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Audit Market Concentration and Auditor Tolerance for Earnings Management *

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Abstract

In recent years, policy makers have expressed concern about the risks posed by audit market concentration (i.e., high market shares for the dominant Big 4 audit firms) for audit quality. In this paper, we examine the relation between concentration at the local (i.e., metropolitan statistical area) level and auditor tolerance for earnings management during 2003-09. Specifically, we focus our analysis on clients that met (or beat) the analysts' earnings forecast but would have missed the target in the absence of positive (i.e., income-increasing) discretionary accruals. Using a sample of clients whose earnings *before* performance-adjusted discretionary accruals are below the consensus analysts' earnings forecast, we find higher concentration is associated with an *increased* likelihood of the client meeting or beating the earnings target. Our findings hold after accounting for the effects of concentration on audit fees, the potential endogeneity of concentration, and other variables identified in the prior literature to affect audit quality. A separate analysis of the earnings distributions for all companies covered by IBES during 2003-09 also suggests that higher concentration increases clients' propensity to just beat (rather than just miss) the analysts' earnings forecast. Collectively, our findings are consistent with the misgivings expressed by policy makers, i.e., that oligopolistic dominance of the audit market by the Big 4 fosters complacency among auditors resulting in a more lenient and less skeptical approach to audits and lowers service quality.

JEL Classification: M41

Key Words: Market concentration, Audit quality, Earnings management.

1. Introduction

In this paper, we examine whether concentration in US local audit markets affects the auditor's tolerance for earnings management by audit clients. In recent years, policy makers have expressed concern about the risks posed by auditor concentration (i.e., the market dominance of the Big 4 audit firms) for audit quality (GAO 2003, 2008; The American Assembly 2005; US Treasury 2008).[1] Basically, the concern is that market concentration limits a company's (particularly a large company's) choice of auditor, and that oligopolistic dominance can foster complacency among auditors resulting in a more lenient and less skeptical approach to audits and lower service quality (GAO 2008). Although prior research (e.g., DeFond et al. 2002) suggests that market-based institutional incentives (e.g., litigation exposure and reputation loss) promote audit quality, to the extent that these institutional incentives are not a guarantee of audit quality, audit market concentration could make auditors more tolerant of earnings management, thereby lowering audit quality.

However, although not addressed in the prior policy literature (e.g., GAO 2008; US Treasury 2008), an alternative view is that audit market concentration could increase, rather than decrease, audit quality. Basically, auditor concentration could raise audit quality by lowering the need to please the client and by strengthening the auditor's professional values and traditional commitment to the independent watchdog function. In particular, by lowering a company's (particularly a large company's) choice of auditor, a more concentrated environment may decrease

[1] The GAO (2003) notes that the Big 4 audit 78 percent of all publicly owned US companies, and over 98 percent of the 1500 largest public companies in the US. Separately, the Big 4 consists of Deloitte & Touche, Ernst & Young, KPMG, and PwC. Our study focuses on 2003-09, a time period following the dissolution of Arthur Andersen when the large international accounting firms were reduced to the current Big 4.

the cost to the auditor of reporting truthfully due to the reduced probability of the client switching auditors. In other words, the reduced fear of being replaced by a more compliant auditor ("opinion shopping") may discourage a "negotiation" mentality and make the individual auditor less inclined towards accommodating the client's need to manage reported earnings in an attempt to sustain the stock price. From this perspective, *higher* concentration could be associated with *higher* audit quality, by enabling the auditor to maintain independence and thus be in a better position to "pushback" and limit client-driven earnings manipulations.

To examine the effects of audit market concentration on audit quality, we focus on local audit markets in the US, a country with an established reputation for high litigation exposure. Our emphasis on the local audit market stems from prior research (e.g., Chaney and Philipich 2002; Penno and Walther 1996; Reynolds and Francis 2001; Wallman 1996), which suggests that audit markets are local, i.e., it is the local office that is the decision-making unit with respect to contracting with the client, administering the audit, and issuing the audit report. Thus, our primary measure of auditor concentration is the Herfindahl index for each year based on audit fees in the local (i.e., metropolitan statistical area or MSA) market in which the audit firm's local practice office is located. To examine the robustness of our findings, we compute the Herfindahl index based on all auditors and Big 4 auditors only, and based on client size (book value of assets or revenues) and number of clients. Following Francis et al. (2010), we also measure auditor concentration as the aggregate market share of the Big 4 as a group.

