

# **AUDIT MARKET CONTESTABILITY IN THE POST-2002 ERA.**

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## AUDIT MARKET CONTESTABILITY IN THE POST-2002 ERA.

### ABSTRACT

The contestability of the U.S. audit market, i.e., the ability of audit firms of different sizes to effectively compete for a given auditee, is a matter of ongoing public interest (GAO [2003; 2008]). We investigate empirically how shocks to the supply and demand structure of this market in 2002 affected subsequent market contestability. Using a novel approach to measure changes in the contestability of audits of a particular size and risk, we find that post-2002 auditor switches and auditor retention reflect both increased market contestability and increased risk-avoidance by Big Four auditors. This evidence suggests a richer and more complex picture of post-2002 audit market competitive dynamics than has been documented in prior research.

# AUDIT MARKET CONTESTABILITY IN THE POST-2002 ERA.

## *1. Introduction*

Arthur Andersen LLP's mid-2002 exit from the U.S. audit market led to a significant reorganization of the supply side of that market and severely stressed the remaining Big Four<sup>1</sup> firms' audit capacity.<sup>2</sup> A concurrent string of high profile financial frauds heightened investor and regulator skepticism about audit quality, potentially impairing the perceived superior quality of, and demand for, Big Four audits. In response to these concerns, the U.S. Congress enacted the Sarbanes-Oxley Act (2002) which further exacerbated supply stress in the audit market by increasing large auditees' demand for audit effort. Our study investigates how these events affected the ability of auditors to effectively compete for audit clients of differing size and risk.

Competitive differences between Big N and smaller auditors can stem from two distinct sources: audit capacity and perceived differences in audit quality. As a practical matter, smaller auditors do not have the capacity to compete for larger, globally-dispersed clients (Doogar and Easley [1998], GAO [2003], GAO [2008]). As a result, the extent of effective competition in the audit market depends on the ability of smaller auditors to compete for auditees of a given size and risk and our tests of market contestability focus on the likelihood (probability) of a given auditee choosing a Non-Big-N auditor, and changes in that likelihood after 2002. Prior research suggests that Big N auditors rebalanced their audit client portfolios in response to post-Enron

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<sup>1</sup> For expositional convenience, we hereafter refer to audit firms as auditors, to the former Big Six or the former Big Five audit firms as the Big Six or Big Five auditors and the Big Six/Five/Four auditors as the Big N auditors. The 1998 merger of Coopers and Lybrand LLP and Price Waterhouse LLP reduced the then Big Six audit firms to the Big Five. Andersen's exit further reduced the set of leading auditors to the present Big Four (Deloitte and Touche LLP, Ernst and Young LLP, KPMG LLP and PricewaterhouseCoopers LLP).

<sup>2</sup> Andersen's exit triggered the largest ever one-time reorganization of U.S. audit capacity. In 2001, the year prior to its exit, Andersen was the third largest of the Big Five auditors with a market share (% of log auditee total assets) of about 15% of all Compustat auditees. Of 841 Andersen public auditees in our sample, 771 (70) migrated to a Big Four (a Non-Big-Four) auditor. The Big Four also recruited many Andersen personnel. The stress on Big Four audit capacity resulting from managing the unprecedented influx of new auditees and employees while maintaining audit quality was widely reported in the business press (Krantz [2004], Plitch and Wei [2004], Browning [2005]).

capacity constraints (Landsman et al. [2008]) as did Middle Tier firms (Hogan and Martin [2007]), and that the flow of auditees from Big Four to Non-Big-Four auditors increased substantially after 2002 (Sullivan [2006]). Our analysis therefore examines all auditee flows between and across Big Four and Non-Big-Four auditors to shed light on post-2002 changes in the competitive dynamics of the audit market.

Several reports in the business press (Byrnes [2002], Stock [2003], Krantz [2004], Brewster [2005], Reilly [2006]) have argued that the events of 2002 eroded the perceived gap in audit quality between the Big Four and smaller auditors<sup>3</sup> reducing the relative appeal of Big N auditors to smaller but more desirable (less risky) auditees.<sup>4</sup> Steep increases in the cost of Big Four audits and service concerns [GAO 2006] were also thought to have reduced smaller auditees' perceived net benefits of being affiliated with a Big Four auditor. Collectively we expect these factors to increase Non-Big-Four auditors' ability to successfully compete for smaller and more desirable audits. Others have argued that these events increased risk-avoidance by Big Four auditors (Hindo [2003], O'Sullivan [2004], Plitch and Wei [2004], Browning [2005], GAO [2006]), leading to the expectation that post-2002, riskier auditees would be less likely to find a successor Big Four auditor. Factors potentially contributing to a migration of smaller and riskier auditees away from the Big Four include the auditors' need to free up capacity to better serve larger auditees, the need to maintain audit quality while coping with an unprecedented increase in audit burdens, and increased sensitivity to auditor reputation risk in the post-Enron environment.

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<sup>3</sup> A large body of research documents that Big N auditors are perceived to offer higher quality services than smaller auditors (e.g. Francis [2004], Simunic [2004]).

<sup>4</sup> For example Byrnes [2003] quotes Art Bowman, editor of Bowman's Accounting Report, an influential industry publication, explaining the logic for smaller auditees to Non-Big Four auditors in the post-2002 period as "There was no reason for them [small auditees] to be there [with Andersen] other than the security of one of the big names ... and that's not very secure any more." [insertions added]. Stock [2003] quotes Brian Rountree, an accounting professor, to the effect that "...investors just didn't see any real need for the Big Four opinion... if a company is in a steady state and they are self-sufficient, it may not be all that important."

Both increased contestability and increased Big Four risk sensitivity can be expected to lead Big Four auditors' post-2002 market shares to decline more substantially among smaller auditees. We investigate this issue by examining Big Four market shares by auditee size and how those shares change post-2002. As the arguments reviewed above suggest, the post-2002 flow of auditees can be expected to reflect the influence of *both* altered auditee perceptions of the net benefits from their current auditor affiliation as well as altered auditor perceptions of the costs and benefits of affiliation with their current and potential auditees. To shed light on the extent to which post-2002 auditee flows reflect changes in audit market contestability and/or changes in auditor attitudes to client risk, we investigate how the post-2002 likelihood of an auditee migrating to a Non-Big-Four auditor varies with auditee characteristics.

Our sample consists of all firms with data available on *Compustat* and *CRSP* for the period 1989-2006. Due to the perception that Big N auditors offer higher quality services than smaller auditors, outgoing Big N and Non-Big-N auditees face different tradeoffs in their choice of a successor auditor.<sup>5</sup> To mitigate the confounding influences of unobserved differences among outgoing Big N and Non-Big-N auditees that might affect our inferences, we study separately the choices made by each group of outgoing auditees.<sup>6</sup> In each case we investigate the extent to which the change in the pre- and post-2002 likelihood of an auditee migrating to a Big N auditor varies with auditee size and riskiness.

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<sup>5</sup> More specifically, differences in auditor and client wealth at risk as well as in the education, training, technical competence and industry expertise of their respective personnel can be expected to lead Big N and Non-Big-N auditors to differ in their client acceptance and separation norms and in the type of successor auditor to which their auditees migrate. In particular, outgoing Big N auditees can switch *laterally* to another Big N auditor (generally interpreted as neutral news) or switch *down* to a less reputable, smaller, auditor (generally interpreted as bad news). An outgoing Non-Big-N auditee, by contrast, can either switch *up* to a Big N auditor (good news) or switch laterally to another Non-Big-N auditor (neutral news). Prior research (see Section 2 for details) documents significant differences in characteristics of auditees making these types of switches during the pre-SOX period.

<sup>6</sup> A within-group analysis is more likely to mitigate the role of unobserved between-group differences in the choice of interest (Altonji, Elder and Taber, 2005).

Our evidence is consistent with both an increase in post-2002 audit market contestability and an increase in Big Four risk-sensitivity. Specifically, holding auditee risk constant, the likelihood of an auditee migrating to a Non-Big-Four auditor increases post-2002 (i.e., increased market contestability). At the same time, holding other auditee characteristics constant, the likelihood of a riskier auditee migrating to a Non-Big-Four auditor also increases (i.e., increased Big Four risk-sensitivity). Landsman et al. [2008] find that post-2002 auditee switches for Big Four client portfolios do not reflect an increase in these auditors' risk avoidance behavior. Hogan and Martin [2007], however, find that post-2002 both incoming and outgoing Middle Tier auditees are riskier than continuing Middle Tier auditees. Our analysis includes all types of auditor switches and documents a richer and more complex impact of the events of 2002 than do these studies. In particular, our analysis of auditor market shares is consistent with the capacity pressure explanation favored by Landsman et al. [2008]. However we also find, consistent with the risk-shifting documented by Hogan and Martin [2007], that holding other auditee attributes constant, the post-2002 likelihood of a riskier auditee migrating to a Non-Big-N auditor increases more than that of a less risky auditee.

