

**Great Migration:
How Recent Events Changed the Switching Behavior of Top-Tier Audit Clients**

by

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Abstract

This study investigates the possible causes of the increase in switching of Big 4 audit clients to non-Big 4 auditors in recent years. Two likely candidate explanations are (1) the recent industry consolidation resulted in an anticompetitive price increase and (2) the requirements of Section 404 of the Sarbanes-Oxley Act increased the relative costs of the Big 4 auditors. The evidence rejects the anticompetitive hypothesis and is consistent with the relative cost increase hypothesis. The study has implications for policy makers who are concerned that recent consolidation may have reduced competition. While both anticompetitive behavior and a relative cost increase would cause the Big 4 audit fees to increase, a fee increase resulting from anticompetitive behavior would likely be more enduring than one stemming from a cost increase. An increase in Big 4 costs may be reversed as more accountants enter the labor market and as the Section 404 demands become less onerous.

Great Migration: How Recent Events Changed the Switching Behavior of Top-Tier Audit Clients

1. Introduction

The failure of Arthur Andersen and the enactment of the Sarbanes-Oxley Act are two of the most significant events in the history of public accounting. The failure of Arthur Andersen reduced the number of top-tier accounting firms from 5 to 4, significantly increasing concentration of the top-tier of the audit market. This consolidation may have reduced competition among the Big 4 auditors. The Sarbanes-Oxley Act represents a major increase in the regulation of public accounting. Section 404 of the Sarbanes-Oxley Act led to a large increase in demand for Big 4 audit services and may have increased the relative costs of the Big 4 auditors.

There is evidence that these events precipitated an increase in switching from Big 4 auditors to non-Big 4 auditors (Yoon 2004, Jean 2004, Schoetzer 2005). Such an increase could have been caused by either anticompetitive behavior or by an increase in the relative costs of the Big 4 auditors. This study investigates whether either of these explanations is responsible for the recent migration Big 4 clients to non-Big 4 auditors.

The study develops testable implications for how switching behavior would be affected by anticompetitive behavior and by changes in relative prices. The theory predicts that anticompetitive behavior would simultaneously reduce client switching among Big 4 auditors and increase switching from Big 4 auditors to non-Big 4 auditors. An increase in the relative costs of the Big 4 should simply increase the likelihood of switching from Big 4 auditors to non-Big 4 auditors.

To test the hypotheses, the empirical design employs a multinomial logit model to estimate the likelihood that a Big 4 audit client will switch to a different Big 4 auditor or to a non-Big 4 auditor. The model controls for trends in switching behavior and for several determinants of switching behavior.

The results reject the hypothesis that the market consolidation lead to anticompetitive behavior. The probability of switching among Big 4 auditors fell in 2003, but the probability of switching from a Big 4 auditor to a non-Big 4 auditor did not increase relative to trend at that time. The evidence is consistent with the hypothesis that Section 404 increased the relative costs of the Big 4 auditors. The probability of switching from a Big 4 auditor to a non-Big 4 auditor increased significantly in 2004 and 2005 after the implementation of Section 404 of the Sarbanes-Oxley Act. The economic significance of these effects varies for small and large client firms. The probability that a Big 4 client would switch a non-Big 4 auditor was larger for small client firms in 2004 and 2005 after the implementation of Section 404.

The study has implications for policy makers who are concerned about the state of competition in the market for audit services. While both anticompetitive behavior and a relative cost increase would cause the Big 4 audit fees to increase relative to non-Big 4 fees, a fee increase resulting from anticompetitive behavior may be more enduring than one stemming from a cost increase. One possible exception is that cost associated with the increased risk from clients receiving adverse Section 404 opinions. To the extent that this risk increased the relative cost of the Big 4, the effect might not be temporary. Policy makers should take this into account when evaluating the proposal to cap auditor liability.

The paper is organized as follows. The next section briefly discusses Arthur Andersen's failure and the enactment of the Sarbanes-Oxley Act. Section 3 develops the hypotheses tested in this study. Section 4 explains the methodology. The data and sample are described in Section 5. Section 6 presents the results and discusses the findings. Section 7 concludes.

2. Background

Arthur Andersen failed after the Department of Justice indicted the firm on charges of obstruction of justice related to the Enron investigation. In October 2001 the Securities and Exchange Commission opened an investigation of Enron for possible violations of federal securities laws. At this time, Andersen had been Enron's independent auditor for sixteen years.¹ On March 15, 2002 the Department of Justice indicted Arthur Andersen for shredding documents related to its audit of Enron. Because Andersen's reputation was so badly damaged by the indictment, and because the indictment raised the possibility that Andersen might be banned from auditing public companies, all of Arthur Andersen's clients left Andersen and hired new auditors within several months of the indictment. Most of the Andersen clients switched to one of the remaining Big 4 auditors.²

In response to Enron and other accounting scandals, the Congress created the Sarbanes-Oxley Act, which was signed into law on July 30, 2002. The Sarbanes-Oxley Act contained two major provisions that affected auditors of publicly-owned companies: the creation of the Public Company Accounting Oversight Board (PCAOB) and the Section 404 requirements concerning internal controls. The PCAOB was created to

¹ United States v. Arthur Andersen 18 U.S.C. § 1512(b)(2).

² According to Government Accountability Office (2003), 87 percent of Andersen's clients that switched between October 2001 and December 2002 switched to a Big 4 auditor.

oversee public accounting firms, the firms that audit publicly-held companies. Public accounting firms were required to register with the PCAOB by October 22, 2003 (CPA Letter 2003).

Section 404 of the Sarbanes-Oxley Act requires that publicly-held companies evaluate their internal controls for financial reporting and that the firms' independent auditors report on the effectiveness their clients' internal controls. The compliance dates for Section 404 differ for large and small companies. Companies with market capitalization in excess of \$75 million—referred to as accelerated filers—were required to comply with the Section 404 requirements in 2004. Smaller companies are not required to comply until the end of 2007.

Since 2003, there has been anecdotal evidence of an increase in switching from Big 4 auditors to non-Big 4 auditors. Yoon (2004) and Business Wire (2004) claim that there were many auditor changes 2003, and a large percentage of clients leaving Big 4 auditors were switching to smaller national auditors. Similar reports of a migration from Big 4 auditors to smaller auditors in 2004 and 2005 (Reilly 2006, Accounting Today 2005). While these reports suggest that the probability of switching increased in 2003, 2004 and 2005, it is impossible to draw this conclusion since they do not estimate the probability of switching and do not control for the trend in switching.

Several academic studies have examined the effect of Andersen's failure and the Sarbanes-Oxley Act on the switching behavior of audit clients. Schloetzer (2005) finds that the number of clients switching from top-tier auditors to smaller auditors increased in 2002, as the former Andersen clients left Andersen to find new auditors, and in 2004, with the implementation of Section 404. While his study makes a significant contribution

in identifying changes in switching behavior, his study examines the number of switches, rather than the probability of switching, and does not control for trends or other determinants of switching.

Doogar et al (2004) assess the performance of the middle-tier auditors from the late 1980s to 2004 to determine how much progress the middle-tier auditors have made in competing with the top-tier auditors. The authors find that the middle-tier firms and smaller auditors have grown in recent years, but most of the growth has come from small client firms.³

Ettredge et al (2006b) find that receiving an adverse Section 404 opinion increases the likelihood that firms switch auditors through both auditor resignations from clients and client dismissals of auditors. They also find that when a Big 4 auditor resigns from a client, the client is less likely to have a Big 4 successor auditor when the adverse opinion was due to a general material weakness over the company's internal controls.