To assess audit quality, we follow the approach developed by Davis et al. (2009) to estimate the likelihood of a client utilizing income-increasing discretionary accruals to meet or beat the analysts' consensus earnings forecasts.[2] Specifically, it identifies clients that met (or beat) the

[2] Since accrual choices are jointly affected by client preferences as well as auditor discretion, it is difficult in practice to distinguish audit quality from financial reporting quality. Still, because

analysts' consensus earnings forecast but would have missed the target in the absence of positive (i.e., income-increasing) discretionary accruals. An advantage of this approach is that it is based on the client's incentive and means to meet or beat the earnings forecast.

Our sample covers the 2003-09 time period to avoid the potentially confounding effects of various events (such as the stock market collapse, and the criminal conviction of Arthur Andersen) during 2002. Specifically, it consists of 4,779 observations for which the client's nondiscretionary earnings (i.e., earnings per share *before* discretionary accruals) fell short of the analysts' consensus earnings forecast, i.e., observations where the client has the *incentive* to manage earnings upwards using income-increasing discretionary accruals. We also examine a reduced sample of 2,988 observations where we exclude clients with nondiscretionary earnings that fall short of the analysts' consensus earnings forecast by more than 5 percent of total assets, i.e., we exclude observations where the client cannot plausibly rely on income-increasing accruals to meet or beat the earnings forecast.[3] We supplement this analysis by following Altamuro et al.'s (2005) approach of comparing the distributions of earnings surprises using the Burgstahler and Dichev (1997) method to determine whether the clients' propensity to just beat (rather than just miss) the analysts' consensus earnings forecast is higher in more concentrated audit markets.

Our results indicate that higher concentration (as measured by the Herfindahl index) is associated with an *increased* likelihood of the client having sufficient positive discretionary accruals that together with the nondiscretionary earnings is equal to or greater than the analysts' consensus

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higher audit quality implies more credible financial reporting, consistent with prior research (e.g., Francis et al. 1999; Khurana and Raman 2004) we view accounting information quality as a consequence of audit quality.

[3] We use the 5 percent cut-off based on Dechow et al.'s (1995) suggestion that up to 5 percent of total assets is an economically plausible magnitude of earnings management.

earnings forecast (i.e., achieving the desired outcome of meeting or beating the earnings target). Our results hold across alternative measures of the Herfindahl index based on all auditors or Big 4 auditors only, and based on audit fees, client size or number of clients. However, we are unable to detect a relation between Big 4 market share and auditor tolerance for earnings management to meet or beat the earnings forecast. Overall, the evidence is consistent with auditor concentration manifesting itself in increased auditor tolerance for earnings management by clients.

We also find that our results are robust irrespective of whether the analysis is done at the client-year, MSA-year or the MSA levels. Moreover, our findings hold after accounting for the effects of concentration on audit fee pricing, the potential endogeneity of concentration, and other variables identified in the prior literature to affect audit quality. Our supplemental tests also reveal that clients in more concentrated local audit markets report more small positive "beats" and fewer small "misses" of the earnings benchmark than clients in less concentrated audit markets. Taken together, our results suggest that auditor concentration is associated with an increased auditor tolerance for earnings management by their clients.

Overall, we add to concurrent work examining the effects of audit market concentration. Using a cross-country research design, Francis et al. (2010) find that in countries where there is greater concentration within the dominant Big 4 group, clients exhibit *lower* earnings (audit) quality. By contrast, Kallapur et al. (2010) find that *higher* concentration in metropolitan US audit markets is associated with *higher* accruals (audit) quality during 2000-06. Our results using focused (conditional) samples based on US clients' incentive (as well as the means) to meet or beat the analysts' consensus earnings forecast suggests that in fact higher auditor concentration is associated with lower earnings (audit) quality.

Our study is important because it provides evidence relating to a topic that has seen relatively little empirical research yet remains an important public policy issue, i.e., whether auditor concentration has a beneficial or a detrimental effect on auditor reporting decisions. As pointed out by the GAO

(2008), concentration has had an adverse impact on choice, i.e., it has reduced the opportunity for Big 4 clients to switch auditors particularly given the new auditor independence requirements following the 2002 Sarbanes Oxley Act (i.e., the prohibition against obtaining an audit from a firm providing certain non-audit services) and the possible desire to avoid a competitor's auditor. In turn, reduced choice is seen as increasing auditor entrenchment and complacency, and potentially contributing to a more lenient and less skeptical audit for clients.

As a caveat, we note that the evidence in our study on the effects of auditor concentration on audit quality does not necessarily translate into the effects of competition on audit quality. Dedman and Lennox (2009) indicate that there are both theoretical and empirical problems in assuming that concentrated industries are less competitive. Consistent with Baumol et al. (1982) and Stiglitz (1987), they argue that there may be no relation between concentration and perceived competition because it is possible for competition to be intense even in highly concentrated markets as long as the market has at least two suppliers and/or current suppliers face the threat of entry from new rivals. For this reason, in our study we do not suggest that the high concentration in the audit market is equivalent to low competition.

