Was It Market Power or Sarbanes-Oxley? An Analysis Using the Workhorse Audit Fee Model and Panel Data Techniques

Lawrance Evans, Jr.[a] and Jeremy Schwartz[b]

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[a]Assistant Director, Applied Research and Methods Group (Center for Economics) at the US Government Accountability Office, 441 G Street, NW, Washington DC 20548, phone: (202) 512 - 4902, email: evansL@gao.gov. The ideas and statements herein do not reflect or represent the official views of the Government Accountability Office in any way.

[b] Corresponding author. Loyola University Maryland, Department of Economics, 4501 North Charles Street, Sellinger 315, Baltimore, MD 21210, phone: (410) 617 - 2919, email: jsschwartz1@loyola.edu..

Abstract

The market for audit services continues to be highly concentrated, raising concerns about the potential for anti-competitive pricing and increasing the importance of precise estimates of concentration's effect on audit fees. This is especially important in the wake of new costs related to the internal control provisions mandated by Sarbanes-Oxley (SOX). Although panel data allows researchers to identify and measure effects that are not detectable in pure cross-sectional and time series designs, its use has not been fully exploited in the audit fee literature. This paper uses panel data techniques to analyze a data set of several thousand companies from 2000 to 2006. By exploiting variation across industrial sectors and over time, we are able to disentangle the impact of overall concentration and individual market power from other important determinants of audit fees, such as the Sarbanes-Oxley regulations. We find that the effect of greater market concentration on audit fees is only positive for the biggest clients and is dwarfed by the increased demand for audit service driven by SOX.

Keywords: Audit fees, panel data, fixed effects, market power, market concentration, Sarbanes-Oxley (SOX)

1. Introduction

The effect of concentration on the market for audit services has been the subject of intense research since Simunic's seminal work in the 1980 which analyzed an industry dominated by eight audit firms. In the three decades since, the market has become more concentrated particularly after the collapse of Arthur Andersen in 2001 which left just four top-tier firms. The increasingly tight oligopoly in the audit service industry raises concerns of anti-competitive pricing behavior in the audit industry. While traditional Industrial Organization theory (Bain, 1956) suggests that adverse effects would surface, more recent theories hypothesize that concentrated industries can still be very price competitive. In addition, empirical studies of the audit industry have not reached consensus on whether or not the handful of firms that dominate the audit industry are able to exert monopoly power. The purpose of this paper is to provide additional insight on the effect of concentration on audit fees, especially in the wake of the Sarbanes-Oxley provision which have placed more demands on auditors and their clients. We accomplish this by using panel data techniques that have not been leveraged by most researchers in this area.

Although panel data allows researchers to identify and measure effects that are not detectable in pure cross-sectional and time series designs, its use has not been fully exploited in the audit fee literature. As such, this paper investigates the effect of audit market concentration on audit fees using econometric techniques and data beyond the commonly specified workhouse audit fee model. In general, the existence of data on audit fees across firms and over time allow researchers the opportunity to use techniques that enhance the validity of parameter estimates and hypothesis tests by providing more variability, less collinearity among variables, more degrees of freedom and efficiency and the opportunity to account for heterogeneity across firms explicitly. Using an unbalanced panel data set containing observations on several thousand companies from 2000 to

2006, we investigate the relationship between higher market concentration and audit fees, given that the structure of the market for audit services continues to raise concerns about the potential for anti-competitive pricing. Because we exploit variation across industrial sectors and over time we are able to separately estimate the impact of overall concentration and individual market power from the impact of the Arthur Andersen collapse and the new Sarbanes-Oxley (SOX) regulations governing publicly traded companies and their auditors. The fixed effect specification also helps to mitigate some of the concerns with omitted variable bias inherent in the workhorse audit fee model. As a sensitivity analysis we utilize sample probability weighting, to investigate whether the results are sensitive to the unbalanced nature of the data. Finally, we use our results to produce a simulation of a counter-factual world where Arthur Andersen did not fail and a simulation where SOX was not enacted.

The paper proceeds as follows: The next section provides background on the market for audit services and Section 3 discusses the link between audit fees and auditor size. Section 4 discusses our methodology and its advantages over the standard workhorse audit fee model. In Section 5 we discuss our data and present results in Section 6. We make concluding remarks in Section 7.

2. Market for Audit Services

In the last decade the extent to which large audit firms can exert anti-competitive pricing power has garnered a great deal of debate, in large part, due to an increase in average fees over the last several years and two important events affecting the audit industry. The first critical event was the collapse of the third largest accounting firm, Arthur Andersen, in 2001.[2] Prior to its collapse, Arthur Andersen, along with PriceWaterhouseCoopers (PWC), Ernst and Young (E&Y), KPMG

[2] Arthur Andersen had the third largest market share by audit fees in 2000, based on our sample, which we discuss in Section 4.

and Deloitte and Touche (D&T), accounted for 97.3% of the fees paid by publicly traded companies for audit services. This group is often referred to as the Big 5, prior to the collapse of Arthur Andersen, and the Big 4 after the company's failure. We refer to both groups as top-tier audit firms.[3] Five years after the collapse of Arthur Andersen, its market share was largely absorbed by the remaining top-tier firms, suggesting an already tight oligopoly had become even tighter.

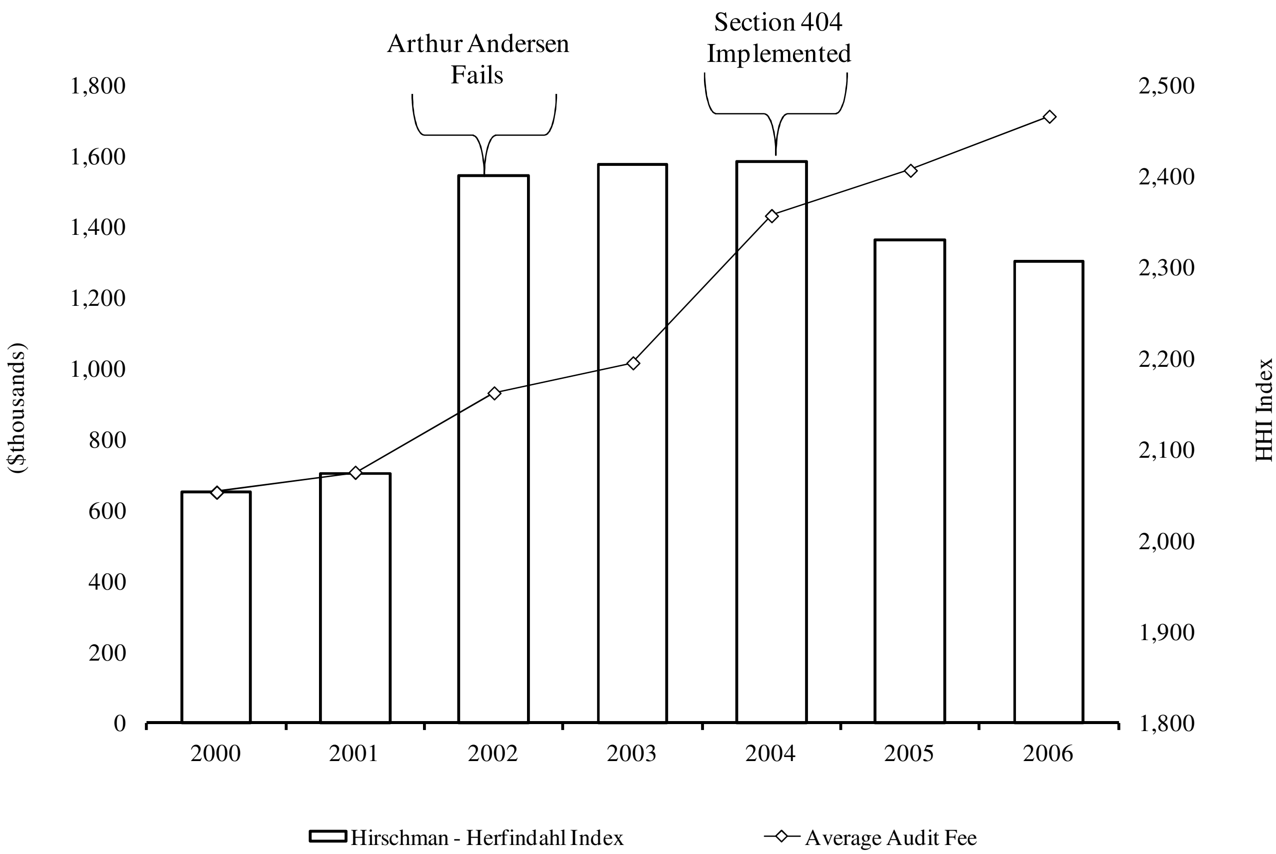
The second major event was the passage of the Sarbanes-Oxley Act, which put additional accounting regulations in place in order to prevent future accounting scandals similar to the Enron and WorldCom incidents, among others. One of its most costly provisions was Section 404, which accelerated filers - those with market capitalizations greater than $75 million - began to implement in 2004. Section 404 increases the effort involved in the audit of a public company since the provision requires public corporations to review their internal controls and have their auditors attest to their adequacy.[4] The additional scrutiny also increases the liability risks of the auditor. Moreover, Title II of the act requires auditors to remove themselves from any non-audit work, which may further restrict auditor choice and possibly increase market power.[5]