Asthana et al (2004) find that the percentage of audit clients voluntarily switching auditors falls in 2002, the year of Andersen's failure. They also find that audit fees increase in 2002 relative to 2000 and 2001, and that the increase was higher for larger, riskier clients.

3. Hypothesis Development

This section develops testable implications for the two research questions addressed by this study: whether Andersen's failure reduced competition and whether the enactment of the Sarbanes-Oxley Act increased the relative costs of the Big 4 auditors.

³ Doogar et al (2004) classify auditors into three groups: top-tier, which includes the Big 4 auditors (Big 5 prior to Arthur Andersen's failure, Big 6 before the PWC merger, and so on), middle-tier auditors, and smaller auditors. The present study classifies audit firms into two groups: top-tier and smaller. My smaller auditor group includes the auditors that Doogar et al (2004) classify as middle-tier auditors.

The resulting hypotheses are based on the premise that changes in the level of competition and in changes in relative prices affect the switching behavior of Big 4 audit clients. To develop these hypotheses, it is necessary to understand how audit buyers choose auditors and why they would switch auditors.

Following Simunic (1980), I assume that audit buyers maximize expected profits. The audit buyer will choose the auditor that minimizes the cost of operating its financial reporting system. For an audit buyer that is soliciting bids from m competing auditors after deciding to switch auditors, the auditor choice decision can be formally stated as:

$$\min_i \text{fee}_i + E(\text{OC}_i) \quad i=1, \dots, m \quad (1)$$

where fee_i is the audit fee bid by auditor i and $E(\text{OC}_i)$ includes all expected other costs associated with choosing auditor i , such as litigation costs and reputation costs.

Each period the firm will evaluate its choice of auditor. If its current auditor continues to be the optimal choice, then the firm will not switch auditors. However, under certain conditions, it may be optimal for the firm to switch auditors. For example, Ettredge et al (2006a) finds that increases in audit fees increase the likelihood that client firms switch auditors. In general, a firm will switch auditors if the expected benefit to switching auditors exceeds its switching costs.⁴ Formally, the client will remain with its current auditor if the total expected cost of remaining with its current auditor is less than the minimum total expected cost of the n competing auditors plus the client's switching cost, SC :

$$\text{fee}_a + E(\text{OC}_a) < \min_j \text{fee}_j + E(\text{OC}_j) + SC \quad j=1, \dots, n \quad (2)$$

⁴ DeAngelo (1981) attributes client switching costs to the transactions costs the client bears when switching auditors.

where the subscript a represents the current auditor and j represents the competing auditors.⁵

Auditors maximize the expected profits from their existing clients and prospective future clients. For a given client, the auditor's expected profits in period t can be expressed as:

$$\max q_t p_t - q_t c_t - E(LC(q_t)) - F_t \quad (3)$$

where q_t is the quantity of resources used by the auditor in performing the audit in period t , p_t is the price charged to the client per unit of audit resources in period t , $q_t p_t$ is the total audit fee in period t , c_t is the auditor's marginal cost of providing the audit resources in period t , $q_t c_t$ is the total variable cost of performing the audit in period t , $E(LC(q_t))$ is the expected litigation costs associated with the audit in period t , and F_t consists of fixed costs of performing the audit in period t . Expected litigation costs are decreasing in q_t , the quantity of resources used to perform the audit.

In the current period, an auditor chooses the quantity of audit resources to use on the audit, q_t , and the price to charge per unit of resources, p_t . Increasing the quantity of resources reduces the expected litigation costs associated with the audit, but raises the cost of the audit. Charging a higher per unit price increases the auditor's profits if the client remains with the auditor, but increases the probability that the client switches to another auditor. If an auditor's costs c_t increase, it would be optimal for the auditor to increase p_t .

⁵ One could model the auditor choice problem with a dynamic model. This would involve adding another term for the expected future costs of each possible auditor choice. In a dynamic model, the client would remain with its current auditor if the net present value of the total expected future cost of remaining with its current auditor were less than the minimum net present value of the total expected future cost of the n competing auditors plus the client's switching cost, SC . The additional insight gained by modeling the client's choice as dynamic is not worth the increase in complexity.

An auditor may also decide to resign from a client if the costs associated with auditing the client increase to the point that the expected future profits are too low. For example, if the expected litigation costs of auditing the client increase by a sufficiently large amount, it may be optimal for the auditor to resign from the client rather than risk litigation. Interestingly, Ettredge et al (2006a) finds that auditors are more likely to resign from clients that are paying relatively low fees. This means that in some cases, auditors choose to terminate clients rather than try to increase their fees.

The auditor considers the opportunity cost of its resources in setting price for a given client or deciding whether to continue auditing the client. If the expected future profits from a given client are lower than an alternative use of the auditor's resources, the auditor may resign from the client or offer the client such a high price that switching is inevitable.

For prospective new clients, the auditor must decide whether to bid for the client's audit business by evaluating the expected future profits from the client. If these profits are lower than the opportunity cost of the next best use of the auditor's resources, the auditor will choose not to bid for the client. Alternatively, if the client is expected to generate sufficient profits for the auditor, the auditor will submit a bid for the client's business. In setting the bid, the auditor will weigh the likelihood that the bid will be lower than the competing bids with the profits generated by the client if the bid is successful.

The probability of switching auditors in the market as a whole depends on auditor costs, the state of competition, and client-specific factors. If an auditor increases its fees in response to a cost increase, and the auditor's competitors do not match the fee increase, then some of the auditors' clients may switch to competing auditors to obtain

lower fees. Mergers of auditors that result in efficiencies can also induce client switching. By combining the resources of two auditors, mergers can increase the size of client that the firm can efficiently audit, making it optimal for some firms to switch to the merged firm from their current auditors (Sullivan 2002). Client-specific factors can also motivate auditor changes. For example, a firm might find it optimal to change auditors if its operational characteristics or financial condition change (Johnson and Lys 1990). Audit firms are differentiated with regard to skills and resources that enable them to specialize in auditing client firms with particular characteristics (Johnson and Lys 1990). For an audit buyer, the choice of auditor is a problem in self-selection (Chaney et al 2004). Therefore auditor-specific factors and client-specific factors that affect the probability of switching auditors will also influence a switching firm's choice of successor auditor.

Did the Consolidation of the Audit Market Reduce Competition?

The failure of Arthur Andersen significantly increased the concentration of the top-tier of the audit market. There are two ways that such an increase in concentration could reduce competition: through coordinated interaction or unilateral effects (U.S. Department of Justice 1997). Coordinated interaction occurs when suppliers form a tacit or explicit agreement to raise price or take other actions to increase their profits. Unilateral effects occur when an increase in concentration reduces competition without coordinated interaction, that is, when the suppliers make independent decisions. Although coordinated interaction and unilateral effects reduce competition through different mechanisms, they would have the same effect on switching behavior: both would simultaneously reduce the probability of switching among the Big 4 auditors and increase the probability of switching from the Big 4 auditors to non-Big 4 auditors.

Coordinated interaction becomes more likely when market concentration increases. To reduce competition through coordinated interaction, the suppliers must form an agreement, monitor the agreement to prevent cheating, and punish cheating when it is detected.⁶ It is easier to form an agreement when the market is concentrated and there are few firms involved in the agreement (Carlton and Perloff 1990).