The rest of the paper proceeds as follows: Section 2 describes and develops our hypotheses. Section 3 discusses our methodology and sample. The empirical findings are reported in Section 4, and Section 5 concludes the paper.

2. Hypotheses Development

Audited financial statements are an important observable outcome of the audit process. Our hypothesis (discussed below) relates to the discretion that auditors permit their clients with respect to the accruals reported in the audited statements. Specifically, since financial statements are prepared by self-interested managers, the auditor's role is to add credibility to the financial statements by limiting misstatement risk (Kinney 2005b). However, since GAAP allows the client to make a number of measurement choices, judgments, and assumptions about company prospects

in preparing the financial statements, the purpose of the audit is also to limit the bias in financial statements and otherwise control "corporate misconduct" risk (p. 101). Put differently, given managerial incentives for manipulating reported earnings (Bartov et al. 2002; Graham et al. 2005), the auditor's role is to limit the bias in reported financial statements by restraining client-driven earnings management. Consistent with this view, Becker et al. (1998) and Francis et al. (1999) examine discretionary accruals and report that Big 4 audits are associated with lower levels of earnings management than non-Big 4 audits.

However, one could argue that the use of discretionary accruals per se represents relatively coarse analysis in that the mere presence of these accruals is taken as sufficient evidence of earnings management.[4] Hence, consistent with Davis et al. (2009), we utilize an alternative metric that is more refined in that it requires a client to not only have the desired outcome (i.e., meet or beat the consensus analyst forecast), but also to have the incentive and the means to successfully accomplish the target outcome. Specifically, we require the client to have the *incentive*, i.e., to have nondiscretionary earnings (i.e., earnings before discretionary accruals) that are below the analysts' consensus earnings forecast. The client must then demonstrate the *means*, i.e., report sufficient income-increasing performance-adjusted discretionary accruals that when added to the nondiscretionary earnings allows the reported earnings to be equal to or greater than the analysts' consensus forecast. Put differently, as evidence of earnings management, the client must meet or beat the analysts' consensus earnings forecast that it would have missed in the absence of the

[4] In other words, the mere presence of discretionary accruals need not imply the prevalence of earnings management. Consistent with this argument, Carey and Simnett (2006) report conflicting results in their study on audit partner tenure in Australia, i.e., they find that long audit partner tenure is not associated with (unconditional) discretionary accruals, although they find a relation with the client's ability to beat earnings benchmarks.

discretionary accruals. The higher the likelihood of the client utilizing income-increasing discretionary accruals to meet or beat the analysts' consensus earnings target, the greater the auditor's tolerance of earnings management by the client.

What is the expected relation between concentration and auditor tolerance for earnings management? Auditor concentration could harm investors by lowering service quality (GAO 2003, 2008). This argument is multifaceted and proceeds as follows: The observable outcome of an audit is a standardized audit report that is normally a clean opinion. Given that audit quality is not directly observable, the audit testing underlying the standardized report can vary substantially and could be reduced in response to economic incentives (Kinney 2005a, p. 96). Moreover, Caramanis and Lennox (2008) suggest that reduced audit effort increases the likelihood of earnings management by managers. In audit markets with higher concentration, the fact that the client's choice of auditors is limited could make the incumbent auditor more complacent.[5] In turn, auditor complacency could lead to self-satisfaction (i.e., a lack of awareness of potential defects in the audit), less rigorous audit procedures, and a reflexive confidence in the client resulting in reduced skepticism of the client's accounting and business practices and a more lenient audit (GAO 2008).

Also, higher concentration may facilitate tacit collusion among the Big 4 auditors who dominate the market. As noted by Shepherd (1997), coordination need not be overt and could simply be conscious parallel behavior. Thus, auditor concentration in local audit markets could facilitate parallel behavior among the Big 4, and possibly result in cutbacks in traditional audit testing as a

[5] As noted previously, with respect to Big 4 clients, although it may appear that the client has a choice of three other Big 4 auditors, in reality there may be little or no choice due to auditor independence requirements, i.e., purchase of nonaudit services from non-incumbent Big 4 auditors, desire to avoid a competitor's auditor, etc.

way of coping with cost pressures and maintaining or increasing profit margins -- in the face of client resistance to higher audit fees -- *without* having to raise such fees. Along the same lines, Lemon et al. (2000) and Knechel (2007) suggest that the Big 4 can develop new audit methods (as a way of coping with market pressures) in parallel without necessarily collaborating. For both these reasons (auditor complacency and reduced audit work), higher auditor concentration in local audit markets could potentially be associated with a less skeptical and more lenient approach to the audit, greater tolerance of (i.e., *higher*) earnings management, and *lower* service quality.[6]

Alternatively, as discussed previously, higher concentration could strengthen the hands of the auditor vis-à-vis the client. In other words, the reduced opportunity for clients to switch auditors (i.e., the reduced risk of being replaced) could allow the auditor to play the watchdog role more effectively by "pushing back" harder against client-driven earnings management, and thus better serve investors by lowering the bias in reported financial statements. From this perspective, higher auditor concentration may be expected to be related to *lower* auditor tolerance of earnings management and, by implication, *higher* audit quality.