Our study adds to a growing body of work that examines post-2002 changes in the audit market (Sullivan [2006], Rama and Read [2006], Landsman et al. [2008], Hogan and Martin [2007], GAO [2008]).<sup>7</sup> Our study makes two principal contributions to the literature. First, our findings that the events of 2002 resulted in both an increase in the contestability of the small auditee segment of the market *and* increased risk-avoidance by Big Four audit firms should be of

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<sup>7</sup> Other studies of the post-2002 audit market include Ho and Wang [2007] and Ettredge et al. [2007a] who focus on changes in audit fees, Schloetzer (2006) and Ettredge et al. [2007b]) who focus on the impact of SOX 404 reports on the choice of a successor auditor and Cassell et al. [2007] who examine changes in the cost of capital for Non-Big-N auditees. These studies do not address the broader causes of changes in post-2002 auditee flows.

interest to regulators and audit market participants. Second, our novel approach to examining shifts in market contestability should be of interest to audit market researchers.

The rest of the paper is organized as follows. In Section 2 we review prior and concurrent related research and state the research expectations. Section 3 describes research methods and data, Section 4 presents the results. We provide concluding remarks in Section 5.

## 2. *Related Research, Models of Auditor Change and Research Expectations*

### 2.1 PRIOR RESEARCH ON AUDITOR SWITCHING

Our study most closely relates to prior studies of *lateral*, *downward* and *upward* auditor switches.<sup>8</sup> For the purposes of exposition it is useful to differentiate between four types of auditee switches. Auditor switches are labeled as *BtB*, *NtN*, *NtB* or *BtN*, where the first letter (*B*, *N*) identifies the type of the predecessor (outgoing) auditor (*Big N* or *Non-Big-N*) and the last letter, the type of the successor (incoming) auditor.<sup>9</sup> We refer to auditees that do not switch auditors as *NCB*, no-change Big N, and *NCN*, no-change Non-Big-N auditees respectively.

Prior research on auditor switching for the most part examines characteristics of lateral Big N (*BtB*) and downward (*BtN*) switches. Studies find that during the pre-2002 era, *BtN* switchers are generally smaller and riskier than *BtB* switchers (Chow and Rice [1982], Nichols and Smith [1983], Schwartz and Menon [1985], Francis and Wilson [1988], Johnson and Lys [1990], DeFond [1992], Chaney et al. [1997], Krishnan and Krishnan [1997], Shu [2000], Sankaraguruswamy and Whisenant [2004]). Choi et al. [2004] also document that *BtN* switchers

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<sup>8</sup> Auditor switching is a long-standing topic of research interest. A complete review of the literature on this topic is beyond the scope of this study and we review only prior studies most directly related to our topic.

<sup>9</sup> We distinguish between eight types of auditees: the two additional types are former Andersen auditees that switch to Big N auditors (*AtB*) and those that switch to Non-Big-N auditors (*AtN*) auditees. We include the last two categories of auditees for descriptive purposes only. Our choice analysis excludes all fiscal year 2002 observations.

during the 1980-1998 period are, on average, smaller and riskier than continuing Big N auditees (the *NCB* and *BtB* subgroups taken together).

Post-2002 switches have been investigated in several recent studies. Sullivan [2006] finds post-Enron rates of *BtN* (*NtB*) switches to be significantly higher (significantly lower) than pre-Enron levels.<sup>10</sup> Ho and Wang [2007] examine the impact of post-2002 switching patterns on audit fees and audit fee premiums. Ettredge et al. [2007a] examine whether audit fees are a significant factor in client dismissals of auditors in the immediate post-SOX period while Ettredge et al. [2007b] investigate the impact of an auditor resigning from a company with a disclosed material weakness in internal control on the identity of the successor auditor.

Other recent studies also investigate the post-2002 riskiness of audit firm clienteles. Rama and Read [2006] find that Big 4 auditors resigned from more audit clients and less risky audit clients in 2003 relative to 2001. Landsman et al. [2008] investigate the realignment of Big N portfolios post-2002 and find that switches to and from big N auditors are consistent with rebalancing of their audit client portfolios in response to capacity constraints.<sup>11</sup> Hogan and Martin [2007] conduct a similar analysis that focuses on continuing, incoming and departing clients of Middle Tier firms. They find that Middle Tier firms accepted clients with higher risk characteristics relative to their existing client base after 2000.

Our study differs from the extant literature on post-2002 auditee flows as follows. First, our focus is on the overall competitiveness of the market. We distinguish auditees according to both source (predecessor auditor identity) and destination (successor auditor identity). More specifically, in our empirical analyses we examine separately the ability of smaller auditors to

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<sup>10</sup> She calls the post-2002 pattern of auditee flows the “great migration” since it reflects an unprecedented increase in the rate of downward switches coupled with an equally noticeable decline in the rate of upward switches.

<sup>11</sup> Landsman et al. [2008] also examine differences between dismissals and resignations pre- and post- Enron. Because they find that the distinction between dismissals and resignations is largely unimportant we do not pursue this distinction.

compete with Big Four auditors for (1) outgoing Big Four auditees, (2) outgoing auditees of other smaller auditors and (3) for the retention of their own auditees. Holding auditee origin constant better mitigates the influence of unobservable differences between Big N and Non-Big-N auditees on the choice of a successor auditor. Second, some prior studies focus on the choices made by a subset of auditees.<sup>12</sup> By including both types of lateral switches (lateral switches between Big N auditors and lateral switches between smaller auditors), as well as downward and upward switches, our study can speak more directly than prior studies to changes in the overall competitiveness of Big N and Non-Big-N auditors for auditees of a particular size and level of risk.

## 2.2 DETERMINANTS OF AUDITOR SWITCHES

A review of the literature reveals that the primary determinants of auditor switching are thought to be the auditor's litigation risk, the auditee's agency cost and auditee size. Accordingly, we organize our discussion of the literature around each of these three factors.

### *Auditor Litigation Risk*

Prior studies document a negative association between auditee profitability and auditor litigation risk (Krishnan [1994], Chaney et al. [1997], Shu [2000], Johnstone and Bedard [2003; 2004], Schloetzer [2006], Ho and Wang [2007], Landsman et al.[2008]). This literature suggests that auditor litigation is more likely when investors are concerned about poor firm performance. Rapidly growing auditees are also thought to pose greater financial reporting risk and thus higher auditor litigation risk (Stice [1991], Krishnan and Krishnan [1997], Shu [2000], DeFond [1992], Francis and Wilson [1988], Ettredge et al.[2007b]). Finally, several prior studies find that clients with a modified (non-standard) opinion are associated with higher auditor litigation risk

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<sup>12</sup> For example, Landsman et al. [2008] study switches to and from the Big N while Hogan and Martin [2007] study changes in the client portfolios of Middle Tier auditors.

(Krishnan [1994], Krishnan and Krishnan [1997], Johnstone and Bedard [2004], Landsman et al. [2008], Ho and Wang [2007]).

#### *Auditee Agency Costs*

Dopuch and Simunic [1980], Datar et al. [1991], and Dye [1995] argue that information asymmetry between investors and entrepreneurs or managers will lead auditees to reduce the cost of capital by appointing a higher quality auditor. A substantial body of work provides empirical evidence consistent with the proposition that auditees facing higher agency costs are more likely to seek out Big N auditors (e.g., Nichols and Smith [1983], Francis and Wilson [1988], DeFond [1992], Johnson and Lys [1990], Healey and Lys [1986], Blouin et al. [2007]).

#### *Auditee Size*

Other things held constant, larger auditees require greater audit capacity, auditor technical competence and auditor sophistication. As discussed earlier, this precludes smaller auditors from being effective competitors for larger auditees (Doogar and Easley ([1998]), GAO ([2003; 2008])). Thus auditee size constitutes an important factor that should be included in a model of auditor change.