The basis for the growing concern over anti-competitive power during this period is clear from the Herfindahl – Hirschman Index (HHI), which measures the extent of market concentration within an industry (Section 3 defines the HHI in further detail). Figure 1 graphs the index along with the average fees paid by clients during the year. In 2000, the HHI was already well above 1,800. At this level the U.S. Department of Justice (1997) expresses concern that monopoly pricing power may develop, stating in its *Guidelines for Horizontal Mergers* that "[w]here the post-merger HHI exceeds 1,800, it will be presumed that mergers producing an increase in the HHI of more than 100

[3] The term top-tier is not necessarily used as indication of quality, since smaller firms like Grant Thornton and BDO are considered by many to deliver high quality audits to public company clients.
[4] Recently, a provision in the Dodd-Frank Act exempted some small companies from compliance with Section 404.
[5] Note that some tax work can still be performed by the auditor.

points are likely to create or enhance market power or facilitate its exercise" (Section 1.5). The HHI increased by almost 350 points following the collapse of Arthur Andersen, which coincided with a large increase in average audit fees. The average audit fee continues its upward trend after the implementation of Section 404, consistent with Griffen and Lont's (2007) estimates that provisions of the legislation resulted in larger fees. The goal of this paper is to disentangle the effect of greater market concentration on the market for audit services from the impact of Sarbanes-Oxley.

Figure 1 - HHI and Audit Fees



3. Auditor Size and Audit Fees

While traditional industrial organization theory states that increases in market concentration will lead to anti-competitive practices, more contemporary theories suggest that this need not be the case. Bain (1956) establishes the traditional structure-conduct-performance (SCP) paradigm. In this context, the basic environment of the audit industry results in its structure. For instance, the existence of large national and multi-national corporations, which require auditing several locations, provides efficiencies for large audit companies with an extensive office network. This structure of a few large companies, in turn allows for anti-competitive behavior. As a result the SCP paradigm suggests a need for monitoring of industrial concentration and regulation.

However, new industrial organization theory (see Krousse, 1990; Farrell and Shapiro, 1990) disputes the linearity between structure, conduct and performance and instead suggests that pricing and firm sizes are endogenously determined. In this case the demand for higher quality audits from some clients may result in the joint determination of large firms, capable of producing higher quality audits and higher prices for the high quality services. Alternatively, Beattie et al.'s (2003) discussion of new industrial organization theory and the audit market, suggests that greater concentration can lead to efficiencies and cost savings, which may be passed to auditors' clients through lower fees. Further, the Bertrand model, used by Morgan and Stocken (1998) and Gigler and Penno (1995) to study the audit market, suggests that an industry with a small number of firms can compete quite strongly over price. Also, Stiglitz (1987) develops a model where searching for prices is costly, which is likely the case in finding an auditor. Fewer firms may be associated with a lower price as it is easier for the customers to sample all the firms in the industry. In light of these theories it is not clear whether greater concentration in the audit market is associated with less competition and greater audit fees.

There are several competing theories that seek to explain the relationship between auditor firm size and audit fees. Hay, Knechel and Wong's (2006) meta-analysis indicates that a premium for audit services from top-tier firms is a strongly significant result in the audit fee literature. This premium may come from either higher quality audits or as a result of greater market power. In contrast, while a premium for top tier audit services is found in most empirical studies, economies of scale for the top tier firm could create cost savings that, when passed to clients, result in lower audit fees.

There are several reasons why larger audit firms may produce higher quality audits that result in higher fees. De Angelo (1981) theorizes that the decision to provide a high quality audit for a given client is a balance between exposing management's mistakes, and possibly losing the client, or subsequently being exposed as providing poor quality audits and losing many other clients. Auditors with more clients have more to lose by lowering quality and consequently produce a higher quality audit. Francis and Wilson (1988) test De Angelo's (1981) reputation theory against an alternative of brand investment and argue that large audit firms make the strategic decision to invest in a brand that will command a premium. Consequently, large firms provide higher quality audits to maintain the brand and ensure they can continue to charge the premium. Using proxies for each theory, the authors find empirical evidence for the brand theory. Using a similar panel data framework as this paper, the Government Accountability Office (2008) also finds that the correlation between auditors' market share, by industrial sector, is likely the result of higher quality audits rather than greater monopoly power.

Researchers have also shown that the top tier firms perform higher quality audits by examining data on auditors' effort. Palmrose's (1986) study of the Big 8 fee premium indicates that top tier firms exert greater effort in the audit process. In addition, Blokdijk, Simunic and Stein (2006) examine the allocation of time across different phases of the audit process and find that top tier auditors allocate their time differently than other auditors, which implicitly signals they are providing a differentiated product.

Rather than quality differentiation, the top tier fee premium may result from monopoly power. Oxera's (2006) comprehensive study of the U.K. industry post-Arthur Andersen's failure suggests market manipulation by the top tier firms and that considerable problems may occur if the industry consolidates further. Feldman (2006) also supports the idea of monopoly power. The authors examining the period surrounding Arthur Andersen's collapse along with variation in industry market concentration to analyze whether or not there is an increase in market power. The author finds that a higher HHI is significantly associated with higher audit fees. Cadman and Stein (2007) show that market shares are positively correlated with audit fees in industries where a small number of auditors have a dominant market share. Using measures of quality, the authors conclude that their results are due to market power and not quality differentiation. The literature is far from settled however. For example, Beattie et al (2003) finds the U.K. audit market to still competitive even after the collapse of Arthur Andersen.