Because of these conflicting arguments, we do not predict the direction of the relation between auditor concentration and audit quality. Below, we state our hypotheses in the null form (H1) as well as the two competing alternative forms (H1a and H1b):

HYPOTHESIS 1: Ceteris paribus, there is no relation between auditor concentration in local audit markets and audit quality.

HYPOTHESIS 1a: Ceteris paribus, the higher the auditor concentration in local audit markets, the *lower* the audit quality.

HYPOTHESIS 1b: Ceteris paribus, the higher the auditor concentration in local audit markets, the *higher* the audit quality.

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[6]As noted previously, to the extent that litigation exposure and reputation loss are not sufficient as market-based institutional incentives for maintaining audit quality, auditor complacency and reduced audit effort cannot be ruled out as potential threats to audit quality in local audit markets.

3. Data and Research Design

Data and Sample

Table 1 summarizes the sample selection process. The sample is formed from the merged Compustat annual industrial files, including the primary, secondary, tertiary and full coverage research files. Excluded from our sample are utility and financial services clients, and industries (2-digit SIC code) with fewer than 10 client-year observations available to estimate the industry-specific modified Jones (1991) model for estimating discretionary accruals.[7] After excluding observations with missing data on control variables (discussed below), we are left with a sample of 22,125 client-years. For the meet or beat analysis, we then exclude observations (1) not in IBES (or with missing IBES data), (2) with fewer than 3 analysts following, and (3) with nondiscretionary earnings (i.e., earnings per share *before* discretionary accruals) that *exceed* the analysts' consensus earnings forecast, to obtain our meet or beat full sample of 4,779 client-years. We then exclude observations where the analysts' consensus earnings forecast exceeds earnings before discretionary accruals by more than 5 percent of total assets, to obtain our more narrowly focused meet or beat reduced sample of 2,988 observations where clients can plausibly rely on income-increasing accruals to meet or beat the earnings forecast.[8] These full (and reduced) sample of observations are obtained from a total of 87 (82) different metropolitan statistical areas

[7] Consistent with prior research (e.g., Fields et al. 2004), utilities and financial institutions are excluded because of their unique regulatory and operating characteristics.

[8] Thus, consistent with Dechow et al. (1995) who suggest up to 5 percent of total assets as an economically plausible magnitude for managing earnings using accruals, the reduced sample excludes observations that cannot plausibly rely on accruals to meet or beat forecasted earnings.

or MSAs.[9] Basically, for these 4,779 (and 2,988) observations the nondiscretionary earnings (i.e., earnings per share *before* discretionary accruals) was *below* the analysts' consensus earnings forecast. Finally, to reduce the influence of outliers, all variables are truncated at the 1st and 99th percentiles.

Meet or Beat Analysis

To test our Hypothesis 1, we estimate the following probit model (1):

MBE = f(HERF, SIZE, SHORT_TENURE, SALES_CHANGE, BOOK_TO_MARKET, LOSS, LEVERAGE, ISSUE, CFO, BIG4, SPECIALIST, AGE, CLIENT_IMPORTANCE, FEE_RATIO, LAGGED_ACCRUALS, LNDISTANCE, HORIZON, ANALYSTS, FORSTD, POS_UE) (1)

The dependent and independent variables in model (1) are defined in Appendix. Statistical inferences for the pooled probit regressions are based on "robust" t-statistics that are adjusted for residual correlation arising from pooling cross-sectional observations across time, i.e., the t-statistics are based on White (1980) heteroskedasticity adjusted robust variance estimates that are adjusted for within-cluster correlation where the MSA and fiscal year comprise the cluster ("two-way clustering" as discussed in Gow et al. 2010).