### 2.3 RESEARCH EXPECTATIONS

We posit two sets of expectations. First, we expect that in the capacity constrained environment of the immediate post-2002 era, Big N auditors will find it optimal to maximize profit per unit of capacity by refocusing their practices on larger auditees and rebalancing their portfolios of audit clients away from smaller auditees.<sup>13</sup> We therefore expect Big N market shares in the small auditee segment to decrease but we would expect an increase, or at least no change, in the larger auditee segment where Non-Big-N auditors are not perceived to have the

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<sup>13</sup> This affect would be expected to be reinforced by any reduction in the perceived value of a Big N audit given higher audit costs (GAO [2006]).

capacity to compete.<sup>14</sup> Second, we examine the auditor choices in the post-2002 era for auditees with differing characteristics. If there has been an increase in the perceived quality of Non-Big-N audits relative to the Big N then we would expect to find that, holding other auditee characteristics constant, post-2002, less risky auditees are more likely to migrate to the Non-Big-N auditors. That is, Non-Big-N auditors can better retain and attract more desirable clients. Likewise, if there has been an increase in Big N selectivity with respect to risky clients then, post-2002, we would expect to find that holding other auditee characteristics constant, more risky auditees would be less likely to migrate to the Big N.

### *3. Methods and Data*

#### 3.1 METHODS

To examine changes in the pre-2002 gaps between the size and risk of auditees migrating between auditors of varying size, we conduct three multiple logit analyses that contrast, respectively, the characteristics of auditees changing between *BtB* versus *BtN*, *NtB* versus *NtN* and *NtB* versus *NCN* auditors. Based on the results of these empirical estimations, we then compute changes in the post-2002 likelihood of an auditee with a given set of attributes migrating to a Big Four auditor.<sup>15</sup>

Since a review of the literature reveals that the primary determinants of switching are thought to be the auditor's litigation risk, the auditee's agency cost, and auditee size, we include in our

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<sup>14</sup> There may be some very large auditees that for historical or idiosyncratic reasons prefer to remain with their existing, non-Big-Four auditors. Few such auditees would be expected to move to a Big Four auditor at a time when Big Four auditors' capacity is stressed.

<sup>15</sup> Since the probability of a given outcome predicted by the logit model is a non-linear function of all the explanatory variables, the marginal effect of a change in auditee characteristics on the outcome probability will generally depend on all auditee characteristics. Testing for the significance of the marginal effect over the entire sample of observations is problematic (Ai and Norton, [2003]). Bell et al. [2008] use an analogous approach in a setting where, like this study, the objective is to investigate comparative statics of changes in predicted outcomes from a non-linear process (in their case, audit labor usage under different audit production regimes).

analysis surrogates for each of these three factors fully interacted with an indicator variable for time period. Formally, the model we use is (excluding auditee subscripts):

$$\begin{aligned}
AudChg_t = & \alpha_1 + \beta_1 Return_{[t-2,t-1]} + \beta_2 Loss_{t-1} + \beta_3 Opinion_{t-1} + \beta_4 AsstGrowth_{[t-2,t-1]} \\
& + \beta_5 Leverage_{t-1} + \beta_6 MCap_{t-1} + \alpha_2 Period + \beta_7 Period * Return_{[t-2,t-1]} \\
& + \beta_8 Period * Loss_{t-1} + \beta_9 Period * Opinion_{t-1} \\
& + \beta_{10} Period * AsstGrowth_{[t-2,t-1]} + \beta_{11} Period * Leverage_{t-1} \\
& + \beta_{12} Period * MCap_{t-1} + \varepsilon_t
\end{aligned} \tag{1}$$

where variables are defined as follows (all data item numbers refer to *Compustat* data items and all fiscal years to Compustat fiscal years). The subscript  $t$  refers to the first auditee fiscal year audited by the new auditor.  $AudChg_t$  is an indicator variable the definition of which varies with the contrast of interest. In the first contrast,  $AudChg_t$  takes the value one for a *BtB* auditee, zero for a *BtN* auditee. In the second contrast,  $AudChg_t$  takes the value one for *NtB* auditees and zero for *NtN* auditees. In the third contrast,  $AudChg_t$  takes the value one for *NtB* auditees and zero for *NCN* auditees. To facilitate interpretation of the results, it may be useful to note here that in each of these definitions, a switch to a Big N auditor is always coded as a one.

Prior research suggests that auditor litigation risk, auditee agency costs and auditee size affect auditor choice.<sup>16</sup> We use four measures as surrogates for determinants of auditor litigation risk identified in prior research.  $Return_{t-2,t-1}$  is twelve-month size adjusted return during the auditee fiscal year immediately preceding the auditor change.<sup>17</sup>  $Loss_{t-1}$  takes the value one if  $ROA_{t-1}$  is negative and zero otherwise, where  $ROA_{t-1}$  is computed as earnings before extraordinary income scaled by assets (data 18/data 6).<sup>18</sup>  $Opinion_{t-1}$  takes the value one if the

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<sup>16</sup> While many measures have been used to surrogate for the three primary factors that drive auditor choice, only a few have consistently been found to possess significant explanatory power. An analysis of measures used in seventeen prior studies is available from the authors upon request.

<sup>17</sup>  $Return$  is measured as the stock return after deducting the corresponding size decile portfolio return accumulated over the twelve month period covering the fiscal year prior to the switch.

<sup>18</sup> We exclude Return on assets (ROA) from the primary analysis to avoid multicollinearity (the results of this and other sensitivity analyses are discussed at greater length in Section 4.4).

predecessor auditor's last opinion was other than a standard opinion (last digit of data item number 149 was other than 1), zero otherwise.  $AsstGrowth_{t-2,t-1}$  is the growth in total assets calculated as the percent change in *Assets* (data 6) from end of auditee fiscal year t-2 to end of auditee fiscal year t-1. Each of these four measures speaks to auditee desirability: more desirable auditees are those with lower auditor litigation risk. Our surrogate for auditee agency costs is  $Leverage_{t-1}$  measured as total liabilities/total assets (data 181/data 6) and that for auditee size is  $MCap_{t-1}$  or auditee market capitalization (data 199\*data 25).<sup>19</sup> *Period* takes the value one if the auditee's Compustat fiscal year is 2003 or later, and zero otherwise. To ensure that the  $AsstGrowth$  and  $MCap$  are comparable over time, we measure both *Assets* and  $MCap$  in constant dollars (1989=100) using the U.S. Bureau of Labor Statistics CPI deflator series (USBLS 2008).

### 3.2 DATA AND DESCRIPTIVE STATISTICS

Table 1 reports details of the sample selection process. The sample includes all available observations listed on both *CRSP* and *Compustat* reporting assets, sales, market capitalization and auditor identity for fiscal years between 1989 and 2006. We exclude auditees in SIC codes starting with the digits 49, 60 and 63 as *Compustat* does not consistently report auditor identities for these auditees throughout the period of our study.<sup>20</sup> The remaining 93,530 observations comprise the set of usable observations for the purposes of this study. Since the pattern of auditor changes during *Compustat* fiscal year 2002 was greatly affected by Andersen's exit, we omit the 4,755 observations related to that year from our main analyses of auditor alignment, yielding a final sample of 88,775 observations of auditor-auditee alignments during 1989-2001 and 2003-2006.

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<sup>19</sup> It may be argued that *Leverage* speaks to both auditor litigation risk and auditee agency costs. Our use of *Leverage* as a surrogate for agency costs is consistent with prior literature. We discuss the effects of including additional measures used in concurrent or prior related studies in Section 4.4.

<sup>20</sup> These SIC codes comprise of utilities (49), depository institutions (60) and insurance carriers (63).

Table 2 presents descriptive statistics on selected measures of auditee size, performance and risk that prior research identifies as potential determinants of auditor choice. Columns 1 through 3 present data for the full sample of 88,775 observations for the period 1989-2001 and 2003-2006. Subsequent columns of Table 2 (columns 4 through 15) present analogous statistics for the four principal subgroups of interest. Columns 4 through 6 reports data for auditees with no change in Big N auditor (*NCB*), columns 7 through 9 for auditees switching from Big N (to either a Big N (*BtB*) or a Non-Big-N (*BtN*) auditor), columns 10 through 12 for auditees switching from a Non-Big-N (*NtB* and *NtN* auditees), and finally columns 13 through 15 for Non-Big-N auditees not changing auditor (*NCN*).