If the Big 4 auditors engaged in a coordinated agreement, what would it look like? Client heterogeneity would likely make it impractical for the Big 4 auditors to agree on a fee schedule that could be enforced. Auditor profits depend on the quantity of resources used to perform the audit, q_t , in addition to the price per unit of resources, p_t . A collusive fee schedule would have to take into account the quantity of resources used for each audit as well as the price per unit of resources. An agreement that is this complex would be time consuming and difficult to administer. Moreover, if one of the auditors deviated from the fee schedule, it would not be discovered until the fees were reported to the SEC well after the fee was set. Finally, since the competing auditors would not be able to determine the quantity of audit resources that had actually been provided for the reported fee ($q_t p_t$), it would be difficult for them to determine whether the agreement had been violated. A more feasible method of coordination would be to simply agree not to solicit each others' clients or respond to their requests for proposals. This sort of agreement would allow auditors to increase audit fees without risking client defections.⁷ The agreement not to take each others' clients would cause the probability of switching among Big 4 auditors to fall. Since the non-Big 4 auditors would not be part of the

⁶ Cheating occurs when a supplier deviates from the terms of the agreement by, for example, lowering price below the coordinated price. A supplier can increase profits by cheating on the agreement, as long as the other suppliers continue to abide by the terms of the agreement and the cheating is not detected.

⁷ Anticompetitive behavior has an ambiguous effect on q_t , the quantity of resources used to audit a client. Increasing q_t would reduce expected litigation costs, but would also increase the total cost of the resources.

agreement, some clients would switch to non-Big 4 auditors to avoid the higher fees, so the probability of switching from a Big 4 auditor to a non-Big 4 auditor would increase.^{8,9}

Even if the consolidation of the top tier of the audit market did not lead to coordinated interaction, competition could still fall as a result of unilateral effects. Unilateral effects occur when an increase in concentration reduces competition in a market where the suppliers make independent, or unilateral, decisions. In the audit market, it is appropriate to consider the unilateral effects theory of differentiated products. When suppliers sell differentiated products or services, customers have stronger preferences for some suppliers than others. Competition is “localized” because the suppliers that a customer values highly compete intensely with each other, but face little competition from suppliers that the customer considers poor alternatives. In such a market, competition varies inversely with the extent of the differentiation among suppliers.

This unilateral effects theory predicts that Arthur Andersen’s failure could have reduced competition in the audit market. Andersen was presumably the top choice of supplier for many former Andersen clients. After Andersen failed, it is plausible that Andersen’s clients tended to switch to the auditor that had been their second choice. If the next auditor in line is a distant third choice, the theory predicts that Andersen’s successor auditor would be able to increase audit fees. Prior to Andersen’s failure, the possibility that a client might switch to its second choice of auditor would keep audit fees low. After

⁸ If the Big 4 auditors could perfectly forecast the maximum fee they could charge each client without inducing the client to switch to a non-Big 4 auditor, then they could in theory prevent an increase in switching to non-Big 4 auditors. However, in practice this would be very difficult to do. Some clients would complain about fee increases even if they had no intention of switching. It would be difficult to use client complaints to identify which clients will actually switch because of increased fees.

⁹ A very large increase in the probability of switching from Big 4 auditor to a non-Big 4 auditor is inconsistent with anticompetitive behavior. If Big 4 audit clients can easily switch to non-Big 4 auditors, then they can avoid the fee increase of the Big 4. In this case, it would not be optimal for the Big 4 auditors to try to impose an anticompetitive fee increase.

Andersen's failure, competition would have fallen for these clients if the third-best auditor is not a good substitute for Andersen and the successor auditor. The same phenomenon would apply to established clients of the remaining Big 4 auditors for whom Andersen had been the second choice of auditor. When Andersen failed the competition that had existed between their auditors and Andersen would disappear, thus allowing their auditors to increase fees.

In addition to increasing audit fees, unilateral effects would reduce switching among the Big 4 auditors. Competition between Andersen and Andersen's closest competitor would have increased the likelihood of switching between these auditors (note that Andersen's closest competitor will not necessarily be the same for all audit buyers). After Andersen failed, this switching would be eliminated. Therefore the probability of switching to a different Big 4 auditor would fall.

A price increase due to unilateral effects would also increase switching from the Big 4 auditors to non-Big 4 auditors. Client size is one dimension in which auditors are differentiated. After Andersen failed, the large client firms would tend to switch to—or remain with—one of the Big 4 auditors. However, some of the small client firms would consider a non-Big 4 auditor to be the next-best alternative to their current auditor. Since concentration did not increase among the non-Big 4 auditors, and they are not good alternatives for most Big 4 clients, then the fees of the non-Big 4 auditors would be unlikely to increase from unilateral effects. Therefore, an increase in Big 4 audit fees would increase the probability that these firms would switch to a non-Big 4 auditor.

Both the coordinated interaction theory and the unilateral effects theory predict an increase in the probability of switching from Big 4 auditors to non-Big 4 auditors and a reduction in the probability of switching among Big 4 auditors.

It is not a foregone conclusion that increasing concentration would result in anticompetitive behavior. An increase in concentration may not be enough to allow suppliers to form a coordinated agreement. Unilateral effects may not occur if the remaining Big 4 auditors are not sufficiently differentiated.

Anticompetitive Hypothesis: In 2003, the year after Andersen's failure, there will be (a) an increase in the probability of switching from a Big 4 auditor to a non-Big 4 auditor and (b) a reduction in the probability of switching among the Big 4 auditors.

Note that these conditions are necessary, but not sufficient, for anticompetitive behavior because they are consistent with other possible explanations. Any increase in the relative price of the Big 4 auditors relative to the non-Big 4 auditors would increase the probability of switching from a Big 4 auditor to a non-Big 4 auditor, even if the price increase were not anticompetitive. Similarly, factors other than anticompetitive behavior could reduce the probability of switching among Big 4 auditors. For example, the burden of absorbing Andersen's former clients could have weakened the incentives of the remaining Big 4 auditors to solicit additional new clients, especially during the period of integration. In taking on former Andersen clients, the remaining Big 4 auditors increased their client assets by between 5% and 20% (Hansen et al 2006).

Did Section 404 of the Sarbanes-Oxley Act Increase the Relative Costs of the Big 4?

Section 404 imposed new requirements on publicly-held firms and their auditors that increased the demand for auditing services. In particular, Section 404 requires that independent auditors report on the effectiveness of their client's internal control over financial reporting, and this requirement resulted in a large increase in the demand for audit services. In a survey of conducted in July of 2004, a sample of publicly-held companies estimated that they would have to hire external personnel for an average of 5,067 hours to comply with Section 404 requirements, in addition to the hours required for their routine audit (FEI 2004). Many companies hired accounting firms to help with compliance testing and to perform the independent assessment of Section 404 compliance (Fowler 2004).

When demand increases for a firm's services, its marginal costs will increase if demand shifts out along an upward sloping supply curve.¹⁰ When demand increases, suppliers must expand their resources in order to satisfy the higher demand. If the supply of resources is constrained in the short run, input prices are bid up as firms compete for resources. In the audit market, the aggregate supply of audit partners and professional staff is limited in the short run, and an increase in demand would force auditors to bid up their wages in an attempt to expand output. There is evidence that auditor wages increased in 2004 and 2005 due to Sarbanes-Oxley demand (Chasan and Nag 2005).

An increase in demand could also increase the opportunity cost of the firm's resources. If the new business is more profitable than some of the auditor's current

¹⁰ Marginal costs are represented as c in equation (3).

clients, the auditor may increase price to the less profitable clients or resign from them and use the resources to serve the more profitable new business opportunity.