Dependent Variable

Recall that the analysis is based on a sample of observations where the client has the incentive to manage earnings, i.e., the client's earnings before discretionary accruals are below the analysts' consensus earnings forecast. Thus, the dependent variable MBE is equal to 1 if the client uses positive (i.e., income-increasing) discretionary accruals to meet or beat the analysts' consensus earnings forecast, and 0 otherwise. As discussed previously, variable MBE is a more refined

[9] As defined by the Office of Management and Budget (OMB), an MSA consists of a core area that contains a substantial population nucleus, together with adjacent communities that have a high degree of social and economic integration with that core. An MSA may include one or more entire counties and some MSAs may contain counties from more than one state.

measure of earnings management in that it requires the client to demonstrate both the incentive as well as the means to achieve the earnings target. Consistent with Kallapur et al. (2010), we estimate normal accruals based on Ball and Shivakumar (2006).[10] To estimate normal accruals under this approach, we augment the Jones model and control for the role of accounting conservatism on managers' discretion in reporting earnings by estimating the following model for each two-digit SIC code industry within each year, provided there are at least 10 observations.

$$TA_{it}/Assets_{it-1} = \alpha(1/Assets_{it-1}) + \beta_1(\Delta SALES_{it} - \Delta AR_{it})/Assets_{it-1} + \beta_2 PPE_{it}/Assets_{it-1} + \beta_3 CF_{it}/Assets_{it-1}, + \beta_4 DCF_{it}, + \beta_5 (CF_{it}/Assets_{it-1})*DCF_{it} + \varepsilon$$

Where TA is total accruals calculated as income from continuing operations less operating cash flows from continuing operations, ΔSALES is change in sales revenue, ΔAR is the change in accounts receivables, PPE is gross property and equipment, CF is cash flows from operations, *DCF* is an indicator variable equal to 1 if CF is negative and 0 otherwise, and the subscripts i and t denote firm and year, respectively. The discretionary accruals denoted as DA_BS represent the difference between total accruals and the estimated (fitted) normal accruals. The higher the absolute value of discretionary accruals, the lower the earnings quality.

Test Variable

In model (1), the test variable HERF is based on the Herfindahl index for the metropolitan statistical area (MSA) in which the audit firm's local practice office is located. Consistent with Kallapur et al. (2010), for each MSA and year, the index (HERF) is calculated by summing

[10] To better reconcile our results with those of Kallapur et al. (2010), we use the same approach as they do, i.e., compute normal accruals based on Ball and Shivakumar (2006) and for the discretionary accruals model (discussed below) the same independent variables SIZE through LAGGED_ACCRUALS.

(across all audit firms within the MSA) the squared fractional market share of each audit firm. Specifically, $HERF = \sum_{i=1}^{N} [s_i / S]^2$, where N is the total number of all audit firms in the MSA, s is the size of the audit firm local office as measured by total audit fees earned, and S is the size of the total audit market for the MSA.[11] The value of HERF is lower when all audit firms in the MSA are of equal size, and higher (with a maximum value of 1) when the audit firm market shares are unequal. The higher the metric, the higher the auditor concentration in the MSA. Thus, in a monopolistic market with a single supplier with 100 percent of the market share, HERF would equal 1. At the other extreme, in a very competitive market with say 100 suppliers with each supplier holding 1 percent of the market share, HERF would equal 0.01.

Table 2 provides descriptive statistics for variable HERF by MSA for our meet or beat full and reduced samples. For the 87 (82) MSAs in our meet or beat full (reduced) sample, the aggregate mean value for HERF was 0.289 (0.295), which is comparable to 0.281 HERF mean reported by Kallapur et al. (2010). Untabulated descriptive statistics of HERF by MSA indicates considerable variation in HERF over the 2003-2009 period for the 87 MSAs in our study, thereby pointing to an analysis at the client-year level.

[11] We also compute the Herfindahl index based on revenues of clients, book value of assets of clients, and number of clients. The four measures based on audit fees, revenues, assets, and number of clients are highly correlated, with correlation coefficients ranging from 0.911 to 0.939**,** suggesting that the four variables capture a similar construct. Consistent with Kallapur et al. (2010), we use HERF based on audit fees as the primary test variable in our regression models. Untabulated results using the other three measures reveal that our multivariate results with respect to auditor concentration hold irrespective of how we compute HERF.

What level of auditor concentration do these HERF numbers indicate? In 1982, the Department of Justice (DOJ) published formal guidelines for business mergers (later revised in 1997 by both the DOJ and the Federal Trade Commission) stating maximum levels of supplier concentration in terms of the Hirschman-Herfindahl Index or HHI (GAO 2008; Shepherd 1997). The range for the HHI is 100 to 10,000, whereas the range for the Herfindahl index (HERF) used in our study – as noted previously -- is 0.01 to 1. In other words, the HERF metric is simply the Hirschman-Herfindahl Index (HHI) divided by 10,000. According to the DOJ/FTC guidelines, an HHI under 1,000 (i.e., a HERF under 0.10) indicates an un-concentrated market (i.e., a market pre-disposed to suppliers being unable to exercise market power), an HHI between 1,000 and 1,800 (a HERF between 0.10 and 0.18) indicates moderate concentration, while an HHI in excess of 1,800 (a HERF in excess of 0.18) indicates high concentration. Thus, even the *lowest* mean HERF value reported in Table 2 (0.266 in the meet or beat full sample for MSAs with all Big 4 audit firms present) represents high auditor concentration. Collectively, the descriptive statistics in Table 2 confirm the high level of supplier concentration in the audit market during 2003-09 alluded to by the GAO (2003, 2008).