The results reported in Table 2 are consistent with comparable data from past studies: Big N auditees (*NCB*) are larger (the mean and median *Asset*, *MCap* and *Sales* are the highest for this group), more likely to be profitable (the mean and median *ROA* for this subgroup are the highest and the mean *Loss* the lowest of all subgroups). *Opinion* and *Leverage* show no distinct differences between *NCB* and other subgroups. *NCB* auditees also have the highest median *Return (PreRet and PostRet)* of all subgroups: their stock price performance in the year before and following a switch is somewhat better. Departing Big N auditees (*DB*) are, on average, smaller than Big N auditees not changing auditors (*NCB*), but larger than either departing Non-Big auditees (*DNB*) or Non-Big-N auditees not changing auditors (*NCN*). Departing Big N auditees (*DB*) are less profitable than auditees retained (*NCB*), but about equally profitable as either Non-Big-N comparison group (*DNB* or *NCN* auditees). Overall, Table 2 documents systematic differences in attributes of continuing Big N auditees and other subgroups.

## 4. Results

### 4.1 AUDITEE MOVEMENT

Table 3 shows the distribution of observations by year and type of auditor. The sample is partitioned into one of eight mutually exclusive types of engagements based on the identities of the current auditor and the predecessor auditor. The last row of Table 3, panel A shows that of the 88,775 observations pertaining to the years 1989-2001 and 2003-2006, 82,714 cases ( $NCB 71007 + NCN 11707$ ) or about 93% of the sample observations involve no auditor change. Of the remaining 6,061 observations ( $88,775 - 82,714$ ), 4,050 cases involve departing Big N auditees ( $BtB 2472 + BtN 1578$ ) while the remaining 2,011 cases involve departing Non-Big-N auditees ( $NtB 1128 + NtN 883$ ). The changes in 2002 reflect the rearrangement of the Arthur Andersen auditees. We specifically exclude these auditor changes from 2002 from further analysis because, unlike studies specifically focused on the impact of the exit of Arthur Andersen, we wish to study the overall contestability of the audit market in the post-2002 period relative to earlier benchmarks. Overall, Table 3, panel A shows that about 7% of the sample engagements involve some type of auditor change, about two-thirds of which involve movement away from a Big N auditor and one-third, movement away from a Non-Big-N auditor.

Panel B of Table 3 summarizes the auditee movements. The first row of Panel B shows that between 1989 and 2001 approximately 4.1% of the sample ( $BtB 2.9\% + BtN 1.2\%$ ) move away from a Big N auditor. Of the departing Big N group 68% finds another Big N auditor (the  $BtB$  subgroup), while 32% (the  $BtN$  subgroup) moves to a Non-Big-N auditor. The second row of Panel B shows that between 2003 and 2006, departing Big N auditees comprise about 6.3% of the sample ( $BtB 2.2\% + BtN 4.1\%$ ). Only 35% of these auditees (the  $BtB$  subgroup) finds another Big N auditor while the remaining 65% move to a Non-Big-N auditor. Of the 2.2% of

auditees moving away from a Non-Big-N auditor during 1989-2001 in row one of Panel B, about 62% (the *NtB* subgroup) moves to a Big N auditor, the rest find another Non-Big-N auditor. During 2003-2006 the total fraction of auditees moving away from a Non-Big-N auditor remains constant at about 2.2% of the sample, but the proportions moving to Big N and Non-Big-N auditors are reversed: during the latter period, only 41% of departing Non-Big-N auditees moves to a Big N auditor (in contrast to 59% during 1989-2001) while 59% find another Non-Big-N auditor (in contrast to 41% during 1989-2001). This migration pattern is consistent with reports in the business press and findings in prior research (Sullivan [2006]) that the pattern auditee flows between Big N and smaller auditors during 2003-2006 differs from the pre-2002 pattern.

We initially consider the overall market shares reflected in the profile of engagements reported in Table 3. Figure 1 plots Big N market shares by auditee size quintile for the period 1989 to 2005. Quintile 1 consists of the smallest 20% of auditees by market capitalization during that year and Quintile 5 consists of the largest 20%. Big N market share within each quintile is measured as the fraction of auditees in that quintile audited by a Big N auditor (i.e. based on auditee counts). The break in the graph corresponds to the year 2002. Figure 1 shows that as expected the Big N dominate the supply of audits to top three quintiles of auditees throughout the entire period under study: their share of the top (second, third) quintile never falls below 96% (92% and 84% respectively). Between 1989 and 2001, their share of the fourth and fifth quintile of auditees (i.e. the smallest 40% of sample auditees) increases somewhat, but in 2003 and subsequent years, their share of these two segments falls dramatically. The overall (market-wide) Big N share during this period falls from 86.6% of all auditees (by count) in 2001 to 83.5% in 2003 and to 74.9% by 2005: the post-2002 era is a period in which overall Big N market share of the number of auditees declines by over 10% (from 86.6% in 2001 to 74.9% in

2005) but during which Big N dominance in the large (small) auditee segment increases (*decreases*).<sup>21</sup> Overall, Figure 1 shows that the actual pattern of post-2002 market share changes corresponds quite closely to our expectation of Big N auditors rebalancing their audit client portfolios in response to post-2002 capacity constraints. Additional multivariate evidence however is needed on the specific changes in the ability of Non-Big-N auditors to compete for more desirable (less risky) auditees.

#### 4.2 AUDITEE ATTRIBUTES AND AUDITOR CHOICE IN THE POST-2002 ERA

Table 4 presents the results of the three principal contrasts described above. Collectively these three contrasts address changes in the determinants of auditor choice (Big versus Non-Big), conditioned on the predecessor auditor (Big versus Non-Big) allowing for changes within and between the Big and Non-Big auditor groups.

The first seven rows of Column 1 of Table 4 show that during the 1989-2001 period, relative to departing Big N auditees that find a successor Non-Big-N auditor, departing Big N auditees that find a successor Big N auditor are: more likely to have had better stock market performance (the coefficient on *Return* is positive and significant at the 5% level), less likely to be loss-making (the coefficient on *Loss* is negative and significant at the 1% level), less likely to have a modified opinion (the coefficient on *Opinion* is negative and significant at the 10% level), more likely to face higher agency costs (the coefficient on *Leverage* is positive and significant at the 10% level) and larger (the coefficient on *MCap* is positive and significant at the 1% level).<sup>22</sup> The overall tenor of these findings is consistent with the results documented in prior studies of auditor choice in the pre-2002 era.

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<sup>21</sup> Much the same picture obtains if auditees are sorted into deciles or quartiles of market capitalization, or if quintiles are formed based on the magnitude of auditee total assets.

<sup>22</sup> Standard errors used to assess significance levels account for industry clustering at the 2-digit SIC level.

The next eight rows of column 1 of Table 4 show statistically significant coefficients for the interaction between the *Period*, indicator indicating the post-2002 period, and *AsstGrowth*, *Leverage* and *MCap*. The significant coefficients on some of the interacted variables establish support the overall inference that the pre- and post-2002 auditor choice models likely differ in the weights placed on different auditee attributes. However in the case of a non-linear model, the coefficients on the interaction terms do *not* indicate the true marginal effect of the interacted variables on the outcome likelihood, either in direction or in magnitude (Ai and Norton [2003], Hoetker [2007]).<sup>23</sup> A better course of action is to investigate how the likelihood of migrating to a Big Four auditor changes from the pre-2002 to the post-2002 period for a given set of auditee characteristics, a task we address in Table 5.<sup>24</sup>

Column 2 of Table 4 reports on the choices made by outgoing Non-Big-N auditees. In the pre-2002 period, the primary discriminant between departing Non-Big auditees that find Big N auditors and those that do not is auditee size. Auditees migrating to a Big N auditor are somewhat more likely to have a modified audit opinion (significant at the 10% level).<sup>25</sup> The next eight rows of column 2 show that in the post-2002 period, both pre-switch auditee stock market performance *Return*, and auditee size *MCap* increase relative to pre-2002 norms. The

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<sup>23</sup> Ai and Norton [2003: 123] observe that: "The magnitude of the interaction effect in nonlinear models does not equal the marginal effect of the interaction term, can be of opposite sign, and its statistical significance is not calculated by standard software." These studies offer two additional cautions that may be of interest in accounting and auditing research settings. First, if there is more than one interaction term, tests of significance of the marginal effect of the interaction term may not be feasible. Second, tests of significance of the marginal effect implemented in several widely used software packages are also misleading: testing the marginal significance at the mean is not descriptive of the significance elsewhere in the sample while the mean of the marginal significance at each sample point is sample specific and thus relatively less useful for generalized inference.