While most researchers find a premium for audit services from top tier auditors, others have found that these auditors do not charge higher fees, but rather provide lower cost audits - due to economies of scale - than non-top tier firms. Simunic (1980) finds a significant auditor premium for one large firm, but also finds evidence of economies of scale in the remaining top tier firms (seven at the time of the study). Francis and Stokes (1986) provide evidence that diseconomies of scale result in smaller auditors charging higher audit fees. Also, Chaney et al (2004), after correcting for selectivity bias in private firms, support the notion that larger audit firms can produce lower cost audits.

Evaluating these competing theories involves both an appropriate model and careful measurement of market power, quality and expertise. In the following sections, we argue that a fixed effects model, along with industry specific measurements of the competitive environment, provides more precise estimates than the standard workhorse cross-sectional model of audit fees. It is also important to control for the effect of SOX on audit fees since the literature in this area has suggested a sizeable effect of these regulations on audit fees, especially for smaller and more complex firms (Ahmed et al., 2010, Linck, et al., 2009, Raghunandan and Rama, 2006). Moreover, some evidence suggests that the costs of SOX are not limited to one-time expenses related to internal control provisions but are recurring and significant (Ahmed et al., 2010).

4. METHODOLOGY

The workhorse of the audit fee literature is the standard cross-sectional audit fee model which has its roots in Simunic's (1980) seminal work on the pricing of audit services. The author theorizes that demand for external audit services is driven by balancing potential liability against the costs of internal and external audit services. In turn the complexity of the audit, and the effort it requires, determines these costs. Simunic's (1980) work justifies a cross-sectional linear regression model that includes factors influencing costs and liability.

The standard audit fee model takes the form:

$$\ln(f_i) = \alpha + \beta X_i + \gamma Z_i + \delta W_i + \epsilon_i \qquad (1)$$

where f_i is the audit fee, X_i represents the size of the firm, Z_i is a vector of proxies of the firm's risk and complexity, and W_i is a vector of measures of the competitive environment. The parameter vectors, β and γ, are likely positive given that larger, more complex and riskier firms require more resources to complete the audit and increase the auditor's expected liability. The factors related to the competitive landscape include higher audit quality and the monopoly power a client's auditor potentially exerts. It is important to note that lower fees may result from economies of scale or from the monopsony power of the client. As a result, the parameter vector δ may include positive and negative elements.

As we discuss in the Introduction, the standard cross sectional approach has two weaknesses: (1) much of the variation in the industry is across time rather than across clients, and (2) much about the client is unobservable and consequently a cross-sectional model will likely suffer from some degree of omitted variable bias. In order to address these two concerns our empirical model augments the standard cross-sectional audit fees model with repeated firm observations over the 2000 to 2006 period using a panel data approach. The model takes the following form:

$$\ln(f_{it}) = \alpha + \beta X_{it} + \gamma Z_{it} + \delta W_{it} + \epsilon_{it} \quad (2a)$$

$$\epsilon_{it} = \mu_i + e_{it} \quad (2b)$$

Equation (2a) is the panel data equivalent to equation (1). We simply augment the model with time subscripts to reflect the dynamic nature of the data. Equation (2b) allows the econometrician to model the error terms with a cross-section specific effect, μ_i, and a standard white noise residual, e_{it}. The cross-section specific effect allows us to control for all time invariant client attributes which avoids the omitted variable bias issues found in other papers in the literature. For instance, if a specific firm has poor information systems, which make the audit more difficult and results in higher cost audits, this will be absorbed in μ_i. We see this as a major advantage to other papers, with many of the models in this paper typically explaining close to 95% of the variation in audit fees.

In principle, the econometrician has two options in modeling μ_i, a random or a fixed effect. A random effects model assumes that μ_i is a random draw for each cross-section, in which case its interpretation is an additional component of the error term. This model is appropriate when μ_i is uncorrelated with the covariates. Alternatively, the fixed effects model assumes that each μ_i is fixed to a specific cross-section, in which case its interpretation is a specific constant term for each cross-section. This model is appropriate when μ_i is correlated with the covariates. To determine which model is appropriate we test for the correlation between μ_i and the covariates using a Hausman test and report the results along with our estimates in Section 6. In all cases we find that a fixed effects specification is appropriate, but also estimate a random effects specification as a robustness check. In both cases we are able to exploit time variation, as well as control for unobserved heterogeneity.

5. Data

Our data source is similar to that used in Government Accountability Office (2008), which uses the Audit Analytics database from the Ives Group, Incorporated. The database has both information about audit engagements, including audit fees, as well as demographic and financial information about the client. The data starts in 2000, with some years having almost ten thousand public companies. From a total of 57,209 client – year observations, we put several restrictions on the sample. First, we eliminate 2,427 observations that report more than one auditor during the year, so there is no confusion on which firm is auditing the client. We then remove all trusts and blank checks, for 3,144 additional observations. Our final restriction is that all observations must have complete information on our covariates, which brings our total sample to 43,239 year-client observations, which is larger than any of the studies Hay et al. (2004) reports. Each observation in our sample is observed at least twice, although most observations are not observed in each of the seven years. There are several reasons why we do not observe every client in a given year. Most importantly, it was not until 2001 that firms were required to report their audit fees. As a result, our sample for 2000 and 2001 includes 3,334 and 5,202 observations, while 2006 includes 6,527 observations. In addition, security issuers enter our sample through the period while other firms enter bankruptcy, merge with others, or go dark, leaving the sample.

An unbalanced panel data set can create standard selection bias issues if missing data is correlated with the outcome (see Hausman and Wise, 1979; Heckman, 1979). While exits and entrants from our sample are relatively small, non-reporting of audit fees prior to the SEC requirement represent a large portion of the sample and may bias our results if the missing sample is correlated with audit fees. This may be plausible if those paying higher fees were less likely to report these costs. For large (greater than $250 million in assets) and small clients (less than $250 million in assets), Table 1 presents 2006 means for audit fees as a percent of assets for firms that did and did not report fees in 2000. While the differences between 2000 and non-2000 reporters of fees are relatively small for large firms, for smaller firms the differences are much larger, with those firms that did not report their fees in 2000 having much larger average fees per dollar of assets in 2006. As a result, we introduce several sensitivities to our analysis, including probability sampling, limiting the sample to periods to where the SEC requires fee disclosure and limiting the sample to large firms to ensure our results are not driven by sample selection.

Table 1: 2006 Fees per Asset for Firms that Did and Did Not Report 2000 Audit Fees

	>$250 million in assets		<$250 million in assets	
	Did Report N=1,239	Did not Report N=2,052	Did Report N=619	Did not Report N=2,610
Fees / Assets	0.0012	0.0014	0.0620	0.2368

Note: Sample restricted to companies with greater than $100 in assets.

Table 2: Variable Definitions and Anticipated Sign

Variable	Anticipated Sign	Description
FEES		Total audit and audit-related fees paid in 2006 dollars
Size Risk and Complexity		
ASSETS	+	Assets of the client in 2006 dollars
LOSS	+	Binary variable, one if company had a loss in a given year
GC	+	Binary variable, one if a going concern opinion was issued
RESTATE	+	Binary variable, one if client restated financials during the year
LATE	+	Binary variable, one if client filed a notice of non-timely filing during the year
BUSY	+	Binary variable, one if the client's fiscal year ends during the busy season (December)
Sarbanes-Oxley		
POSTSOX	+	Binary variable, one if audit year occurs after the Sarbanes-Oxley Act was passed on July 24, 2002
INTERNAL	+	Binary variable, one if client completed the Sarbanes-Oxley Act Section 404 review
INADEQ	+	Binary variable, one if client's internal controls were found inadequate
Competitive Environment		
EXPERT	+	Binary variable, one if client's auditor audits 10 percent or more of all clients in a particular industry sector
HHI	+	HHI (defined by total audit fees) for two-digit NAICS code
SHAREFEES	+	Percentage of the market (defined by audit fees) audited by a company's auditor
CI	-	Fees paid by the client as a percentage of total revenues for the client's auditor within the client's industry.