To examine the robustness of our findings, we compute two more concentration measures HERF_BIG4 and BIG4SHARE (also defined in Appendix) based on Francis et al. (2010) who examine audit market concentration and audit quality during 1999-2004 in 40 countries around the world. Francis et al. (2010) measure concentration (1) *within* the Big 4 based on the Herfindahl index of market shares for the Big 4 audit firms within a country (similar to our variable HERF_BIG4), and (2) based on the Big 4 market share defined as the percentage of listed companies audited by the Big 4 in a country (similar to our variable BIG4SHARE). By contrast, consistent with Kallapur et al. (2010), the HERF measure discussed previously is based on the Herfindahl index of market shares of listed companies for all audit firms within local US audit markets. Thus, the advantage of the HERF measure is that it uses all audit firms competing in the

local audit market for listed companies to obtain a more complete picture of auditor concentration. Given the competing arguments discussed in Section 2, we do not predict the sign for the coefficient on HERF (or HERF_BIG4 and BIG4SHARE) in the regressions.

Control Variables

The control variables (SIZE through POS_UE) are defined in Appendix. Prior research (Davis et al. 2009) suggests that SIZE (log of total assets) is related to forecast accuracy. Kallapur et al. (2010) suggest that a short tenure of the auditor (SHORT_TENURE) is related to a higher magnitude of discretionary accruals (lower audit quality). SALES_CHANGE and BOOK_TO_MARKET proxy for company growth; clients with higher growth tend to report more discretionary accruals. Loss making clients (LOSS) are more likely to take a big bath (i.e., less likely to manage earnings). Companies with more debt (LEVERAGE) are more likely to manage earnings to avoid breaching debt covenants. Clients that issue equity or debt (ISSUE) are more likely to manage earnings in order to raise capital. Prior research indicates that cash flow from operations (CFO) is also related to discretionary accruals and forecast accuracy. BIG4 controls for type of auditor. We also control for auditor industry specialization at the national and MSA levels (SPECIALIST). Since accruals may differ over the life cycle, we control for company age (AGE). To control for the influence of quasi-rents and nonaudit fees on the auditor's incentive to compromise independence, we include variables CLIENT_IMPORTANCE and FEE_RATIO. To control for variations in the reversal of accruals over time, we include LAGGED_ACCRUALS. Recent research by DeFond et al. (2011) examines the geography of SEC enforcement in explaining cross-sectional differences in the behavior of auditors and finds that both Big 4 and non-Big 4 auditors are more likely to issue going concern reports for clients that are headquartered farther away from an SEC regional office. Therefore, we control for proximity to a regional office of the SEC by including the distance from the MSA to the nearest regional SEC office (LNDISTANCE).

The other control variables included in the model are based on prior analyst literature. To control for client-specific cross-sectional differences that may explain forecast accuracy, we control for the number of months from the most recent available earnings forecast to the earnings announcement (variable HORIZON), the number of analysts following the client (ANALYSTS), and the forecast dispersion (FORSTD). Consistent with Davis et al. (2009), the predicted signs for HORIZON, ANALYSTS, and FORSTD are negative, positive, and negative, respectively. Finally, variable POS_UE controls for the positive relation between the change in earnings and the forecast error (Davis et al. 2009).

4. Empirical Findings

Meet or Beat Analysis

Panel A of Table 3 provides descriptive statistics for the dependent and explanatory variables in the meet or beat analysis. Variable MBE, the dependent variable in this analysis, is a dummy variable equal to 1 if the client utilized income-increasing performance-adjusted discretionary accruals to meet or beat the analysts' consensus earnings forecast, and 0 otherwise. Recall that to obtain the full and reduced samples for this analysis (n=4,779 and 2,988, respectively), we (1) exclude observations in which non-discretionary earnings (i.e., earnings per share *before* discretionary accruals) exceed the analysts' consensus earnings forecast, and (2) exclude observations in which the forecasted earnings exceeds nondiscretionary earnings by more than 5 percent of total assets. Thus, both samples consist only of observations where the client's earnings before the discretionary accruals is below the analysts' consensus earnings forecast. In panel A, variable HERF represents the Herfindahl index of concentration, such that the higher the index, the higher the auditor concentration. As discussed previously, the reported means (0.2886 and 0.2950) indicate high concentration as per US Department of Justice guidelines.