<sup>24</sup> In non-linear models the marginal effect of a variable depends on the values of the other explanatory variables. Comparing changes in outcome likelihoods by varying auditee characteristics permits a deeper understanding of the changes in the model over a range of values rather than a test of significance of differences at the sample mean. Bell et al. (2008) conduct a similar exercise to estimate marginal effects in a log-linear model of audit labor usage.

<sup>25</sup> While the notion that auditees for which the predecessor Non-Big-N auditor has issued a Non-standard opinion are more likely to move to a Big N successor is on the face of it counterintuitive, it is consistent with at least two scenarios, one in which the auditee has information that future performance will improve and the other in which the auditee wants to gain credibility even if the successor Big N auditor will, to reduce its risk, issue a modified opinion.

importance of *Opinion* also increases as does, to a lesser degree, *AsstGrowth*. As with column 1, the results reported in column 2 suggest a change in the underlying decision model that drives auditor changes in the post-2002 period. The impact of these changes on the likelihood of migrating to a Big Four auditor is more fully discussed in the context of the results reported in Table 5.

Column 3 of Table 4 sheds light on changes in the ability of Non-Big-N auditors to retain their auditees by contrasting attributes of Non-Big auditees switching to Big N auditors (*NtB*) and Non-Big-N auditees not changing auditors (*NCN*). The first seven rows of column 3 show that in the pre-2002 era, relative to auditees that do not change their Non-Big-N auditor, auditees that move to a Big N successor have better pre-switch stock returns (*Returns*), have higher *Leverage*, are more likely to be growing somewhat faster (*AsstGrowth*) and to have losses (*Loss*) and are larger (*MCap*). Overall these results suggest that during the pre-2002 era, auditee size, asset growth, leverage and better (worse) pre-switch stock market (accounting performance) positively affect the likelihood of a Non-Big-N auditee moving to a Big N auditor. In the post-2002 era, the salience of several (but not all) variables increases, suggesting as do columns 1 and 2, a shift in the post-2002 determinants of a Non-Big-N auditee migrating to a Big Four auditor.

Finally, the significant coefficient on *Period* in each column of Table 4 shows that after controlling for all other factors, the base rate of switches to Big N auditors has decreased while the rates at which Non-Big-N auditors are able to attract departing Big N and Non-Big-N auditees, and to retain their own auditees, has increased post-2002. We now turn to an examination of how these changes affect the pre-2002 likelihood of an auditee with fixed characteristics migrating to a Big N auditor.

#### 4.3 CHANGES IN LIKELIHOOD OF A BIG N SUCCESSOR AUDITOR

Table 5 reports the predicted probability of migrating to a Big N auditor in the pre- and post-2002 periods for auditees with specific attributes. To obtain a sense for the degree to which the roles of the explanatory factors have changed over time, it is necessary to consider how the likelihood of migrating to a Big N auditor has changed over time for auditees of particular characteristics. The marginal effect of any single factor in a non-linear process, such as that represented by the logit models reported in Table 4, depends on the levels of all the variables and it is, therefore, somewhat misleading to compute a single, *sample-wide* marginal effect (refer to Ai and Norton [2003] for further discussion, see Bell et al. [2008] for a similar approach).

Panel A of Table 5 presents the results of three comparisons for departing Big N auditees. Columns 1 and 2 report values of outcome likelihoods for a pair of low and high risk auditees with size and leverage set equal to the 10<sup>th</sup> percentile point of the sample of pre-2002 outgoing Big N auditees. Columns 3 and 4 (columns 5 and 6) consider pairs of low and high risk auditees with size and leverage set equal to the sample median (90<sup>th</sup> percentile point). That is, Columns 1, 3 and 5 (2, 4, and 6) report the probabilities of a low risk (high risk) auditee obtaining a Big N auditor conditional on the auditee's level of size and leverage. These probabilities are reported for the pre and post 2002 periods.

Column 1 of Panel A of Table 5, considers the case for an auditee with size, leverage and risk measures (*Return*, *Loss*, *Opinion* and *AsstGrowth*) set equal to the 10<sup>th</sup> percentile point of the sample of pre-2002 outgoing Big N auditees. The probabilities are computed using the coefficients reported in the first column of Table 4. This auditee can be thought of as representative of small pre-2002 auditees with low agency costs. As reported in column 1 the pre-2002 likelihood of a small, low leverage, low risk outgoing Big N auditee migrating to

another Big N auditor is 44.9%. Post-2002 the likelihood that the auditee in column 1 would find a successor Big Four auditor drops to a mere 2.5%. This reflects a 94.3% drop from the pre-2002 likelihood of obtaining a Big N auditor of (calculated as  $1 - 2.5\% / 44.9\%$ ). Other low risk groups, but with larger size and leverage, in Columns 3 and 5 show a similar pattern in that the post-2002 likelihood of obtaining a Big N auditor declines by 73.0% and 13.5%, respectively from the pre-2002 level. Columns 1, 3 and 5 show that departing low risk (i.e., more desirable) auditees are more likely to find successor Non-Big-N auditors in the post-2002 era, which is consistent with an increase in the ability of Non-Big-N auditors to compete for these clients.<sup>26</sup>

Columns 2, 4 and 6 report the probabilities of a high risk auditee obtaining a Big N auditor conditional on the auditee's level of size and leverage. Column 2 of Panel A of Table 5 considers a similarly sized and leveraged auditee to column 1, but with high risk, i.e., risk characteristics at the 90<sup>th</sup> percentile of the sample of pre-2002 outgoing Big N auditees. Focusing on the potential increase in risk aversion by Big N auditors, Column 2 shows that the drop in the likelihood of obtaining a Big N auditor falls from 40.5% in the pre-2002 period to 1% in the post-2002 period, a drop of 97.6%. Columns 4 and 6 show a similar pattern. In each size and leverage group, the likelihood of high risk auditees finding a successor Big N auditor drops in the post-2002 period relative to the pre-2002 period, which is consistent with the loss of more risky auditees by Big N auditors in the post-2002 period. Evidence reported in Columns 2, 4, and 6 collectively shows an increase in risk aversion by Big N auditors in the post-2002 period.

In addition, as might be expected, Panel A also shows that as auditee size and leverage increase, auditee risk plays a smaller role in determining the probability of migrating to a Big Four auditor. An additional pattern is worthy of note. Holding auditee size and leverage

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<sup>26</sup> The drop in likelihood for low risk auditees finding successor Big N auditors is equivalent to an increase in likelihood for low risk auditees finding Non-Big-N successor auditors.

constant, a change in auditee risk causes the likelihood of migration to a Big N auditor in the pre-2002 period to drop by 9.9% for a small auditee with low agency costs, by 5.1% for a medium sized auditee with average agency costs and by only 1.4% for a large auditee with high agency costs. The corresponding declines in likelihood in the post-2002 period are, however, much larger, ranging from 62.1% to 24.8%. That is, the marginal impact of risk on auditee likelihood of finding a Big 4 successor is decreasing in both pre- and post-200 period. However, the marginal impact of risk on auditee likelihood of finding a Big Four successor is much more negative in the post-2002 period for all sizes of clients than it was during the pre-2002 period.

Panel B of Table 5 reports an analysis similar to Panel A for outgoing Non-Big-N auditees. Column 1 of Panel B considers the case for an auditee with size, leverage and risk measures (*Return*, *Loss*, *Opinion* and *AsstGrowth*) set equal to the 10<sup>th</sup> percentile point of the sample of pre-2002 outgoing Non-Big-N auditees. The probabilities are computed using the coefficients reported in the second column of Table 4. Overall, Panel B provides strong support for the inferences drawn from Panel A. The likelihood of a small, lower-risk, auditee migrating from a Non-Big-N to a Big Four auditor drops from 42.2% pre-2002, to 9.6% after 2002 (Column 1). Likewise, in Columns 3 and 5, post-2002, larger and more highly levered but lower-risk Non-Big-Four auditees also show a decline in the likelihood of migrating to a Big Four auditor. Collectively this evidence is consistent with increased market contestability since it reveals that Non-Big-N auditors are more likely to attract and retain larger and low risk auditees in the post-2002 period. Moreover, and consistent with increased Big Four sensitivity to risk, the likelihood of a risky auditee migrating from a Non-Big-N to a Big Four auditor drops across all size and leverage groups (Columns 2, 4, and 6).