Section 404 likely increased the demand for Big 4 audit services by more than that of the non-Big 4 during the period covered by this study. The main factor contributing to the larger increase in demand for the Big 4 auditors is the composition of their client base: in 2004, 84.8% of Big 4 audit clients were accelerated filers, while only 21.9% of non-Big 4 audit clients were accelerated filers.¹¹ Since the accelerated filers had to comply with Section 404 in 2004 and the non-accelerated filers had until 2007 to comply, the demand for the Big 4 audit services should have increased by more than those of the non-Big 4 during the period of this study. Moreover, the accelerated filers audited by Big 4 tend to be larger and more geographically diverse than those audited by the non-Big 4. To certify Section 404 compliance for these firms likely requires disproportionately more resources than for the smaller, less complex clients of the non-Big 4 auditors.

If demand for Big 4 audit services increased by more than those of the non-Big 4, the relative marginal costs of the Big 4 may have increased as they attempted to obtain the resources necessary to expand.¹²

Alternatively, the marginal costs of the Big 4 auditors may not have increased relative to those of the non-Big 4 auditors if both classes of auditors compete in the same labor market. If this is the case, then the Big 4 auditors would be able to expand their resources by hiring partners and staff from the non-Big 4 auditors. This would equalize the costs of accounting personnel for the Big 4 and the non-Big 4 auditors. Moreover, if the non-Big

¹¹As mentioned in Section 2, “accelerated filers” are firms with market capitalization in excess of \$75 million.

¹² This does not mean that the marginal costs of the non-Big 4 auditors would not increase. It only means that the marginal costs of the Big 4 auditors would increase relatively more.

4 auditors' resources were as constrained as those of the Big 4 after Andersen's failure, then the upward pressure on the costs of the two classes of auditors may have been the same. There is little evidence on the question of whether the Big 4 and non-Big 4 compete in the same labor market. There is anecdotal evidence that the Big 4 accounting firms pay higher salaries than the non-Big 4 accounting firms. According to Chasan and Nag (2005), Big 4 accounting firms were offering annual salaries of \$85,000 to \$90,000 for accountants with five years of experience in 2005, while non-Big 4 accounting firms were offering only \$75,000 for an accountant with the same amount of experience. The pay differential could mean that the Big 4 and non-Big 4 hire from different labor pools. However, it is also consistent with a single labor pool, with the Big 4 accounting firms paying their accountants more to induce them to work longer hours.

In addition to a possible increase in relative marginal costs, the opportunity costs of the Big 4 may have increased by more than those of the non-Big 4, because the resources of the Big 4 were already strained from having just taken on Andersen's former clients. This may have reduced their ability to expand rapidly and caused their resources to be used less efficiently.

If the audit costs and fees of the Big 4 auditors increase relative to those of the non-Big 4 auditors, this will increase the probability that a Big 4 client will switch to a non-Big 4 auditor.

Another factor stemming from Section 404 that may contribute to higher relative audit costs for the Big 4 auditors is the increase in risk associated with adverse Section 404 opinions. Ettredge et al (2006b) find that receiving an adverse opinion increases the likelihood that firms switch auditors, through both auditor resignations from clients and

client dismissals of auditors. They conclude that the Section 404 report may be a proxy for risk.

The events leading up to the enactment of the Sarbanes-Oxley Act may have increased the relative costs of auditing risky clients for the Big 4 auditors. Due to their large presence, the Big 4 are more likely to hurt by negative publicity stemming from audit failures. In an environment of increased regulatory scrutiny, the Big 4 should be more sensitive to the potential litigation and regulatory costs associated with risky clients because they are more desirable target for regulators and shareholders. Andersen's rapid failure stemming from its involvement with a problematic client serves as a constant reminder to the remaining Big 4 of the potential costs associated with risky clients.

The remaining Big 4 auditors could respond to increase in risk from adverse Section 404 opinions in three ways. First, they could resign from clients that receive adverse Section 404 opinions, as has been documented by Ettredge et al (2006b). Second, they could choose not to bid for clients that receive an adverse Section 404 opinion. Third, the Big 4 could devote more resources to auditing risky clients. Rama and Read (2006) find evidence consistent with the last possibility. Specifically, they find that in 2003, clients dropped by a Big 4 auditor and picked up by another Big 4 auditor experience larger fee increases than non-switching Big 4 clients. This phenomenon does not hold in 2001. One possible explanation for the change is that after Andersen's failure, the remaining Big 4 auditors devoted more resources to auditing risky clients because of concerns about increased expected litigation costs.

The increased risk associated with adverse Section 404 opinions will increase the likelihood of switching to a non-Big 4 auditor if a Big 4 auditor resigns from the client

and the other Big 4 auditors choose not to bid for the client's business due to their concern about the client's risk. Adverse Section 404 opinions will also increase the likelihood of switching to a non-Big 4 auditor if the Big 4 auditors' relative costs of auditing such clients increase because they are utilizing more resources to audit these risky clients.

To summarize, Section 404 may have increased the relative costs of the Big 4 accounting firms by increasing their marginal costs, opportunity costs and risk-related costs relative to those of the non-Big 4 accounting firms.

Increasing Relative Cost Hypothesis: The probability of switching from a Big 4 auditor to a non-Big 4 auditor will increase in 2004 and 2005 after the implementation of Section 404 of the Sarbanes-Oxley Act.

4. Methodology

The objective of the estimation model is to determine how the two switching probabilities of interest—the probability that a Big X client will switch to a non-Big X auditor and the probability of switching among Big X auditors—were affected by the market consolidation and the implementation of Section 404 after controlling for other factors that can affect these switching probabilities.¹³ To do this, I model the auditor choice decision by specifying that a Big X client firm has the following three choices: the client can remain with its current auditor, switch to a non-Big X auditor, or switch to a different Big X auditor. To model this choice decision, I estimate a multinomial logit

¹³ “Big X” refers to the Big 6 auditors prior to the PWC merger in 1998, Big 5 from 1998 until Arthur Andersen's failure in 2002, and Big 4 from 2002 through 2005.

model. For a detailed description of this model, see Greene (2003) and Long and Freese (2003).

The multinomial logit model is defined as follows:

$$\begin{aligned}
 P(y_i=0) &= P_{i0} = 1/\{1+\exp(x_i' \beta_1)+\exp(x_i' \beta_2)\} \quad \text{for } j=0 \\
 P(y_i=1) &= P_{i1} = \exp(x_i' \beta_1)/\{1+\exp(x_i' \beta_1)+\exp(x_i' \beta_2)\} \quad \text{for } j=1 \\
 P(y_i=2) &= P_{i2} = \exp(x_i' \beta_2)/\{1+\exp(x_i' \beta_1)+\exp(x_i' \beta_2)\} \quad \text{for } j=2
 \end{aligned}
 \tag{4}$$

where y_i is a random variable indicating which choice was made by the i^{th} client firm, x_i is a vector of characteristics describing firm i , and β_j is a vector of parameters specific to choice j . The multinomial logit model estimates a separate set of parameters for $j=1$ (switching to a non-Big X auditor) and for $j=2$ (switching to a different Big X auditor), while $j=0$ (remaining with the current Big X auditor) is the base choice.