Panel B of Table 3 reports the correlation matrix for the full sample.[12] The pairwise correlations between the test variable HERF and the control variables are quite low, indicating that collinearity is not likely to be a problem in interpreting the regression results. Further, in the regressions discussed below, the variance inflation factors (VIFs) for the test variables were low (below 3) indicating that collinearity is unlikely to be an issue in interpreting the results.

Table 4 reports the probit regression results used to test Hypothesis 1, with Panels A and B reporting results for the meet or beat full and reduced samples, respectively. Each panel reports 3 regressions: first, a regression based on client-year observations; second, a regression based on MSA-year observations, i.e., a regression where client-year observations for a single MSA and year are collapsed into a single MSA-year observation by averaging each variable across all client observations within a MSA-year; and third, a regression where client-year observations for a single MSA and all years are collapsed into a single MSA observation by averaging each variable across all client-year observations within a MSA.[13] The control variables are generally significant with the expected signs, and consistent with prior research. In all six regressions reported in the two panels of Table 4, the test variable HERF is significant with a *positive* sign indicating that higher auditor concentration is associated with an *increased* likelihood of the client utilizing income-increasing discretionary accruals to meet or beat the consensus earnings forecast.

As discussed previously, the meet or beat analysis discussed in this section is based on a restrictive definition of earnings management, i.e., it focuses on clients with nondiscretionary earnings (i.e., net income less discretionary accruals) *below* the consensus analysts' earnings forecast, and thus with an incentive to utilize income-increasing discretionary accruals to meet or beat the earnings

[12] Pairwise correlations for the reduced sample were similar and are not shown for brevity.

[13] Estimates in the second and third column regressions are obtained from a grouped probit model (Greene 1997, pp. 894-896).

target. The results for this analysis indicate that after controlling for various client characteristics that are likely to influence forecast accuracy and discretionary accruals, higher auditor concentration is associated with a *greater* likelihood of the client having sufficient income-increasing discretionary accruals to meet or beat the earnings forecast. Thus, these findings suggest that auditor concentration impairs audit quality by increasing the auditor's tolerance for earnings management.

Table 5 presents results for the meet or beat analysis using the alternative test variables HERF_BIG4 and BIG4SHARE. Recall that in Table 4, the test variable HERF represents the Herfindahl concentration measure based on all auditors in the MSA (consistent with Kallapur et al. 2010). By contrast, in Table 5 the test variables HERF_BIG4 and BIG4SHARE represent the Herfindahl measure based only on Big 4 auditors and the market share of the Big 4 in the MSA, respectively (consistent with Francis et al. 2010). For our meet or beat full and reduced samples, the pairwise (untabulated) correlations between HERF and HERF_BIG4 were 0.926 and 0.938, respectively. Further, the pairwise correlations between HERF_BIG4 and BIG4SHARE for our meet or beat full and reduced samples (0.026 and 0.019, respectively) were not statistically significant.

In Table 5, for brevity we show the regression results for both the meet or beat full and reduced samples using only the client-year observations as the unit of analysis. In both regressions, the test variable HERF_BIG4 is significant with a *positive* sign indicating that higher auditor concentration is associated with an *increased* likelihood of the client utilizing income-increasing discretionary accruals to meet or beat the consensus earnings forecast. However, the BIG4SHARE variable is not statistically significant. Untabulated regression results using MSA-year observations or MSA observations as the unit of analysis were similar to those reported in Table 5 with one exception, namely, the coefficient on HERF_BIG4 was positive but not statistically significant in the MSA analysis for the meet or beat reduced sample. Collectively,

once again, the results suggest that after controlling for various client characteristics that are likely to influence discretionary accruals and forecast accuracy, higher auditor concentration is associated with a *greater* likelihood of the client utilizing income-increasing discretionary accruals to meet or beat the earnings forecast. Thus, the findings suggest that auditor concentration impairs audit quality by increasing the auditor's tolerance for earnings management.