Overall, the evidence from Table 5 is consistent with both an increase in post-2002 audit market contestability, the ability of audit firms of different size to compete for public company audits, and a rebalancing of Big Four audit client portfolios with a higher probability of high risk clients switching to Non-Big-Four auditors. Our results with respect to auditor market shares and the role of auditee size in explaining post-2002 switches is consistent with the capacity pressure explanation proposed by Landsman et al. [2008]. We also find evidence consistent with the risk-realignment explanation documented in Hogan and Martin [2007]: Table 5 provides strong support for the proposition that in the post-2002 period, risky auditees are less likely to migrate to a successor Big N auditor. A key difference between prior studies and ours however is that, given our focus on contestability, and following recent research on the econometrics of non-linear models (Ai and Norton [2003], Hoetker [2007]), we examine the marginal effects to more directly consider the probability of an auditee with given characteristics switching in the post-2002 environment rather than examining changes in the determinants of the auditor switching decision.

#### 4.4 SENSITIVITY ANALYSES AND FURTHER DISCUSSION

Auditor switches usually happen after the end of auditee fiscal year  $t-1$  and before the financial reports for fiscal year  $t$  are ready for audit. Thus at the time of the switch both the outgoing and incoming auditor may have access to more current auditee performance data which may also explain the type of auditor change. To investigate this possibility, we estimated all the models using independent variables measured using data from the financial reports at the end of fiscal year  $t$ . The returns and changes in asset growth are therefore measured over fiscal year  $t$  in the latter specification. Table 6 presents the results of the contrasts reported in Table 4 using

post-switch measures in lieu of the pre-switch measures used in Table 4. The motivation for using ex-post measurements is to shed light on the forward-looking information likely to be observable by the successor auditor at the time of the auditor switch but not fully reflected in the auditee's pre-switch attributes used in this study. Table 6 strongly corroborates the findings in Table 4 of a post-2002 change in the auditor choice model as evidenced by an increase in the salience of *MCap* and *Leverage* in the later period.

In additional tests, we augmented the model reported in Table 4 with absolute value of discretionary accruals (*ABSDACC*), inventory and receivables (*INVREC*), auditor tenure (*TENURE*) and cash (*CASH*) as computed in Landsman et al. [2008]. These additions do not significantly improve model fit (Wald scores, model  $R^2$  or model C-score) or change our principal conclusions in any material respect.<sup>27</sup> We conclude that the overall conclusions of our study remain robust to the inclusion of several alternative and/or additional variables.

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<sup>27</sup> Untabulated results show that including these additional variables does not alter model  $R^2$  by more than 2% or the *C-Score* by more than 1%. None of the additional variables are significant in the pre-2002 period and none of the interaction terms are significant in the post-2002 period suggesting that the sensitivity of the switching decision to these variables did not change in the post-2002 period. We also added to the model in Table 4 a variable for clients mismatched with their auditor (*MISMATCH* as computed in Landsman et al. [2008]) with no material improvement in model fit (model  $R^2=0.24$ , *C-Score*=82%). Since we hold the predecessor auditor's identity (Big or Non-Big) constant in each contrast, *MISMATCH* in our contrasts proxies for very small auditees of Big N auditors in contrast 1 and large auditees of non-Big-N auditors in contrasts 2 and 3. The coefficient on *MISMATCH* is negative and significant (-0.825, p-value 0.000) while that of the interaction term *Period*\**MISMATCH* is not significant (-0.102, p-value 0.725) in contrast 1. The lack of a significant interaction coefficient suggests that the sensitivity of switches to *MISMATCH* did not increase in the post-2002 period. Empirically, in our sample estimating *MISMATCH* as a function of size alone generates about 96% of the model fit of the five-variable model used by Shu [2000]. We also added to the model in Table 4 an indicator variable (*SMALL*) that takes the value 1 if the auditee's total assets are less than \$50 million, 0 otherwise. The coefficients on *SMALL* (-0.902, p-value 0.000) as well as *Period*\**SMALL* (0.441, p-value 0.039) are both significant. The significance of the interaction term in particular suggests that the sensitivity of the choice of successor auditor to *SMALL* increased in the post-2002 period. Because we include *SIZE* and partition on client size in the subsequent table we do not include this variable in the primary analysis reported.

## 5. Conclusion

The circumstances leading up to the passage of the Sarbanes-Oxley Act in 2002 significantly altered the competitive landscape of the US audit industry. The noticeable change in the pattern of auditee migration from the Big N auditors to Non-Big-N auditors has been attributed to widely divergent causes ranging from an increase in audit market competitiveness (reduced auditee desire for affiliation with Big N auditors) to increased risk avoidance on the part of Big N auditors (increased client shedding by these firms). We present empirical evidence relevant to this debate by examining, relative to pre-disruption benchmarks (1989-2001), the auditor choices made by outgoing Big N and Non-Big-N auditees during the post-disruption period (2003-2006). The overall tenor of our evidence is that both market contestability *and* Big Four risk-avoidance increased in the post-2002 period. These findings present a richer and more complex picture of recent developments in the audit market than has been documented in prior research.

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**Table 1**  
Sample selection

The table summarizes the effect of the sample selection criteria and data availability requirements on the number of observations included in the sample. (Compustat data item numbers noted in parentheses.)

Observations common to CRSP and Compustat (1989-2006)	125,545
From which the following exclusions were made:	
Observations for which Total Assets (data 6), Sales (data item 12) and Market Capitalization (data 25*data 199) were missing	(2,336)
Observations for which auditor identity information (data 149) is missing	(22,798)
Observations with two-digit standard industrial code 49,60, or 63	(6,881)
Full sample of audit engagements for the period 1989-2006 (including 2002)	93,530
Observations with <i>Compustat</i> fiscal year 2002	(4,755)
Final sample of engagements for the period 1989-2001 and 2003-2006 (total number of observations excluding 2002)	88,775

**Table 2**

Descriptive statistics for the final sample covering years 1989-2001 and 2003-2006.

This table provides descriptive statistics for all available auditees and sub-samples categorized as follows: *NCB* auditees do not change their Big N auditor during the year in question, *DB* auditees switch from a Big N auditor to another Big N auditor or to a Non-Big-N auditor during the fiscal year in question (switches during 2002 by former Arthur Andersen auditees excluded), *DNB* auditees switch from a Non-Big N auditor to another Non-Big-N auditor or to a Big N auditor during the fiscal year in question, and *NCN* auditees do not change their Non-Big N auditor during the year in question. *Nobs* is the number of observations for the variable in question, *Mean* and *Median* are the pooled mean and median across all years. The Big N auditors are Arthur Andersen LLP (exited 2002), Arthur Young (Ernst & Young LLP w.e.f. 1989), Coopers & Lybrand LLP (PricewaterhouseCoopers w.e.f. 1998), Deloitte Haskins and Sells (Deloitte and Touche LLP w.e.f. 1989), Ernst & Young LLP (w.e.f. 1989), Ernst and Whinney (Ernst & Young LLP w.e.f. 1989), KPMG LLP, Price Waterhouse LLP (PricewaterhouseCoopers w.e.f. 1998), Touche Ross (Deloitte and Touche LLP w.e.f. 1989). The variables are defined as follows. For any auditee fiscal year, *PreRet* is twelve-month size adjusted returns during the immediately preceding fiscal year and *PostRet* is twelve-month size adjusted returns during the current fiscal year. *Opinion* takes the value 1 if the last digit of *Compustat* data item number 149 indicates other than a standard opinion, 0 otherwise. *Leverage* is Total Liabilities/Total Assets (data 181/data 6). *ROA* is Earnings before extraordinary income scaled by assets (data 18/data 6). *Assets* is Total Assets (data 6). *AsstGrowth* is Total Asset growth rate computed as the percent change in *Assets* from year t-1 to t. *Loss* takes the value 1 if  $ROA < 0$ , 0 otherwise. *MCap* is Market Capitalization (data 199\*data 25). *Sales* is Sales Revenue (data 12).