In addition to audit fees, the large scope of the Audit Analytics data allows us to include several variables that describe the size, risk and complexity of the audit. However, the variables available to us in the Audit Analytics database do not cover all the variables the audit fees literature utilize, such as the number of subsidiaries or specific attributes from individual auditor offices. While these variables are available from other sources, linking to them would invariably further limit our sample size. Since, we view our large sample as one of the contributions of this article, we limit the scope of covariates to those available to us in the audit analytics database. In addition, to the extent that any additional variable is time invariant, their effect will be captured in the client fixed effects and their omission does not bias our results.

Table 2 defines each of these variables and their anticipated sign. The dependent variable in our model is the log of total audit fees expressed in constant 2006 dollars.[6] In Hay et al.'s (2006) meta-study, the size of the corporation can explain over seventy percent of the variation in fees with total assets being the most common measure of size. We also use the log of assets to capture the size and scope of the audit and anticipate a positive coefficient. To proxy for the riskiness of the company, we include separate indicator variables that are one if the company experiences a loss in the year (LOSS), if the firm's auditor issues a going concern (GC) opinion, if the firm files a restatement in the prior year (RESTATE), and if the company files their financial statements late (LATE). We anticipate that the sign of all of these variables will be positive. Charles et al. (2010) provide evidence that the relationship between audit fees and financial reporting risk increased significantly in 2002, due in part to increased business and litigation risk faced by auditors. The variables are intended to capture elements of that risk not captured by other variables. We also include an indicator variable (BUSY) that is one if the firm's fiscal year ends in the last quarter of

[6] Our dependent variable includes both audit fees and audit related fees. Audit related fees include charges for due diligence internal controls or other services normally performed by the independent auditor.

the calendar year. Given the higher demand for audit services during this period, we expect this variable to also have a positive coefficient.

Many of these variables differ greatly between large (greater than $250 million in assets) and small corporations (less than $250 million in assets). Table 3 provides descriptive statistics for the variables in the sample and it is clear that large and small corporations differ greatly. Small companies are more likely to report a loss, to have a going concern opinion issued and to report late. Larger corporations are somewhat more likely to report during the busy season. Given these differences, we provide sensitivities in the next section to see if there are differences in our estimates by company size.

We include three variables that measure the impact of Sarbanes-Oxley on the market for audit fees. Our first variable (SOX) is one for all filings after the passage of SOX.[7] While accelerated filers were not required to implement Section 404 until 2004, starting this indicator early may capture two effects. The first is Title II of the legislation, which strengthens the rules governing the non-audit activities auditors could perform for their audit clients. The second effect is from higher fees firms may incur in preparing for the internal controls review and the greater risk auditors may perceive in conducting the review. Moreover, Linck et al. (2009) find that SOX impact the supply and demand for directors which led to increases in Director and Officer insurance premiums, director pay and overall director costs, particularly among smaller firms. While we cannot separate these two effects, we believe that the impact of Title II is likely minor, since the choice of an auditor likely dominates that of a consultant, where more options are available. Firms would likely change consultants in order to accommodate their choice of an auditor, limiting the

[7] This variable takes on a value of one for all public companies who fiscal year ends after July 24, 2002. Companies whose 2002 fiscal year ended before July 24, 2002 were not subject to the new requirements. As a result the SOX dummy is not collinear with the yearly time dummies in the model.

effect of Title II on auditors' market power. As a result, we interpret the SOX variable as greater risk and preparation costs associated with the internal controls review and more importantly captures an important structural break in the data that would not be captured by time dummies alone. We also include an indicator variable that indicates whether an internal controls review was conducted in the year (INTERNAL). Among small companies (defined as less than 250 million in assets), just 21.9 percent completed an internal control review after 2003, while 66.6 percent of large firms completed such a review. This reflects the exemption for non-accelerated filers from Section 404 during the sample period. Despite this exemption, we do find that 10.5% of non-accelerated filers still conduct an internal controls review. The final indicator variable takes the value one if the internal controls were found to be inadequate (INADEQUATE). After 2003, five percent of the total sample (those with and without a review) were found to have inadequate internal controls. Lastly, recent evidence suggests that the rules and regulations under SOX significantly altered the litigation and business risk faced by auditors (Charles, et al., 2010).

Table 3: Descriptive Statistics by Firm Size

Variable	Full Sample	<$250 million in Assets	>$250 million in Assets
FEES	1,371,290	219,801	2,570,125
	(4,537,207)	(301,127)	(62,536)
Size Risk and Complexity			
ASSETS ($millions)	6,970	60	142,000
	(57,402)	(68)	(81,400)
LOSS	0.367	0.558	0.167
GC	0.130	0.235	0.021
RESTATE	0.082	0.086	0.079
LATE	0.166	0.254	0.074
BUSY	0.728	0.681	0.775

Variable	Full Sample	<$250 million in Assets	>$250 million in Assets
Sarbanes-Oxley (2004 – 2006)			
INTERNAL	0.438	0.219	0.666
INADEQ	0.050	0.033	0.068
Competitive Environment			
EXPERT	0.633	0.449	0.826
HHI	2,476	2,469	2,484
	(382)	(373)	(392)
AUDITSHARE	0.163	0.110	0.215
	(0.135)	(0.129)	(0.119)
CLIENTSHARE	0.172	0.284	0.056
	(0.325)	(0.398)	(0.154)

Note: Standard deviations are in parentheses.

In order to evaluate the competitive environment of the audit industry, we take the view point that the audit is a differentiated product based on the client's industry. This view is supported by Palmrose (1986), Chen and Elder (2001), Feldman (2006), and Cadman and Stein (2007), among others, who examine audit fees at the industry level. If the audit product is differentiated by industry we may be more worried about the competitive environment and monopoly power at the industry level of the client. Within two digit North American Industrial Code System (NAICS) industry segments, the audit market is, in many instances, not dominated by four firms but just one or two. For instance, in the agriculture sector in 2006, E&Y had almost 80 percent of the market share, with the next highest auditor, KPMG, having just 12 percent and PWC just 5 percent. Similarly, in 2006, D&T had a dominant market share in the utilities sector with over 50 percent of the revenue and with the next largest auditor, PWC, having a 27 percent share. If clients must retain auditors with the ability to perform an audit in their specific industry, the effects of market concentration may be amplified.