In testing the hypotheses, it is important to control for any trends that might exist in the switching probabilities. To get a sense of whether there are trends in the data, Figure 1 illustrates the fraction of Big X audit clients switching to non-Big X auditors and the fraction switching to other Big X auditors from 1988 through 2005.¹⁴ Because switching probabilities vary significantly by size of client firm, the data are plotted for the full sample and for small firms, with assets below the median, and for large firms, with assets above the median.¹⁵ Note that the graphs have different ranges for the vertical axis because the probability of switching varies considerably by client size. These graphs show that for the full sample and for small firms, the fraction of Big X clients switching

¹⁴ The sample selection criteria are described in Section 5 below.

¹⁵ The median cut-offs are computed for all Compustat firms with asset data by year, not for the final estimation sample. This procedure makes the cut-off between small and large firms independent of the sample, which consists of clients of the Big X accounting firms, and more representative of the economy as a whole.

to non-Big X auditors (*bnb*) was increasing in the late 1990s until 2005. For large firms, this series increased in 1998 and 1999, declined in 2000, and leveled off until 2003.

There is also a trend in the fraction of Big X clients switching to other Big X auditors (*bb*) from 1998 to 2001, the year before Andersen's failure. The trends in switching behavior may have been caused by the merger of Price Waterhouse and Coopers and Lybrand in 1998. This was a major merger involving two of the then Big 6 auditors and may have initiated a trend in auditor realignments in the audit market. The data suggest that it is appropriate to control for the trend from 1998-2001 when estimating the model.

To control for the trends illustrated in Figure 1, the main specification includes a trend variable, *trend*, for the sample period 1998-2005. For the years 2002 to 2005, the model includes year dummy variables $y02 - y05$.¹⁶ By including a trend variable and year dummies for 2002-2005, any given year dummy coefficient measures the incremental change in switching during that year relative to the trend from 1998-2001. The hypothesis tests, which are described in more detail below, examine the incremental changes in switching (net of trend) in 2003, 2004 and 2005. Andersen's failure in 2002 affected switching behavior and makes it necessary to include a year dummy variable for that year.

To control for other factors that may be changing over time, I include three determinants of the switching probabilities: client size, the change in client size, and leverage. Chaney et al (2005) find that client size and leverage are the two most important determinants of whether a client chooses a Big 5 auditor or a non-Big 5 auditor. To control for firm size, I include *lna*, the natural log of assets in year $t-1$. Because the analysis includes several years of data, I deflate assets by the CPI. The

¹⁶These variables, along with all other variables in the study, are defined in Exhibit A.

change in firm size is d_lna , the difference in natural log of assets (deflated) between t-1 and t. The measure of leverage, lev , is defined as long-term liabilities plus debt in current liabilities divided by market value of equity plus total liabilities, in year t-1.

Firm size is likely related to the switching decision, for two reasons. First, small firms are more likely to switch auditors.¹⁷ The higher switching probability for small firms could be due to lower switching costs for small firms. Small firms may also be more likely to switch auditors for reasons that are unobservable or that cannot be measured accurately by researchers. Firm size may serve as a proxy for these variables. In either case, firm size should be positively related to the probability of not switching (i.e., remaining with the current Big X auditor). Second, for Big X client firms that switch auditors, small firms should be more likely to switch to a non-Big X auditor than to a different Big X auditor. . Healy and Lys (1986) examine a sample based on two acquisitions of non-Big 8 accounting firms by Big 8 accounting firms. They find that client firm size is positively related to the probability of choosing a Big 8 audit firm versus the acquired non-Big 8 audit firm.

Client firm growth can induce a firm to switch auditors. Since auditors are differentiated with respect to the size of firm they can most efficiently audit, a firm that changes size may be able to reduce its audit fees by switching to a different auditor. Johnson and Lys (1990) find that growth in client firm assets is positively related to the relative size of the successor audit firm. Healy and Lys (1986) find that growth in client firm assets is positively related to the probability that the clients of the acquired non-Big 8 accounting firms remain with the Big 8 acquirer.

¹⁷ Figure 1 shows that small firms are more likely to switch auditors than are large firms. The fraction of small firms switching auditors between 1988 and 2005 ranges from 7.0% to 20.5% (Figure 1b), while the fraction of large firms switching auditors during the same period ranges from 2.2% to 5.2%.

Leverage also affects switching decisions. Chaney et al (2005) find that clients with higher leverage are more likely to choose non-Big 5 auditors, controlling for client firm size. There are two possible explanations for this result. First, audit fees are increasing in leverage for clients of Big 5 auditors, but not for clients of non-Big 5 auditors (Chaney et al 2005). High-leverage clients may therefore choose non-Big 5 auditors to reduce their audit fees. Second, highly-leveraged firms are more likely to be financially distressed firms. Such firms may face more conservative accounting choices by their auditors, which could induce them to switch auditors to seek more favorable accounting choices.

5. Sample and Descriptive Statistics

The sample selection process is described in Table 1. The sample consists of all firms in the Compustat database for at least two successive years during the period 1996-2005 and that were clients of a Big X auditor during initial year of each two-year period.¹⁸ ADRs were deleted. Banks and other financial firms (SIC 6000 – 6999) have different operating characteristics than other firms, so I exclude them from the sample. I also omit observations with incomplete Compustat data. For the year 2002, firms that were clients of Arthur Andersen in the previous year were also deleted from the sample. The former Andersen clients were forced to find new auditors when Andersen failed, and this is a fundamentally different auditor choice decision than the one modeled in this study. Counting them as switchers is not appropriate, because their “switching” resulted from an auditor failure. Classifying them as not having switched is not correct, either, because they actually did change auditors. Therefore I omit these firms from the sample.

¹⁸ It is necessary for a firm to be in the sample for at least two successive years to examine its switching behavior.

The estimation sample has 38,600 observations, or firm-year-pairs, from 1997-2005. A firm-year-pair is defined as a firm in the sample in years t and $t-1$, and was audited by a Big X auditor in $t-1$.

Table 2, Panel A lists the descriptive statistics for the two explanatory variables for the full sample and for the subsamples of small and large firms. For the small firms, the mean and median change in size, d_lna , is negative; for large firms, it is positive. Panel B lists the means of these variables by year. Mean assets (deflated) tend to increase over time. Panel C lists the Pearson correlations of the explanatory variables for the full sample and the two subsamples of small and large firms.

6. Results

Table 3 provides the parameter estimates for the multinomial logit model in (4). The top of Table 3, labeled Big-to-non-Big, contains the estimates associated with switching from a Big X auditor to a non-Big X auditor. The middle of Table 3, labeled Big-to-Big, contains the estimates associated with switching from a Big X auditor to a different Big X auditor.

The results for the full sample are reported in columns 1 and 2. All parameter estimates for the Big-to-non-Big option are significant at either the 1% or 5% levels. Big X clients with higher assets are less likely to switch to a non-Big X auditor than they are to not switch auditors ($\beta_{11} = -0.89$).¹⁹ Firms that are increasing in size are less likely to switch to a non-Big X auditor ($\beta_{12} = -0.82$). Compared to the option of not switching, firms with higher leverage are more likely to switch to a non-Big X auditor ($\beta_{13} = 1.98$). For the Big-to-Big option, all parameter estimates are significant at the 1% level, except

¹⁹ The first digit in the subscript indicates the choice option: '1' for Big-to-non-Big and '2' for Big-to-Big. For example, β_{11} refers to the estimated coefficient of lna for the Big-to-non-Big option, and β_{21} refers to the analogous coefficient for the Big-to-Big option.

the year dummy coefficients for 2002 and 2003, which are not significantly different than zero. Big X clients with higher assets are less likely to switch to a different Big X auditor than not to switch ($\beta_{21} = -0.12$), but are more likely to switch to a different Big X auditor than to a non-Big X auditor ($\beta_{21} - \beta_{11} = 0.77$; $\text{prob} > \chi^2 = 0.000$). Increases in firms size increase the likelihood of switching to a Big X auditor relative to not switching ($\beta_{22} = 0.27$) and make it more likely that a switching firm will switch to Big X auditor than to a non-Big X auditor ($\beta_{22} - \beta_{12} = 1.09$; $\text{prob} > \chi^2 = 0.000$). A Big X client with higher leverage is more likely to switch to a different Big X auditor than not to switch ($\beta_{22} = 0.82$), but is less likely to switch to a different Big X auditor than to a non-Big X auditor ($\beta_{23} - \beta_{13} = -1.16$; $\text{prob} > \chi^2 = 0.000$). The results for the small and large firms, in columns 3-6 of Table 3, are roughly similar to those of the full sample.