	<i>Sample</i>			<i>NCB</i>			<i>DB</i>			<i>DNB</i>			<i>NCN</i>		
	1 <i>Nobs</i>	2 <i>Mean</i>	3 <i>Median</i>	4 <i>Nobs</i>	5 <i>Mean</i>	6 <i>Median</i>	7 <i>Nobs</i>	8 <i>Mean</i>	9 <i>Median</i>	10 <i>Nobs</i>	11 <i>Mean</i>	12 <i>Median</i>	13 <i>Nobs</i>	14 <i>Mean</i>	15 <i>Median</i>
<i>PreRet</i>	80698	0.05	-0.11	64919	0.05	-0.09	3711	0.07	-0.18	1744	0.09	-0.20	10324	0.03	-0.20
<i>PostRet</i>	79030	0.04	-0.11	64007	0.04	-0.09	3417	0.10	-0.15	1712	-0.03	-0.27	9894	0.03	-0.20
<i>Opinion</i>	88770	0.27	0	71004	0.27	0	4048	0.29	0	2011	0.27	0	11707	0.28	0
<i>Leverage</i>	88634	0.51	0.49	70881	0.51	0.49	4044	0.56	0.51	2011	0.50	0.47	11698	0.48	0.43
<i>ROA</i>	82724	-0.04	0.06	66180	-0.01	0.07	3712	-0.18	0.02	1886	-0.18	0.01	10946	-0.14	0.03
<i>Assets</i>	88773	2071.70	111.28	71006	2503.90	161.13	4050	1020.40	61.13	2011	282.18	25.81	11706	121.18	18.38
<i>AsstGrowth</i>	88754	3.48	0.08	70997	1.06	0.08	4049	0.99	0.04	2009	1.99	0.09	11699	19.23	0.07
<i>Loss</i>	82724	0.30	0	66180	0.27	0	3712	0.43	0	1886	0.47	0	10946	0.43	0
<i>MCap</i>	88308	1634.90	112.52	70701	1976.50	164.34	4027	718.44	56.75	1994	177.30	26.07	11586	119.94	19.91
<i>Sales</i>	88655	1205.90	97.66	70919	1455.60	142.71	4043	556.39	52.13	2005	165.69	21.43	11688	93.66	17.03

**Table 3**

Distribution of engagements by type of predecessor and successor auditor (1989-2006).

Our sample consists of all firms with data available on *Compustat* and *CRSP* for the period 1989-2006. This table reports the frequency of auditor retention and auditor switches for the full sample selected as described in Table 1. The Big N auditors are as defined in Table 2. For the purposes of this table, auditees are classified as follows. *NCB* auditees do not change their Big N auditor during the year in question. *BtB* auditees switch from one Big N auditor to another during the year in question. *BtN* auditees switch from a Big N auditor to a Non-Big-N auditor during the year in question. *AtB* auditees switch from Arthur Andersen to another Big N auditor in 2002. *AtN* auditees switch from Arthur Andersen to another Non-Big-N auditor in 2002. *NCN* auditees do not change their Non-Big-N auditor during the year. *NtB* auditees switch from a Non-Big-N auditor to a Big N auditor during the year in question. *NtN* auditees are auditees that switch from one Non-Big-N auditor to another during the year in question. In every case, transitions from a predecessor Big N auditor to a successor Big N auditor in the year of merger (1989 for Arthur Young, Ernst and Whinney and for Deloitte, Haskins and Sells and Touche Ross and 1998 for Coopers and Lybrand and Price Waterhouse) or thereafter have been coded as *NCB*.

Panel A. Number of engagements, by type of predecessor and successor auditor, 1989-2006									
	<i>NCB</i>	<i>BtB</i>	<i>BtN</i>	<i>AtB</i>	<i>AtN</i>	<i>NCN</i>	<i>NtB</i>	<i>NtN</i>	<i>Total</i>
<i>Switch from</i>	<i>No</i>	<i>Big N</i>	<i>Big N</i>	<i>AA</i>	<i>AA</i>	<i>No</i>	<i>Non-B</i>	<i>Non-B</i>	
<i>Switch to</i>	<i>Change</i>	<i>Big N</i>	<i>Non-B</i>	<i>Big N</i>	<i>Non-B</i>	<i>Change</i>	<i>Big N</i>	<i>Non-B</i>	
1989	3600	159	62			747	93	38	4699
1990	3629	142	57			683	100	54	4665
1991	3789	145	52			694	54	32	4766
1992	4013	128	62			659	56	22	4940
1993	4373	122	49			747	60	17	5368
1994	4686	125	69			791	69	30	5770
1995	4871	157	57			788	86	24	5983
1996	5338	157	49			799	78	43	6464
1997	5378	197	54			796	80	30	6535
1998	5121	162	96			598	58	129	6164
1999	4851	189	104			584	66	85	5879
2000	4656	214	91			595	96	88	5740
2001	4171	209	95			517	75	78	5145
2002	3215	63	84	721	68	524	33	47	4755
2003	3576	99	130			558	47	47	4457
2004	3401	98	221			645	35	53	4453
2005	3118	101	227			804	44	64	4358
2006	2436	68	103			702	31	49	3389
Total	74222	2535	1662	721	68	12231	1161	930	93530
Total excluding 2002	71007	2472	1578			11707	1128	883	88775

  

Panel B. Average proportion of observations in each category as a fraction of the total.									
	<i>NCB</i>	<i>BtB</i>	<i>BtN</i>	<i>AtB</i>	<i>AtN</i>	<i>NCN</i>	<i>NtB</i>	<i>NtN</i>	<i>Total</i>
<i>Switch from</i>	<i>No</i>	<i>Big N</i>	<i>Big N</i>	<i>AA</i>	<i>AA</i>	<i>No</i>	<i>Non-B</i>	<i>Non-B</i>	
<i>Switch to</i>	<i>Change</i>	<i>Big N</i>	<i>Non-B</i>	<i>Big N</i>	<i>Non-B</i>	<i>Change</i>	<i>Big N</i>	<i>Non-B</i>	
Average (89-01)	81.1%	2.9%	1.2%			12.5%	1.3%	0.9%	100%
Average (03-06)	75.2%	2.2%	4.1%			16.3%	0.9%	1.3%	100%

**Table 4**

Auditee attributes and auditor choice during the periods 1989-2001 and 2003-2006.

This table reports logistic regressions providing comparisons of attributes of auditees making specific auditor changes during the periods 1989-2001 and 2003-2006. The variables are defined as follows. In column (1) the dependent variable takes the value 1 for auditees switching from one Big N auditor to another Big N auditor during the year in question (*BtB*), and 0 for auditees switch from a Big N auditor to a Non-Big -N auditor (*BtN*). In column (2) the dependent variable takes the value 1 for auditees switching from a Non-Big-N auditor to a Big N auditor (*NtB*), and 0 for a switch from one Non-Big-N auditor to another (*NtN*). In column (3) the dependent variable takes the value 1 for auditees switching from a Non-Big-N auditor to a Big N auditor (*NtB*), and 0 for Non-Big-N auditees that do no change their Non-Big-N auditor during the year of interest (*NCN*). Explanatory variables are defined as follows (*Compustat* data item numbers in parentheses). All attributes are estimated using the pre-switch fiscal period. *Return* is twelve-month size adjusted returns during the fiscal year immediately preceding the fiscal year audited by the incoming auditor. The following variables are computed using financial statement data from the fiscal year immediately preceding the first fiscal year audited by the incoming auditor. *Loss* takes the value 1 if  $ROA < 0$ , 0 otherwise. *ROA* is Earnings before extraordinary income scaled by assets (data 18/data 6). *Opinion* takes the value 1 if the last digit of *Compustat* data item number 149 is other than 1 (modified opinion), 0 otherwise. *AsstGrowth* is Total Asset growth rate computed as the percent change in Assets (data 6) from year t-1 to t. *Leverage* is Total Liabilities/Total Assets (data 181/data 6). *MCap* is Market Capitalization (data 199 \* data 25). *Period* takes the value 1 if the auditee's *Compustat* fiscal year is 2003 or later, 0 otherwise. *C-Score* is the area under the Receiver Operating Characteristic curve.