In order to measure the competitive environment at the industry level, we consider four measures, all at the 2 digit NAICS code industry level. The first measure, AUDITSHARE, is each auditor's market share defined by audit fees within each industry-year cell. In the sample, smaller clients are audited by smaller auditors. The average market share for smaller clients' auditors is 11% compared to 21.5% for larger firms. Many early studies (see Palmrose, 1986; Francis and Simon, 1987; and Francis and Wilson, 1988) rely solely on market share and industry experts, which researchers determine using some function of market share. With only these variables, the researcher is left to provide additional evidence or reasoning why each variable captures audit quality rather than market power. More recent studies (see Pong, 1999; Bandyopadhyay and Kao, 2004; Feldman, 2006) recognize the HHI as a superior measure of concentration in the audit industry. The HHI for each industry (*j*) in each year (*t*) is:

$$HHI_{jt} = \sum_{k=1}^{K} (100 X AudShare_{kjt})^2 \quad \textit{for } t=2000,\ldots,2006,\ j=1,\ldots 24 \qquad (3)$$

The HHI is simply the sum of the squared market share for each auditor within each industry-year cell. We prefer the HHI to market share, as a measure of market power, since it considers not only the status of the client's auditor, but the market shares of all auditors that are auditing clients within the industry. An industry that has two auditors each with 50% of the market may perform differently from an industry where one auditor has a 50% market share, but there are five other smaller, but still large, auditors with a 10% share. Consequently, the HHI in our model captures the effects of market concentration. Further, we interpret market share, when also controlling for market concentration, through the HHI, as a measure of the audit quality as in Francis and Wilson (1988).

Bandyopadhyay and Kao (2004) and Casterella et al. (2004) have also shown that, in addition to the size of the auditor, the relative size of the client may be important in determining audit fees. Large clients may be able to exert monopsony power and command lower fees. To account for this, we also construct a variable CLIENTSHARE. We define this variable as the client's audit fees as a percentage of their auditor's total revenues within the client's industry. Since, smaller firms are audited by smaller third-tier auditors, client influence tends to be higher among smaller firms. Finally, since Simunic (1980), researchers have cited the possibility that economies of scale may lower audit fees. One source of economies of scale is an auditor's industry specific expertise. We designate an auditor as an expert if their share of the total number of clients in an industry is above ten percent. Over half of the sample and more than four-fifths of large firms are audited by an expert.

These measures provide the basis for describing the size, risk and complexity of the client, as well as the effect of SOX and the competitive environment. In addition to these variables, client-specific fixed effects account for unobservable time-invariant heterogeneity and annual fixed effects, dummy variables for each year from 2000 to 2006, account for common unobserved factors impacting all firms in a particular year.

6. RESULTS

6.1 Sarbanes-Oxley

Table 4: Fixed Effects Results: Sarbanes Oxley Variables Only

	Complete Sample (1) N= 43,239	>$250 million (2) N= 21,184	<$250 million (3) N= 22,055	>$1 billion (4) N= 11,746
CONSTANT	4.9058**	2.4042**	7.1814**	2.8784**
	(41.9221)	(6.0981)	(56.6393)	(4.3213)
LOG(ASSETS)	0.3733**	0.5032**	0.2310**	0.4847**
	(60.6435)	(27.0502)	(31.6026)	(15.8923)
LOSS	0.0359**	0.0652**	0.0456**	0.0675**
	(4.0527)	(5.3331)	(4.1074)	(4.0049)
GC	0.1933**	0.1173*	0.0903**	0.1037
	(10.0696)	(2.5170)	(4.6724)	(1.7102)
LATE	0.1030**	0.1633**	0.1002**	0.1823**
	(9.2961)	(10.0331)	(7.3402)	(8.3844)
BUSY	0.1371**	-0.0620	0.1937**	-0.0156
	(3.8373)	(-0.9169)	(3.8444)	(-0.1442)
POSTSOX	0.0950**	0.1604**	0.0097	0.1201**
	(6.0227)	(7.6178)	(0.4560)	(4.1888)
INTERNAL	0.4443**	0.4179**	0.5388**	0.3582**
	(45.4063)	(33.2265)	(29.9449)	(22.4279)
INADEQ	0.2309**	0.1899**	0.2214**	0.1808**
	(11.3498)	(8.4077)	(5.3426)	(6.2380)
Cross Section Fixed Effects	Y	Y	Y	Y
Period Fixed Effects	Y	Y	Y	Y
Other Statistics				
σ_e	0.4728	0.3817	0.4668	0.3575
R^2 [1]	0.9197	0.9268	0.8496	0.9230
F-statistic	52.9219	54.9854	21.5221	49.1280
Durbin Watson Statistic	1.8042	1.7085	1.9704	1.6822
Hausman Test	994.2134	546.1017	1111.6074	165.5001

Note: t-statistics are in parentheses, based on White's standard error.

** and * indicate significance at the 1% and 5% levels.

In this section, we consider the effects of Sarbanes-Oxley alone without controlling for the competitive environment. Table 4 presents the results, which include estimates for the whole sample (Column 1), for companies with greater than $250 million in assets (Column 2), for firms with less than $250 million in assets (Column 3) and firms with greater than $1 billion in assets

(Column 4). In each case, the models include cross-section and period fixed effects. The models explain more than 80 percent of the variation and, in most cases, more than 90 percent. The Durbin-Watson statistic reveals that auto-correlation is not an issue and the Hausman tests indicate that the fixed effects model is appropriate.

The control variables in the estimates for the full sample all have the expected sign. The coefficient on LOG(ASSETS) is 0.3733 and is somewhat lower for smaller firms (Column 3) and somewhat higher in larger firms (Columns 2 and 4). The positive sign reflects the additional costs for auditing larger firms. In all cases, LOSS, GC and LATE are all positive and significant, indicating that riskier firms pay higher fees. The BUSY variable also has the expected sign, for the full sample and for small firms, but for the large firm subsamples it is statistically insignificant.

The Sarbanes-Oxley variables indicate that the legislation substantially increases audit fees. The POSTSOX period increases fees by 11% for the entire sample. However, in the larger firm subsamples, this was as much as 17%, while the POSTSOX variable was not significant for smaller firms.[8] This may again reflect the fact that many smaller firms were exempt from the internal controls review during the sample period, while larger firms may have incurred significant costs in this period complying with SOX. In both large and small firms however, an internal controls review led to an increase in audit fees, as indicated by the coefficient on the INTERNAL variable. Larger firms seem to incur the smallest increase as a result of the internal controls review, with those over one billion dollars seeing an increase of 43%, while small firms audit fees increased by 72%. This may reflect larger firms' ability to utilize in-house capital and human resources to deal with the additional workload that SOX requires, while smaller firms may have to rely on their external auditors. A similar pattern emerges for the effect of an inadequate controls finding and

[8] The percentage impact for dummy variables is calculated by the exp(coefficient) -1.

firm size, although the magnitude is not as striking. An inadequate internal control finding increases fees for smaller firms by 25%, while the largest firms see an increase of 20%. Using the results from the complete sample, after 2003, a small firm that has an internal controls review and is found to have inadequate controls, had audit fees that are on average 97 percent higher than if the legislation was not in effect. Nevertheless, these findings are consistent with Ahmed et al (2010) which finds the cost of SOX are more significant for smaller firms.

