation's principal executive office.	.0132	.3844	.0012	.9726

Chi-Square Statistic for the Proportional Odds Assumption (36 d.f.) = 228, p = .0001

Deviance Goodness of Fit Statistic (1,716 d.f.) = 846, p = .9999

Pearson Goodness of Fit Statistic (1,716 d.f.) = 1,811, p = .0538

Likelihood Ratio Statistic for Model, excluding intercepts (9 d.f.) = 121, p = .0001

Pseudo R squared = .2887

Adjusted Pseudo R squared = .3087

**Table 10:**  
**Polytomous Regression Results**  
**1996 through 2007, n=354**  
**Five Category Cumulative Logit (Proportional Odds) Model for Additional Analysis**

<b>Explanatory Variable Term</b>	<b>Explanatory Variable Description (See Table 2 for OUTCOME codes)</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>Wald Chi-Sq.</b>	<b>Two Sided Prob Value</b>
Intercept1		-1.5717	.6663	5.5639	.0183
Intercept2		.0754	.6474	.0135	.9073
Intercept3		.7565	.6479	1.3636	.2429
Intercept4		1.3521	.6509	4.3152	.0378
BDO	1 = BDO Seidman; 0 = otherwise	-1.3981	.4087	11.6993	.0006
GT	1 = Grant Thornton; 0 = otherwise	-.9179	.3353	7.4939	.0062
SOLO	1 = Sole practitioner; 0 = otherwise	2.1983	.3464	40.2657	.0001
BANKRUPT	1 = auditee bankruptcy 1 year before (or after) lawsuit filing; 0 = otherwise	1.0245	.2812	13.2777	.0003
INDLOW	Industries with low risk of negative OUTCOME for the auditor: SIC 4000-4999 (see Table 3a and Figure 1)	-1.4995	.5183	8.3687	.0038
INDBELOW	Industries with below average risk of negative OUTCOME for the auditor: SIC 2000-3999, 5000-5999, and 8000-8999 (see Table 3a and Figure 1)	-1.2941	.2662	23.6335	.0001
INDAVERAGE	Industries with average risk of negative OUTCOME for the auditor: SIC 7000-7999 (see Table 3a and Figure 1)	-1.0091	.3041	11.013	.0009
TOTALASSETS	Auditee total assets in thousands of US dollars (natural log used for regression)	-.0596	.046	1.6807	.1948
US	1 = US auditee; 0 = otherwise. Per corporation's principal executive office.	.0152	.3845	.0016	.9685

Chi-Square Statistic for the Proportional Odds Assumption (27 d.f.) = 231, p = .0001

Deviance Goodness of Fit Statistic (1,371 d.f.) = 819, p = .9999

Pearson Goodness of Fit Statistic (1,371 d.f.) = 1,465, p = .0381

Likelihood Ratio Statistic for Model, excluding intercepts (9 d.f.) = 120, p = .0001

Pseudo R squared = .2873

Adjusted Pseudo R squared = .3091

**Table 11:**  
**Polytomous Regression Results**  
**1996 through 2007, n=354**  
**Four Category Cumulative Logit (Proportional Odds) Model for Additional Analysis**

<b>Explanatory Variable Term</b>	<b>Explanatory Variable Description (See Table 2 for OUTCOME codes)</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>Wald Chi-Sq.</b>	<b>Two Sided Prob Value</b>
Intercept1		.2709	.6676	.1646	.6849
Intercept2		.9539	.6687	2.0346	.1538
Intercept3		1.5488	.6722	5.3083	.0212
BDO	1 = BDO Seidman; 0 = otherwise	-1.3806	.4092	11.3809	.0007
GT	1 = Grant Thornton; 0 = otherwise	-.9143	.3381	7.314	.0068
SOLO	1 = Sole practitioner; 0 = otherwise	2.1438	.3886	30.4369	.0001
BANKRUPT	1 = auditee bankruptcy 1 year before (or after) lawsuit filing; 0 = otherwise	.9284	.2928	10.0509	.0015
INDLOW	Industries with low risk of negative OUTCOME for the auditor: SIC 4000-4999 (see Table 3a and Figure 1)	-1.4817	.5194	8.139	.0043
INDBELOW	Industries with below average risk of negative OUTCOME for the auditor: SIC 2000-3999, 5000-5999, and 8000-8999 (see Table 3a and Figure 1)	-1.3593	.2764	24.1761	.0001
INDAVERAGE	Industries with average risk of negative OUTCOME for the auditor: SIC 7000-7999 (see Table 3a and Figure 1)	-1.1039	.3162	12.1891	.0005
TOTALASSETS	Auditee total assets in thousands of US dollars (natural log used for regression)	-.0768	.0481	2.5533	.1101
US	1 = US auditee; 0 = otherwise. Per corporation's principal executive office.	.0682	.391	.0305	.8615