	Comparisons		
	1	2	3
	<i>BtB</i> vs. <i>BtN</i>	<i>NtB</i> vs. <i>NtN</i>	<i>NtB</i> vs. <i>NCN</i>
<i>Return</i>	0.1328 **	0.0213	0.0710 ***
<i>Loss</i>	-0.2953 ***	0.0703	0.3399 ***
<i>Opinion</i>	-0.1107 *	0.2328 *	-0.0156
<i>AsstGrowth</i>	0.0002	-0.0016	0.0057 **
<i>Leverage</i>	0.3268 *	0.1153	0.2962 ***
<i>MCap</i>	0.5144 ***	0.2373 ***	0.2585 ***
<i>Period</i>	-4.1343 ***	-1.9887 ***	-1.2539 ***
<i>Period*Return</i>	-0.0194	0.5080 ***	-0.0233
<i>Period*Loss</i>	-0.3103	0.3546	0.0988
<i>Period*Opinion</i>	0.1459	-0.8836 **	-0.5982 **
<i>Period*AsstGrowth</i>	-0.4288 **	-0.5493 *	-0.3705 ***
<i>Period*Leverage</i>	1.1719 **	-0.3927	-0.4897 *
<i>Period*MCap</i>	0.2882 ***	0.3561 ***	0.1873 ***
<i>Constant</i>	-0.8000 ***	-0.5459 ***	-3.3287 ***
Goodness of fit measures			
$R^2$	0.232	0.061	0.038
<i>C-Score</i>	81%	65%	65%
Sample composition			
<i>Observations</i>	3346	1590	10342
Of which:			
<i>Dependent variable = 1</i>	2442	1289	8024
<i>Dependent variable = 0</i>	904	301	2318
<i>Period = 1</i>	2026	858	858
<i>Period = 0</i>	1320	732	9484

\*, \*\* and \*\*\* indicate significance at 10%, 5% and 1% levels of significance. Standard errors clustered by 2-digit sic code.

**Table 5**

Changes in the probability of migration to a Big Four Auditor, pre and post-2002

Columns 1 and 2 present the analysis for small auditees (auditee size and leverage set at the 10<sup>th</sup> percentile of sample values) with low and high risk levels defined as, respectively, the 10<sup>th</sup> and 90<sup>th</sup> percentile of sample values of the four risk measures (*Return*, *Loss*, *Opinion* and *AsstGrowth*). Columns 3 and 4 present the corresponding analyses for a medium- sized auditee (auditee size and leverage set at the sample median) while columns 5 and 6 present that for a large auditee (auditee size and leverage set at the 90<sup>th</sup> percentile of sample values). Coefficients used to compute the probabilities are reported in Table 4.

Panel A. Example based on Pre-2002 Departing Big N Auditee Characteristics						
	10 <sup>th</sup> percentile of auditee Size and Leverage		50 <sup>th</sup> percentile of auditee Size and Leverage		90 <sup>th</sup> percentile of auditee Size and Leverage	
	Low Risk 1	High Risk 2	Low Risk 3	High Risk 4	Low Risk 5	High Risk 6
Pre-2002 probability of a Big Four auditor	44.9% (a1)	40.5% (b1)	73.3% (a1)	69.6% (b1)	92.9% (a1)	91.6% (b1)
Percentage decline in pre-2002 probability due to change in risk characteristics [1-(b1/a1)]		9.9%		5.1%		1.4%
Post-2002 probability of a Big Four auditor	2.5% (a2)	1.0% (b2)	19.8% (a2)	8.4% (b2)	80.4% (a2)	60.5% (b2)
Percentage decline in post-2002 probability due to change in risk characteristics [1-(b2/a2)]		62.1%		57.4%		24.8%
Percentage decline in pre-2002 probability in post-2002 period [1-(a2/a1) or 1-(b2/b1)]	94.3%	97.6%	73.0%	87.9%	13.5%	34.0%
Panel B. Example based on Pre-2002 Departing Non-Big-N Auditee Characteristics						
	10 <sup>th</sup> percentile of auditee Size and Leverage		50 <sup>th</sup> percentile of auditee Size and Leverage		90 <sup>th</sup> percentile of auditee Size and Leverage	
	Low Risk 1	High Risk 2	Low Risk 3	High Risk 4	Low Risk 5	High Risk 6
Pre-2002 probability of a Big Four auditor	42.2% (a1)	50.6% (b1)	54.1% (a1)	62.3% (b1)	67.9% (a1)	74.8% (b1)
Percentage decline in pre-2002 probability due to change in risk characteristics [1-(b1/a1)]		-19.8%		-15.1%		-10.1%
Post-2002 probability of a Big Four auditor	9.6% (a2)	5.9% (b2)	22.4% (a2)	14.6% (b2)	49.8% (a2)	37.0% (b2)
Percentage decline in post-2002 probability due to change in risk characteristics [1-(b2/a2)]		38.5%		34.9%		25.8%
Percentage decline in pre-2002 probability in post-2002 period [1-(a2/a1) or 1-(b2/b1)]	77.3%	88.3%	58.6%	76.6%	26.6%	50.5%

**Table 6**

Auditee attributes and auditor choice during 1989-2001 and 2003-2006: post-switch attributes

This table reports logistic regressions providing comparisons of attributes of auditees making specific auditor changes during the periods 1989-2001 and 2003-2006. The explanatory variables are computed using financial statement data from the fiscal year audited by the incoming auditor. The variables are defined as follows. In column (1) the dependent variable takes the value 1 for auditees switching from one Big N auditor to another Big N auditor during the year in question (*BtB*), and 0 for auditees switch from a Big N auditor to a Non-Big -N auditor (*BtN*). In column (2) the dependent variable takes the value 1 for auditees switching from a Non-Big-N auditor to a Big N auditor (*NtB*), and 0 for a switch from one Non-Big-N auditor to another (*NtN*). In column (3) the dependent variable takes the value 1 for auditees switching from a Non-Big-N auditor to a Big N auditor (*NtB*), and 0 for Non-Big-N auditees that do not change their Non-Big-N auditor during the year of interest (*NCN*). Explanatory variables are defined as follows (*Compustat* data item numbers in parentheses). All attributes are estimated using the post-switch fiscal period. *Return* is twelve-month size adjusted returns during the fiscal year audited by the incoming auditor. The following variables are computed using financial statement data from the first fiscal year audited by the incoming auditor. *Loss* takes the value 1 if  $ROA < 0$ , 0 otherwise. *ROA* is Earnings before extraordinary income scaled by assets (data 18/data 6). *Opinion* takes the value 1 if the last digit of *Compustat* data item number 149 is other than 1 (modified opinion), 0 otherwise. *AsstGrowth* is Total Asset growth rate computed as the percent change in Assets (data 6) from year t-1 to t. *Leverage* is Total Liabilities/Total Assets (data 181/data 6). *MCap* is Market Capitalization (data 199 \* data 25). *Period* takes the value 1 if the auditee's Compustat fiscal year is 2003 or later, 0 otherwise. *C-Score* is the area under the Receiver Operating Characteristic curve.

	Comparisons		
	1	2	3
	<i>BtB</i> vs. <i>BtN</i>	<i>NtB</i> vs. <i>NtN</i>	<i>NtB</i> vs. <i>NCN</i>
<i>Return</i>	0.0140	-0.0108	-0.0228
<i>Loss</i>	-0.1237	0.2033	0.3835 ***
<i>Opinion</i>	-0.1698 *	0.0930	-0.0756
<i>AsstGrowth</i>	-0.0054	0.0221	0.0026 **
<i>Leverage</i>	0.1575	0.2341	0.1150
<i>MCap</i>	0.5354 ***	0.2886 ***	0.2565 ***
<i>Period</i>	-4.6181 ***	-2.1870 ***	-1.4993 ***
<i>Period*Return</i>	0.1485	-0.1496	-0.0080
<i>Period*Loss</i>	-0.2355	0.4488 *	0.3103
<i>Period*Opinion</i>	0.2008	0.1762	0.1747
<i>Period*AsstGrowth</i>	-0.0597	-0.2028	-0.0753
<i>Period*Leverage</i>	0.9958	-1.1184 ***	-0.7686 ***
<i>Period*MCap</i>	0.3458 ***	0.4218 ***	0.2134 ***
<i>Constant</i>	-0.7506 ***	-0.6697 ***	-3.1851 ***
Goodness of fit measures			
$R^2$	0.237	0.065	0.034
<i>C-Score</i>	81%	66%	64%
Sample composition			
<i>Observations</i>			
<i>Dependent variable = 1</i>	3123	1598	10146
<i>Dependent variable = 0</i>	2424	1370	8440
<i>Period = 1</i>	699	228	1706
<i>Period = 0</i>	2011	938	932

\*, \*\* and \*\*\* indicate significance at 10%, 5% and 1% levels of significance.

**Figure 1**  
Big N market shares by auditee size class (1989-2006)

Each year auditees are sorted into quintiles in increasing order of market capitalization so that Quintile 1 comprises of the smallest 20% of auditees during that year and Quintile 5 comprises of the largest 20%. The graph shows the Big N annual market share by quintile for the period 1989 to 2006. The break in the graph corresponds to the year 2002.