The test of the Anticompetitive Hypothesis has two parts. The first part determines whether the probability of switching from a Big X auditor to a non-Big X auditor in 2003 increased relative to trend. This part of the test is rejected for the full sample and for the small and large firm subsamples, since the estimated coefficients of the 2003 year dummy variables for the Big-to-non-Big option are not significantly different from zero.²⁰ The second part of the hypothesis test determines whether the probability of switching among Big X auditors in 2003 fell relative to trend. For each of the estimation samples, this prediction is not rejected, because the estimated coefficients of the 2003 year dummy variables for the Big-to-Big option are negative and significant. The Anticompetitive Hypothesis is rejected for the full sample and for the subsamples of small and large firms. In each case, the probability of switching from a Big X auditor to a

²⁰ The estimated coefficient of the 2003 year dummy variable indicates the incremental change in the likelihood of switching to a non-Big X auditor in 2003 net of trend.

non-Big X auditor in 2003 is not significantly different from zero after controlling for the trend. While the second prediction is not rejected, both predictions are needed to provide evidence consistent with anticompetitive behavior.

The test of the Increasing Relative Cost Hypothesis determines whether the probabilities of switching from a Big X auditor to a non-Big X auditor in 2004 and 2005 increased relative to trend. This hypothesis cannot be rejected for the full sample, for small firms, or for large firms. The estimated coefficients of the 2004 and 2005 year dummy variables for the Big-to-non-Big option are positive and statistically significant. The evidence is consistent with increasing relative costs of the Big X auditors in both 2004 and 2005.

So far the study has examined the statistical significance of the hypothesized effects. It is also useful to get a sense of the economic significance or magnitude of these effects. The relevant question is how much the events of interest—the post-Andersen consolidation and the implementation of Section 404 of the Sarbanes-Oxley Act—changed the relevant switching probabilities, controlling for other factors. To answer this question, I compute the how much the relevant probabilities changed in 2003-2005 relative to trend, controlling for other factors. The results are reported in Table 4.

Panel A of Table 4 shows how the probability of switching from a Big X auditor to a non-Big X auditor changed in 2004 and 2005, controlling for other factors. Since the probability of switching from a Big X auditor to a non-Big X auditor in 2003 was not significantly different than trend, the first column of Panel A lists the magnitudes as not significant (ns). For 2004, the change in the predicted probability of switching from a Big X to a non-Big X auditor is computed as follows. Using the Big-to-non-Big parameter

estimates in Table 3, I compute the predicted probability in 2004 by setting the 2004 year dummy variable to 1 and *lna*, *d_lna* and *lev* to their median values.²¹ I then compute the predicted probability with the 2004 year dummy variable set to 0 and the explanatory variables set to their median values. The change in the probability of switching from a Big X auditor to a non-Big X auditor in 2004 is equal to the difference. For the full sample, the incremental change (net of trend) in the predicted probability in 2004 is 2.28 percentage points. For small firms, it was 6.81 percentage points, and for large firms, 1.19 percentage points. The 2005 effects are computed using the same way. In 2005, the predicted probability of switching from a Big X auditor to a non-Big X auditor was 3.29 percentage points higher than trend for the full sample, 10.63 percentage points higher than trend for small firms, and 1.22 percentage points higher than trend for large firms.

Panel B of Table 5 shows how the probability of switching among Big X auditors changed in 2003 relative to trend, controlling for other factors. For the full sample, the predicted probability fell by 3.00 percentage points relative to trend. For small firms, the predicted probability fell by 3.28 percentage points relative to trend, and for large firms, it fell by 2.86 percentage points relative to trend.

Discussion

In recent years, there has been a transition of clients from the Big 4 auditors to non-Big 4 auditors. This study has examined two possible explanations for the transition: Big 4 anticompetitive behavior and an increase in the relative costs of the Big 4 auditors.

The evidence suggests that the increase in switching from Big 4 to non-Big 4 auditors was caused by increasing Big 4 costs associated with Section 404 of Sarbanes-Oxley Act, not from anticompetitive behavior. This finding corroborates the conclusion

²¹The median values of *lna*, *d_lna* and *lev* are listed in Panel A of Table 2.

of General Accountability Office (2003) in its study, which “found no evidence of impaired competition to date.” This has implications for policy makers who are concerned about the state of competition in the market for audit services. While both anticompetitive behavior and a relative cost increase would cause the Big 4 audit fees to increase by more than those of the non-Big 4, a fee increase resulting from anticompetitive behavior would likely be more enduring than one stemming from a cost increase. Normally one expects that anticompetitive behavior will be disciplined by entry of suppliers attracted by supra-competitive pricing. However, entry is unlikely in the top tier of the audit market due to severe barriers to entry (Government Accountability Office 2003). Several ideas have been advanced on how to increase competition in the top tier of the audit market, but the proposed solutions are problematic.²² One possibility is to break up the large accounting firms. This radical move would likely cause tremendous inefficiencies in the audit market and turmoil in capital markets. Another possibility is to encourage mergers of mid-tier firms. However, it is unrealistic that this would produce a firm that could compete with one of the Big 4. A third proposal is to require mandatory rotation. Given the burden posed on the Big 4 due to Andersen’s failure, this would likely put even more upward pressure on audit costs. Moreover, research suggests that mandatory rotation can lower audit quality (Myers et al 2003, Ghosh and Moon 2005). The good news is that if firms are not behaving anticompetitively, as suggested by this study, then there is no need to intervene to increase competition.

In contrast to anticompetitive behavior when entry is unlikely, a cost increase may be temporary. What happens in the future depends on the specific cause of the cost

²² These ideas are described in the report on auditor concentration written by the American Assembly (2005).

increase. Three possible causes of a Big 4 relative cost increase have been advanced in this study: (1) an increase in the relative Big 4 marginal costs of audit resources, (2) an increase in the Big 4 opportunity cost of audit resources, and (3) an increase in the Big 4 cost of risk associated with clients that receive adverse Section 404 reports.

If the cost increase is attributable to increased marginal costs, these costs should fall as more accountants enter the labor market. The upward pressure on marginal costs will also lessen as firms gain more experience with Section 404 implementation. The initial burden in complying with Section 404 is expected to fall in future due to learning effects (McGillicuddy 2006). The resulting reduction in demand for audit services should ease the increase in Big 4 marginal costs.

To the extent that the increase is due to increased opportunity costs, any reduction in demand stemming from Section 404 learning effects should relax the upward pressure on these costs as well. As the demand for Section 404 compliance services shifts down, this will free up Big 4 resources for marginally profitable audit clients.