6.2 Competitive Environment

Table 5: Fixed Effects Estimates: Competitive Environment

	(1) N= 43,239	(2) N= 43,239	(3) N= 43,239
CONSTANT	4.3867**	6.5897**	8.3614**
	(11.0573)	(14.0505)	(19.1629)
LOG(ASSETS)	0.3731**	0.3456**	0.2626**
	(60.6431)	(53.1202)	(44.33394)
BIGCO	----	-3.3063**	-1.6072**
		(-5.8882)	(-3.2214)
LOSS	0.0359**	0.0433**	0.0334**
	(4.0470)	(4.9938)	(4.2863)
GC	0.1932**	0.1764**	0.1269**
	(10.0606)	(9.4497)	(7.9424)
LATE	0.1033**	0.1071**	0.1213**
	(9.3210)	(9.7947)	(12.6142)
BUSY	0.1366**	0.1317**	0.1331**
	(3.8239)	(3.7723)	(4.3941)
POSTSOX	0.0944**	0.0901**	0.0674**
	(5.9819)	(5.7682)	(4.5565)
INTERNAL	0.4441**	0.4422**	0.3707**
	(45.3736)	(45.3913)	(40.9927)
INADEQ	0.2309**	0.2233**	0.2201**
	(11.3477)	(10.8848)	(11.6355)
LOG(HHI)	0.0676	-0.1674**	-0.0771
	(1.3686)	(-2.8685)	(-1.4026)
*LOG(HHI)*BIGCO*	----	0.4661**	0.2450**
		(6.4771)	(3.8311)
LOG(AUDITSHARE)	----	----	0.2572**
			(47.2729)
EXPERT	----	----	-0.3174**
			(-16.6114)
CLIENTSHARE	----	----	0.8994**
			(31.5128)

	(1) N= 43,239	(2) N= 43,239	(3) N= 43,239
Cross Section Fixed Effects	Y	Y	Y
Period Fixed Effects	Y	Y	Y
Other Statistics			
σ_e	0.4728	0.4687	0.4257
R^2 [1]	0.9197	0.9197	0.9349
F-statistic	52.9204	53.89847	66.0705
Durbin Watson Statistic	1.8037	1.8024	1.7862
Hausman Test	1011.7972	1106.2794	982.475762

Note: t-statistics are in parentheses, based on White's standard error.

** and * indicate significance at the 1% and 5% levels.

Table 5 introduces the competitive environment variables into the full sample fixed effects model. The results for both the control variables and the SOX variables are largely unchanged for all the specifications in this table. In the first column, we introduce only the HHI variable in log form. While the variable is positive, indicating a 0.07% increase for every 1% increase in the HHI, the coefficient is not significant. In Column (2), we interact the LOG(HHI) with a dummy variable BIGCO that is one for companies with assets greater than $250 million. LOG(HHI) alone is *negative* and significant, providing evidence that, for smaller firms, greater concentration actually leads to lower fees. This is consistent with Bertrand and Stiglitz (1987) type competition, where a few firms can compete quite intensively over price. For larger firms BIGCO*LOG(HHI) is also significant and, taken with the coefficient for LOG(HHI) alone, suggests that for larger firms greater competition can lead to higher fees consistent with the traditional Bain (1956) SCP framework. In Column (3) of Table 5, we introduce the remaining competitive environment variables, LOG(AUDITSHARE), EXPERT, and CLIENTSHARE. In this case LOG(HHI) is still negative, but not significant, while LOG(HHI)*BIGCO still suggests greater concentration leads to higher fees for large firms. The LOG(AUDITSHARE) variable is positive and highly significant.

As mentioned, in many papers this variable alone is seen as a proxy for market concentration. However, given that we have already controlled for market concentration using the HHI, we interpret AUDITSHARE as a proxy for higher quality. The positive coefficient is likely a result of the ability of big firms within the industry being able to perform higher quality audits. We also find evidence of economies of scale among "expert" auditors within each industry. Auditors that are above our ten percent threshold for being an expert pass on a reduction in audit fees of -27%. The final competitive environment variable, CLIENTSHARE, does not seem to capture monoposony power given the positive and significant coefficient. Since the CLIENTSHARE variable captures the size of the client relative to their auditor's other clients within the industry, this variable may indicate some underlying complexity that is not being picked up elsewhere.

6.3 Sensitivity Analysis

TABLE 6: ALTERNATE SPECIFICATIONS

	Fixed Effects	Pooled OLS	Random Effects	Probability Weighted
	(1)	(2)	(3)	(4)
	N= 43,239	N= 43,239	N= 43,239	N=43,239
CONSTANT	8.3614**	10.3992**	8.9979**	NA
	(19.1629)	(33.6427)	(26.2744)	
LOG(ASSETS)	0.2626**	0.3508**	0.2815**	0.2703**
	(44.33394)	(92.6677)	(63.6417)	(46.87322)
BIGCO	-1.6072**	-7.4595**	-2.8089	-0.7878
	(-3.2214)	(-17.8379)	(-6.8120)	(-1.4938)
LOSS	0.0334**	0.2336**	0.0626**	-0.0470**
	(4.2863)	(26.9114)	(8.8861)	(4.9981)
GC	0.1269**	0.4087**	0.1670**	0.1437**
	(7.9424)	(28.2287)	(12.1341)	(7.9244)
LATE	0.1213**	0.2176**	0.1305**	0.1383**
	(12.6142)	(18.4146)	(14.5404)	(11.9859)
BUSY	0.1331**	-0.0214*	0.0663**	0.1215**
	(4.3941)	(-2.4425)	(4.5712)	(4.30430)
POSTSOX	0.0674**	0.1211**	0.0703**	0.0704**

	Fixed Effects	Pooled OLS	Random Effects	Probability Weighted
	(1)	(2)	(3)	(4)
	N= 43,239	N= 43,239	N= 43,239	N=43,239
	(4.5565)	(4.7150)	(4.6219)	(5.2218)
INTERNAL	0.3707**	0.4444**	0.3868**	0.3792**
	(40.9927)	(35.6620)	(45.5418)	(37.0481)
INADEQ	0.2201**	0.3475**	0.2339**	0.2584**
	(11.6355)	(14.1885)	(13.6320)	(13.4379)
LOG(HHI)	-0.0771	-0.5746**	-0.2055**	-0.0435
	(-1.4026)	(-15.0237)	(-4.7979)	(-0.7320)
*LOG(HHI)*BIGCO*	0.2450**	0.9690**	0.3965**	0.1301
	(3.8311)	(7.4982)	(7.4982)	(1.9219)
LOG(AUDITSHARE)	0.2572**	0.2382**	0.2574**	0.2437**
	(47.2729)	(70.4594)	(65.4513)	(44.1048)
EXPERT	-0.3174**	-0.0282	-0.2541**	-0.2718**
	(-16.6114)	(-1.7397)	(-16.2313)	(-13.7575)
CLIENTSHARE	0.8994**	0.99644**	0.9144**	0.8756**
	(31.5128)	(53.1086)	(43.8442)	(30.0996)
Cross Section Fixed Effects	Y	N	N	Y
Period Effects	Y	Y	Y	Y
Other Statistics				
σ_e	0.4257	0.7707	0.4329	0.39779
R^2 [1]	0.9349	0.7865	0.7225	0.67514
F-statistic	66.0705	7966.2680	5929.3240	4492.314
Durbin Watson Statistic	1.7862	0.4770	1.3547	1.7771

Note: The constant is not available for column (4) since we have run weighted least squares on the demeaned data.
t-statistics are in parentheses, based on White's standard error.
** and * indicate significance at the 1% and 5% levels.

Table 6 presents three alternatives to the fixed effects specification in the previous tables. Column (1) reproduces the fixed effects specifications in Column (3) of Table 5 for comparison purposes. The first alternative, in Column (2), is a simple pooled OLS specification, where there are no cross-section fixed effects. This model still utilizes the large number of firm-year observations in the data set, but does not control for firm heterogeneity. While the Hausman test suggests a fixed effects model is appropriate, Column (3) presents the equivalent random effects model. Column (4) addresses concerns regarding the unbalanced nature of the panel using a weighted least squares (WLS) specification. In particular, one may be concerned that the non-reporting of audit fees prior to 2001 may result in selection bias. To correct for the changing number of firms within each industry, across years, we first demean the data by client. Then we construct a probability sampling weight within each industry, where the weight is the inverse of the count of the number of firms in each industry-year cell divided by the total number of observations for each industry across all years. We then apply weighted least squares to the demeaned data. This strategy corrects the unbalanced panel within each industry, but holds composition across industries the same as in our fixed effects model.