Chi-Square Statistic for the Proportional Odds Assumption (18 d.f.) = 32, p = .0213

Deviance Goodness of Fit Statistic (1,026 d.f.) = 712, p = .9999

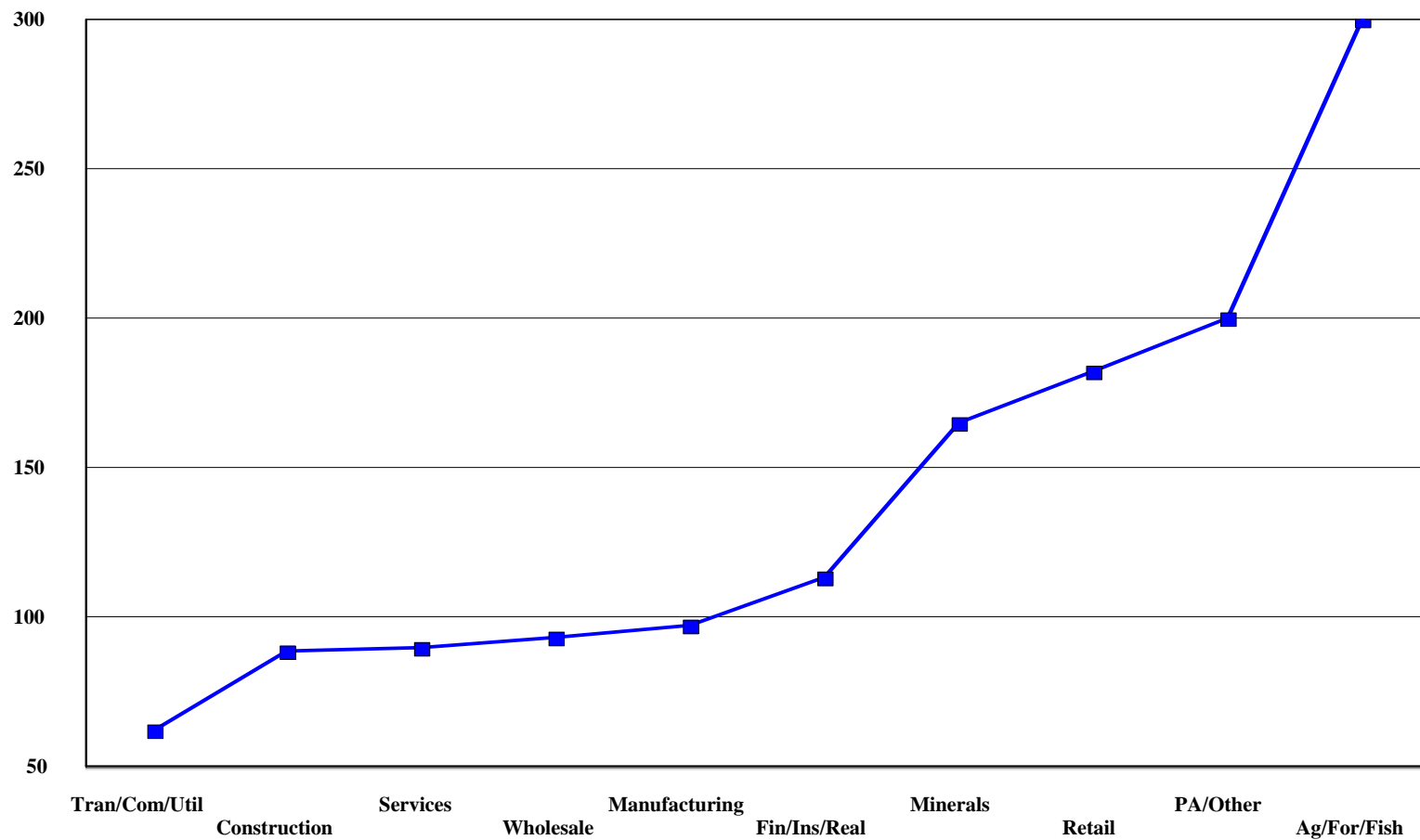
Pearson Goodness of Fit Statistic (1,026 d.f.) = 1,049, p = .3059

Likelihood Ratio Statistic for Model, excluding intercepts (9 d.f.) = 114, p = .0001

Pseudo R squared = .2752

Adjusted Pseudo R squared = .3048

Figure 1: Association of OUTCOME of the Auditor with Industry of the Auditee



NOTE: Industries arranged in sequential order from least risky (at left) to most risky (at right); see Table 3a.