Some of the increase in costs attributable to increased risk may decline as marginal costs fall. However, some of the cost increase could be due to an increase in resources being used to audit risky clients and to an increase in expected litigation costs from risky clients. Any cost increase from these factors would likely be more permanent than an increase stemming from marginal costs and opportunity costs. Unless the perceived riskiness of these clients falls, the Big 4 would continue to use more resources to audit them or resign from them due to high expected litigation costs.

One proposal for reducing the cost of auditing risky clients is to cap auditor liability. The Committee on Capital Markets Regulation recommends that Congress

explore liability caps to protect auditors from catastrophic liability (Committee on Capital Markets Regulation 2006). One concern with this proposal is that capping liability may reduce audit quality. On the other hand, auditor changes tend to reduce audit quality. If the cost of auditing risky clients makes switching more likely, then capping liability may increase quality by reducing the frequency of switching.

7. Conclusion

This study has examined how the recent consolidation of the audit market and the implementation of Section 404 of the Sarbanes-Oxley Act affected the switching behavior of clients of the top tier of audit firms. The results reject the hypothesis that the recent increase in switching from Big 4 auditors to non-Big 4 auditors was caused by anticompetitive behavior. Rather, the evidence is consistent with the hypothesis that the migration from the top tier of auditors was caused by an increase in the relative costs of the Big 4. The study has implications for policy makers who are concerned that recent consolidation may have reduced competition. While both anticompetitive behavior and a relative cost increase would cause the Big 4 audit fees to increase, a fee increase resulting from anticompetitive behavior would likely be more enduring than one stemming from a cost increase. An increase in Big 4 costs may be reversed as more accountants enter the labor market and as the Section 404 demands become less onerous. However, one possible source of cost increase that may be more permanent is the risk associated with adverse Section 404 opinions. Policy makers should take this into account when evaluating the proposal to cap auditor liability.

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Exhibit A Variable Definitions

Dependent Variable

equals 1 if the firm does not switch auditors, equals 2 if the firm switches to a non-Big X auditor, equals 3 if the firm switches to a different Big X auditor;

Experimental Variables

trend equals 1 in 1998 and is incremented by 1 each year through 2005;

y98 equal 1 in 1998, 0 otherwise;

y99 equal 1 in 1999, 0 otherwise;

y00 equal 1 in 2000, 0 otherwise;

y01 equals 1 in 2001, 0 otherwise;

y02 equal 1 in 2002, 0 otherwise;

y03 equal 1 in 2003, 0 otherwise;

y04 equal 1 in 2004, 0 otherwise;

y05 equals 1 in 2005, 0 otherwise;

Independent Variables

lna the natural log of firm assets (Compustat #6) in year t-1; assets deflated by the CPI;

d_lna the natural log of firm assets in year t minus the natural log of firm assets in year t-1;

lev long-term liabilities plus debt in current liabilities divided by market value of equity plus total liabilities (Compustat (#9 + #34)/(#25*#199+#181)), in year t-1.

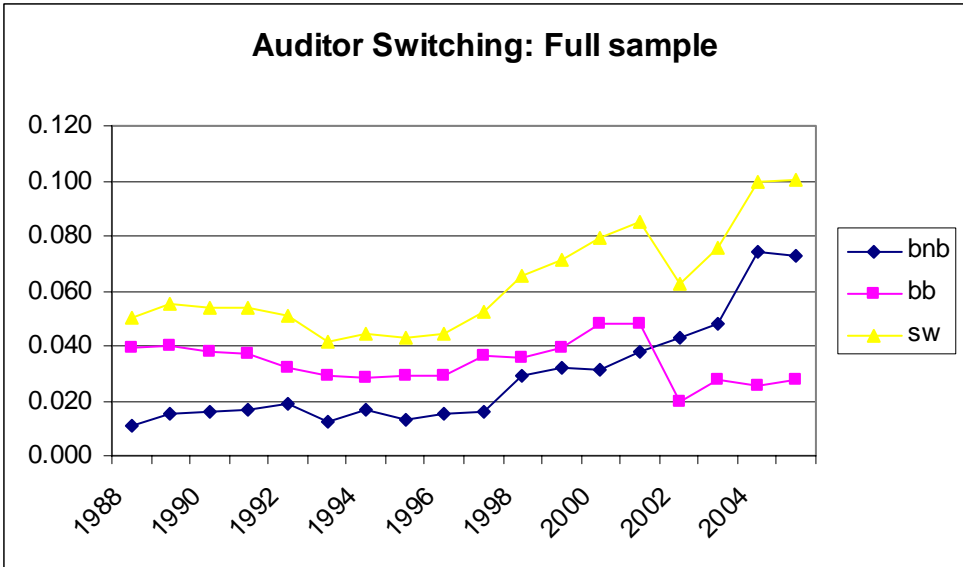


Figure 1a: The fraction of Big X client firms switching auditors (sw), the fraction of Big X client firms switching to a non-Big X auditor (bnb), and the fraction of Big X client firms switching to a different Big X auditor, 1988-2005, full sample.

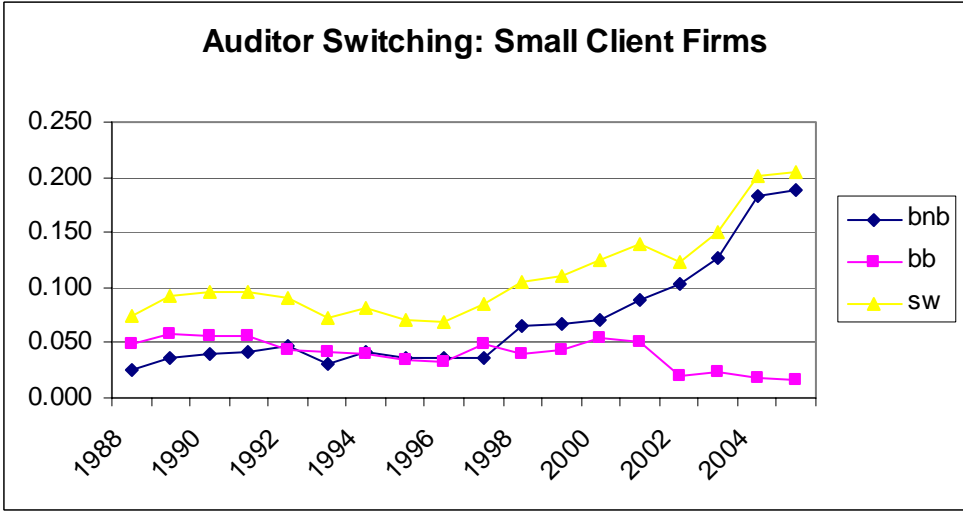


Figure 1b: The series are the same as in Figure 1a. Small client firms are those firms with assets below median assets of all Compustat firms by year.