In comparing the fixed effects model to a simple Pooled OLS approach, there are large differences in the parameter estimates of the control, SOX and competitive environment variables. In particular, the elasticity of fees with respect to assets is considerably higher, along with the estimates of the effects of a reported loss, going concern opinion and filing late. In addition, an audit during the busy season actually lowers audit fees in the pooled OLS sample. All three of the SOX variables are also significantly higher than the estimates in Column (1). The coefficients on the competitive environment variables are also substantially different. Market concentration, as measured by the HHI, has a much greater negative effect on audit fees and the EXPERT variable is insignificant. The pooled OLS estimates, which suffer from omitted variable bias, appear to lead to incorrect conclusions about the magnitude of SOX's effect, as well as the direction of market concentration's effect on audit fees.

While the Hausman tests points to a fixed effects specification, a random effects model does not substantially change the results. With the exception of a few parameters, such as BUSY, most of the control and SOX variables are of the same magnitude. In addition, the competitive environment variables are also similar between Column (1) and Column (3), with one important exception. LOG(HHI) alone is negative and significant in the random effect specification. The probability weighted fixed effects model in Column (4) shows our results are not very sensitive to the potential issues involved in the changing composition of the firms within each industry. In most cases the coefficients have the same signs as well as similar significance levels and magnitudes. It is important to note that accounting for the unbalanced nature of the panel in this way does reduce the magnitude of the LOG(HHI)*BIGCO variable and somewhat decrease is significance (p-value is 0.0545).

6.4 Sensitivity to Sub Samples

Table 7 - Fixed Effects Model Additional Sensitivity Analysis

Years Included:	2000 – 2006	2001 – 2006	2002 – 2006	2000 – 2006	2000 – 2006
Asset Range:	All	All	All	All	All
	(1)	(2)	(3)	(4)	(5)
	N= 43,239	N= 39,905	N= 34,703	N= 43,239	N= 43,239
CONSTANT	8.3614**	8.6488**	9.4775**	7.7625**	7.4177**
	(19.1629)	(15.1018)	(12.2939)	(20.0454)	(20.5517)
LOG(ASSET)	0.2626**	0.2597**	0.2533**	0.2623**	0.2648**
	(44.33394)	(42.4441)	(39.4470)	(45.2629)	(46.4513)
BIGCO	-1.6072**	-2.6518**	-4.1872**	-2.0660**	-1.5033**
	(-3.2214)	(-3.9167)	(-4.2525)	(-4.0644)	(-2.6279)
LOSS	0.0334**	0.0312**	0.0292**	0.0327**	0.0303**
	(4.2863)	(3.7568)	(3.0835)	(4.1584)	(3.8363)
GC	0.1269**	0.1176**	0.1000**	0.1300**	0.1303**
	(7.9424)	(6.9287)	(5.3064)	(8.0607)	(8.0712)
LATE	0.1213**	0.1164**	0.1024**	0.1209**	0.1211**
	(12.6142)	(12.0022)	(10.1026)	(12.5769)	(12.5884)
BUSY	0.1331**	0.1363**	0.1297**	0.1102**	0.1140**
	(4.3941)	(4.4707)	(4.1052)	(3.6653)	(3.7988)
POSTSOX	0.0674**	0.0674**	0.0703**	0.2629**	0.2660**
	(4.5565)	(4.4948)	(4.2807)	(31.3138)	(31.5682)
INTERNAL	0.3707**	0.3683**	0.3713**	0.3793**	0.3732**
	(40.9927)	(40.5166)	(38.8979)	(41.9616)	(41.1853)
INADEQ	0.2201**	0.2069**	0.1859**	0.2195**	0.2295**
	(11.6355)	(10.8812)	(9.6432)	(11.6115)	(12.1806)
LOG(HHI1)	-0.0771	-0.0871	-0.1485	0.0209	0.0623
	(-1.4026)	(-1.1942)	(-1.5178)	(0.4316)	(1.3780)
*LOG(HHI1)*BIGCO*	0.2450**	0.3835**	0.5857**	0.3080**	0.2379**
	(3.8311)	(4.4227)	(4.6543)	(4.7146)	(3.2448)

Years Included:	2000 – 2006	2001 – 2006	2002 – 2006	2000 – 2006	2000 – 2006
Asset Range:	All	All	All	All	All
	(1)	(2)	(3)	(4)	(5)
	N= 43,239	N= 39,905	N= 34,703	N= 43,239	N= 43,239
LOG(AUDITSHARE)	0.2572**	0.2618**	0.2760**	0.2562**	0.2549**
	(47.2729)	(44.3353)	(37.8007)	(47.1565)	(47.0829)
EXPERT	-0.3174**	-0.3353**	-0.3802**	-0.3257**	-0.3229**
	(-16.6114)	(-15.7533)	(-12.7652)	(-16.9287)	(-16.9126)
CLIENTSHARE	0.8994**	0.8990**	0.9134**	0.8822**	0.8699**
	(31.5128)	(29.1707)	(25.9293)	(31.1136)	(30.7346)
BIGCO Threshold ($million)	$250	$250	$250	$500	$1,000
Cross Section Effects	Y	Y	Y	Y	Y
Period Effects	Y	Y	Y	Y	Y
Other Statistics					
σ_e	0.4257	0.4244	0.4268	0.4275	0.4276
R^2 [1]	0.9349	0.9373	0.9395	0.9343	0.9343
F-statistic	66.0705	63.5978	57.7961	65.5139	65.4714
Durbin Watson Statistic	1.7862	1.8820	2.0295	1.7969	1.7982
Hausman Test	982.4758	955.4522	841.7767	858.0021	844.6175

Note: t-statistics are in parentheses, based on White's standard error.

** and * indicate significance at the 1% and 5% levels.

In this section, we investigate how sensitive our results are to various subsamples, as well as redefinitions of the BIGCO variable. Again, we present the baseline model in Column (3) of Table 5 in Column (1) of Table 7 for comparison purposes. Columns (2) and (3) restrict the sample to 2001 – 2006 and 2002 – 2006, given that 2000 and 2001 may bias the results because the SEC did not require the reporting of fees. Columns (4) and (5) change the threshold for the BIGCO variable to $500 million and $1 billion.

The results appear to be very robust to the alternative specifications in Table 7. There are no notable differences when the periods where SEC did not require reporting are left out in Columns (2) and (3), with the exception of LOG(HHI)*BIGCO which is higher in the 2002-2006 subsample. In Columns (4) and (5), when we raise the threshold for the BIGCO variable, there is a substantial increase in the POSTSOX variable. This may be absorbing the larger fees from some of the companies that are classified as a big company in Column (1), but not in Column (4). The results for the remaining SOX variables however are largely unchanged. Also, the HHI variable and the interaction term with the BIGCO variable, along with the other competitive environment measures, are approximately the same as in Column (1).