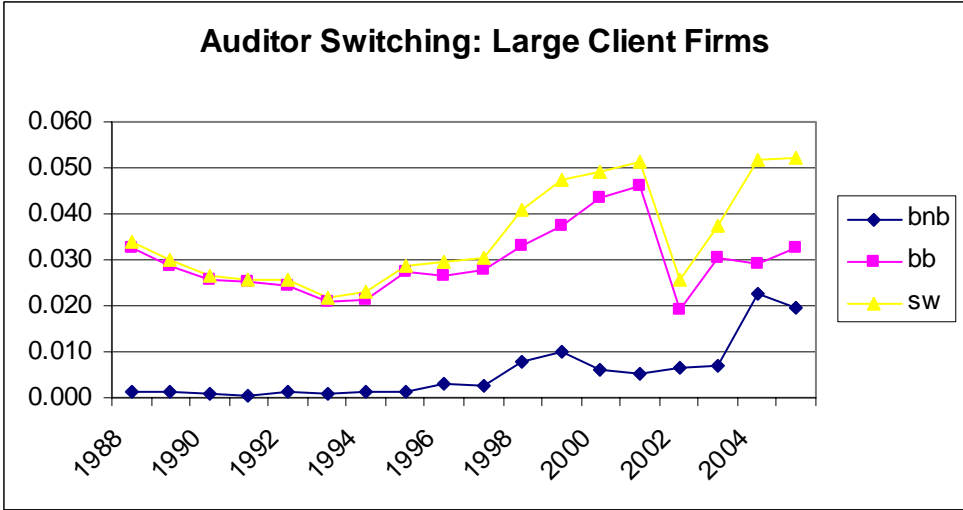


Figure 1c: The series are the same as in Figure 1a. Large client firms are those firms with assets above median assets of all Compustat firms by year.

Table 1
Sample Selection

	Estimation sample Observations
Firm-years included on Compustat Industrial File in 1996 to 2005	222,880
less observations:	
ADRs	214,606
financial firms	167,170
missing assets	73,832
missing auditor	73,033
non-Big X auditor in (t-1) ¹	58,921
audited by AA in 2001	58,092
single-year observation (no previous-year data)	46,116
missing explanatory variables	38,600
Total observations	38,600

¹Since the study examines the switching behavior of Big X client firms, it is necessary to omit firms audited by a non-Big X auditor in period t-1.

Table 2
Descriptive Statistics and Correlations¹

Panel A: Descriptive Statistics

	Variable	Mean	Std.dev.	Median
Full Sample (38,600 obs.)	lna	4.915	2.017	4.783
	d_lna	0.046	0.395	0.024
	lev	0.173	0.191	0.109
Small Firms ² (14,364 obs.)	lna	2.946	0.964	3.086
	d_lna	-0.054	0.447	-0.035
	lev	0.122	0.176	0.033
Large Firms ² (24,236 obs.)	lna	6.082	1.506	5.826
	d_lna	0.136	0.435	0.045
	lev	0.202	0.193	0.157

Panel B: Means by Year

Year	Full Sample			Small Firms			Large Firms		
	lna	d_lna	lev	lna	d_lna	lev	lna	d_lna	lev
1997	4.540	0.093	0.159	2.761	-0.017	0.115	5.741	0.168	0.189
1998	4.615	0.081	0.160	2.746	-0.045	0.114	5.767	0.158	0.188
1999	4.709	0.100	0.193	2.795	0.003	0.141	5.913	0.161	0.225
2000	4.826	0.090	0.190	2.953	-0.023	0.139	6.049	0.163	0.223
2001	4.967	-0.094	0.191	3.059	-0.236	0.140	6.158	-0.006	0.223
2002	4.990	-0.068	0.177	2.988	-0.179	0.127	6.214	0.000	0.207
2003	5.148	0.035	0.186	3.004	-0.026	0.129	6.260	0.067	0.216
2004	5.334	0.083	0.151	3.144	0.046	0.094	6.379	0.101	0.178
2005	5.596	0.059	0.135	3.463	0.016	0.072	6.576	0.079	0.163

Table 2
Descriptive Statistics and Correlations¹

Panel C: Correlations

Full Sample

	lna	d_lna
d_lna	0.009*	
lev	0.245***	-0.128***

Small Firms

	lna	d_lna
d_lna	-0.223***	
lev	0.117***	-0.116***

Large Firms

	lna	d_lna
d_lna	-0.226***	
lev	0.155***	-0.220***

¹Variables are defined in Exhibit A.

²Small firms are firms with assets below the median assets for all Compustat firms, and large firms are firms with assets above the median assets for all Compustat firms.

***, **, * indicate significance at the 0.01, 0.05, and 0.10 levels respectively

Table 3
Multinomial Logit Results¹

	Full Sample		Small Firms ²		Large Firms ²	
Independent Variables	Coefficient Estimates	z-stat.	Coefficient Estimates	z-stat.	Coefficient Estimates	z-stat.
Big-to-non-Big						
Intercept/ β_{10}	-1.12***	-12.53	-1.23***	-11.89	-0.76*	-1.73
lna/ β_{11}	-0.89***	-43.25	-0.87***	-27.97	-0.89***	-10.83
d_lna/ β_{12}	-0.82***	-13.52	-0.82***	-12.58	-0.67***	-3.19
lev/ β_{13}	1.98***	14.11	2.16***	13.71	1.37***	4.27
trend/ β_{1t}	0.20***	6.94	0.21***	6.77	0.12*	1.68
y02/ β_{1y02}	-0.11	-0.90	-0.10	-0.72	-0.21	0.58
y03/ β_{1y03}	0.07	0.52	0.11	0.71	-0.14	0.71
y04/ β_{1y04}	0.74***	4.60	0.64*	3.64	1.13***	2.79
y05/ β_{1y05}	0.85***	4.48	0.81***	3.93	1.06**	2.21
Big-to-Big						
Intercept/ β_{20}	-2.96***	-34.36	-3.04***	-18.86	-2.76***	-15.74
lna/ β_{21}	-0.12***	-7.76	-0.04	-0.86	-0.17***	-6.21
d_lna/ β_{22}	0.27***	4.25	0.38***	3.69	0.19**	2.02
lev/ β_{23}	0.82***	5.76	0.82***	3.48	0.77***	4.32
trend/ β_{2t}	0.11***	4.71	0.06*	1.83	0.15***	4.73
y02/ β_{2y02}	-1.00***	-6.95	-0.94***	-4.20	-1.04***	-5.60
y03/ β_{2y03}	-0.77***	-5.60	-1.16***	-3.99	-0.73***	-4.25
y04/ β_{2y04}	-0.88***	-5.55	-1.32***	-4.06	-0.85***	-4.29
y05/ β_{2y05}	-0.88***	-4.88	-0.77***	-3.89	-0.84***	-3.73
R ²	0.135		0.105		0.065	
Observations	38,600		14,364		24,236	
Log likelihood	-10,652		-6,667		-4,659	
LR	3,314		1,397		353	
Prob > LR	0.000		0.000		0.000	

¹This table contains the estimated coefficients and z-statistics from the multinomial logit model in equation (1). The coefficients for the choice option of switching from a Big X auditor to a non-Big X auditor are listed in the first part of the table, labeled “Big-to-non-Big.” The coefficients for the choice option of switching from one Big X auditor to a different Big X auditor are listed in the second part of the table, labeled “Big-to-Big.”

²Small firms are firms with assets below the median assets for all Compustat firms, and large firms are firms with assets above the median assets for all Compustat firms.

Variables are defined in Exhibit 1.

***, **, * indicate significance at the 0.01, 0.05, and 0.10 levels respectively

Table 4
Magnitude of Hypothesized Effects

Panel A: Change in predicted probability of switching from a Big X auditor to a non-Big X auditor (in percentage points)

	2003 versus trend	2004 versus trend	2005 versus trend
Full sample	ns	2.28	3.29
Small Firms	ns	6.81	10.63
Large Firms	ns	1.19	1.22

Panel B: Change in predicted probability of switching among Big X auditors (in percentage points)

	2003 versus trend
Full sample	-3.00
Small Firms	-3.28
Large Firms	-2.86