6.5 Effects of Arthur Andersen's Failure and Sarbanes-Oxley

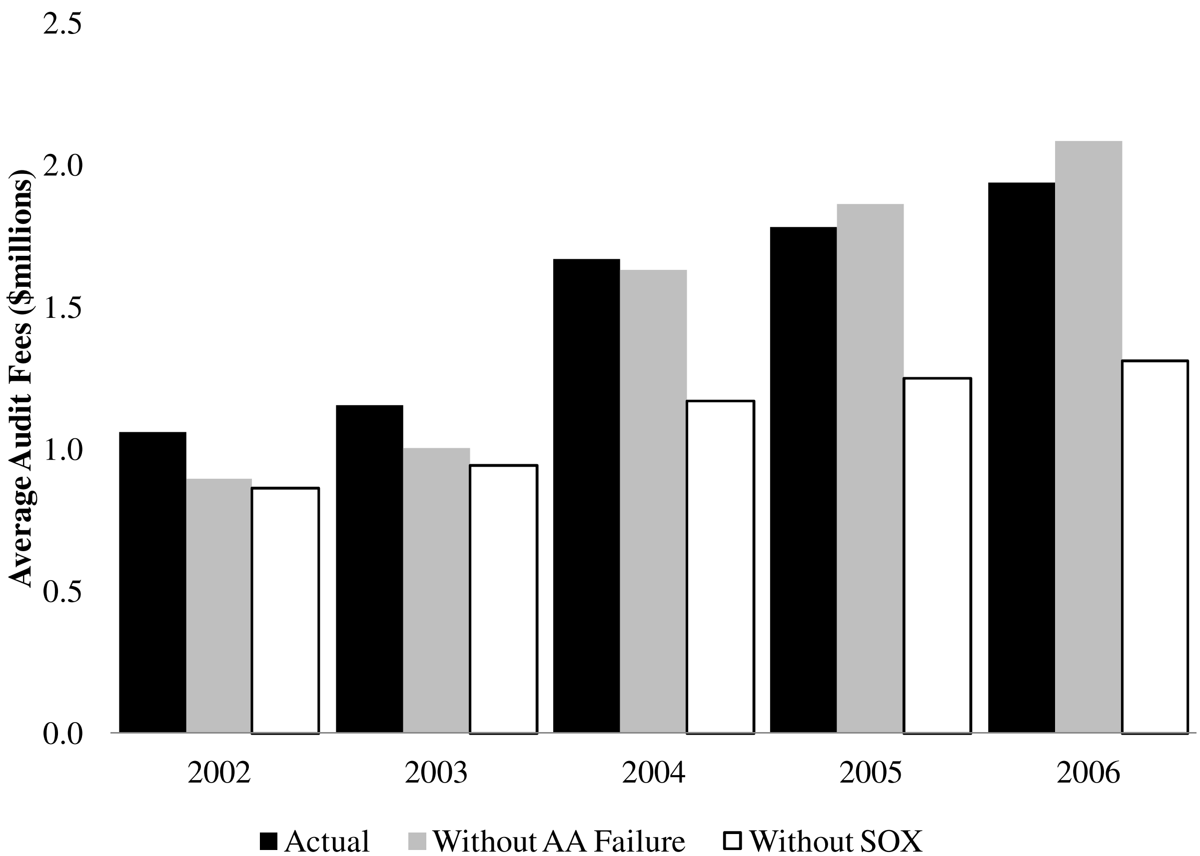
This section assesses the magnitude of the Sarbanes-Oxley legislation and the collapse of Arthur Andersen's effect on audit fees. While the fixed effects model suggests that the competitive environment is important in explaining audit fees, the magnitude of the coefficients, as well as how the values of these variables would have changed had Arthur Andersen not failed, is not readily apparent from the previous sections' tables. As a result, we create two additional simulated samples.

The first sample is meant to approximate the data if Arthur Andersen was still in existence. To construct this sample, we simply assume that the Arthur Andersen would have retained its client roster after 2001. Although some clients would have left Arthur Andersen regardless of its failure, and some firms would have switched to Arthur Andersen, the net result is uncertain, we make the simplifying assumption that there would be no switching between any of the auditors. To get an initial estimate on the competitive landscape we calculate the HHI, EXPERT, CI, and AUDITSHARE using the same fees Arthur Andersen's clients were charged by the successor auditor. Our estimates of course suggest that the fees of all of clients would be affected by a less concentrated industry where Arthur Andersen continued to operate. To take this into account our next step is to use our baseline fixed effects model, Table 6, Column (1), to recalculate a counterfactual distribution of fees if Arthur Andersen had not failed. Since, this fee distribution is associated with a different set of competitive variables we again calculate HHI, EXPERT, CI, and AUDITSHARE with the new counterfactual distribution of fees. We continue to alternate between using our baseline fixed effects model to simulate the distribution of fees and recalculating the competitive variables until the average fees converges to a fixed point.

The second sample estimates the impact of SOX, simulating the accounting industry in absence of the regulations while assuming Arthur Andersen still failed. We create this sample by setting SOX, INTERNAL, and INADEQ to zero for all observations. We then determine a new set of simulated fees using our baseline model, again from Column (1) of Table 6.

The results of these simulations can be found in Figure 2. The figure shows that while market concentration has a statistically significant positive effect on audit fees for large firms, the effect of the Arthur Andersen collapse is less clear. Further, it appears that the effect of SOX can account for much of the upward trend in audit fees. The figure shows the actual average fee for each year after Arthur Andersen's failure, along with the simulated fees from our alternative samples. The results suggest that had SOX not been implemented, but Arthur Andersen still collapsed, audit fees would have been 8% lower in 2002 and over 30% lower in 2006. Similar to the impact of SOX , in 2002 and 2003 if Arthur Andersen was still operating fees would be lower by 15% and 13%. However, the story is very much the reverse by 2006, where average fees would have been $141,000 higher if Arthur Andersen continued to audit clients. This is because the collapse of Arthur Andersen allowed for more companies to be audited by an expert, which our estimates suggest can produce an audit at a lower cost. In our simulation 6% fewer clients in 2002 would have been audited by an expert had Arthur Andersen survived and more than 15% fewer clients in 2006. While we find that large firms are adversely affected by greater market concentration the collapse of one of the five major auditing firms, may have actually lowered audit fees after 2003 as a larger range of firms were able to become industry "experts". As a result, it appears that the trend in average fees that we observe is more likely a result of the Sarbanes-Oxley legislation.

Figure 2: Impact of AA Failure and SOX _



1. CONCLUSION AND DISCUSSION

Many have begun to worry about anti-competitive practices in the audit industry due to the large growth in audit fees in the early 2000s. What had already been a very tight oligopoly became even tighter when Arthur Andersen failed in the wake of the Enron accounting scandal. In addition, the subsequent passage of Sarbanes-Oxley increased the demand for accounting services during this period. The two events made it difficult to discern the root cause of the increase in fees over this period.

Given the variation across time and problems with omitted variable bias, we argue that a fixed effects model can supply superior estimates to the workhorse cross-sectional model of audit fees. Our large sample allows us to efficiently and precisely estimate the effects of SOX, as well as market concentration over this period. We find that Sarbanes-Oxley has a substantial effect on audit fees, while greater market concentration seems to only be significant for the larger half of firms in our sample. However, simulating our data for a world where Arthur Andersen is still in operation reveals that the firm's failure may have had an immediate effect of increasing audit fees, but after 2003, fees may have actually been higher had this firm survived. In contrast Sarbanes-Oxley has increased the average audit fee by over 30% in 2006. As a result, we conclude that the increasing trend in audit fees during this period is a result of new legislation, and not increasing market concentration and anti-competitive pricing.

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