Robustness Tests

In this section, we assess the sensitivity of our results by using instrumental variable estimation to address potential endogeneity bias, which would arise if concentration is itself driven by audit quality such as would occur, for example, if clients migrate towards (or away from) higher quality auditors, thereby affecting concentration. If auditor concentration is driven by audit quality, then the statistically significant positive association between MBE and HERF that we obtain could be due to endogeneity bias.[14]

We begin by identifying the exogenous determinants of HERF, termed the "instruments" for HERF. Consistent with Kallapur et al. (2010), since concentration is related to the number of Big 4 firms operating in an MSA and the size of the MSA, the exogenous determinants of concentration are likely to be factors that affect the auditor's decision to open an office in an MSA, i.e., the costs of operating in the MSA and how attractive the MSA is in terms of market size and business growth. Hence, consistent with Kallapur et al. (2010), we proxy (1) the costs of

[14] To examine the pervasiveness of the endogenity issue in our sample, we examine the number of clients who use an auditor from outside their MSA. We find that nearly 22 percent (1074 out of 4799) client years use auditors outside their MSA. Typically, this was common either in large urban areas that are in close geographical proximity (e.g., San Francisco-Oakland-Freemont, CA MSA and San Jose-Sunnyvale-Santa Clara, CA MSA) or in the smaller MSAs where auditor choice is limited (e.g. Midland, TX).

operating in an MSA by the median hourly wage rate for auditors and accountants in that MSA,[15] and (2) the attractiveness of the MSA by the geographic size of the MSA, the number of business establishments at the beginning of the year, and the number of businesses added during the year. We then regress HERF on these exogenous determinants (HERF instruments) plus the exogenous determinants of MBE as specified in model (1) (i.e., all the explanatory variables in model (1) except HERF). We retain the fitted value of HERF from this regression, which we call HERF_HAT. We calculate the test statistic for testing the null hypothesis that the coefficient loadings on the HERF instruments are jointly equal to zero. We then compare that statistic to the critical values reported in Table 2 of Stock and Yogo (2002), which defines an instrumental variable set as "weak" if a nominal 5% two-stage t-test exceeds 15% (i.e., the actual alpha risk exceeds the nominal 5% alpha risk by a factor of three). Based on this definition of instrument weakness, the instruments are considered weak if the first-stage test statistic falls below the tabulated critical values (Larcker and Rusticus 2010). The first-stage test statistic is F= 385.11, which easily exceeds the critical value of 22.30 reported in Stock and Yogo (2002) Table 2 (k=3, n=1, r=.10). Thus, the null of weak instruments is rejected for the MBE analysis.

Next, we conducted a test for overidentifying restrictions based on Lee (1992) to evaluate whether the instrumental variable "cure" is worse than the endogeneity bias "illness" (Larcker and Rusticus 2010). The resulting test statistics (χ^2 =6.184) rejects the null hypothesis that all instruments are exogenous (p=0.0454), indicating that one or more of the HERF instruments are not exogenous. However, we note that the large partial R^2 of the HERF instruments (30.15%, untabulated statistic) implies that any endogeneity within these instruments could be approximately one-third as large as the endogeneity between HERF and MBE, and still the instrumental estimator will have lower bias

[15] This data is obtained from the Occupational and Employment Statistics issued by the US Department of Labor Bureau of Labor Statistics (http://www.bls.gov/oes/oes_dl.htm).

than the uncorrected probit estimates. Moreover, the HERF instruments are quite strong and there is little if any theoretical basis for expecting endogeneity in these instruments.

Finally, we directly test for possible endogeneity bias in model (1) based on Smith-Blundell (1986). The null hypothsis of no endogeneity was rejected at the 0.0628 level of significance, which raises the possibility that the statistically significant positive association between MBE and HERF might be attributable to endogeneity bias. Based on this result, we proceeded to instrumental variable estimation of model (1), i.e., we reestimate model (1) by substituting HERF_HAT for HERF.

In instrumental variable estimation, the slope coefficient on HERF_HAT was positive and significant at the 0.002 (0.016) level for the full (reduced) sample, which is consistent with results reported in Table 4. Assuming the appropriateness of our instrumental variable approach, the instrumental variable estimates suggest that the statistically significant positive association between MBE and HERF is robust to possible endogeneity bias.

Additional Analysis Based on Absolute Discretionary Accruals

In this section, we attempt to reconcile our findings of a positive relation between concentration and an *increased* likelihood of the client meeting or beating the earnings target, with the findings of Kallapur et al. (2010) who find that higher concentration is associated with lower earnings management and, by implication, *higher* audit quality. A potential explanation for the divergent results is the extent to which the research designs in the two studies capture the incentives and the ability to meet or beat earnings targets. For example, Davis et al. (2009) regard discretionary accruals as a relatively coarse metric because the mere presence of discretionary accruals may not be sufficient evidence of earnings management.

Specifically, we examine the relation between concentration and absolute discretionary accruals for the full and reduced samples of 4,779, and 2,988 observations used in our meet or beat analysis. For this analysis, consistent with Kallapur et al. (2010), we use variable AQ (i.e., the

absolute value of discretionary accruals multiplied by (-1)) as the dependent variable, and estimate the following ordinary least squares model (2):[16]

AQ = f(HERF, SIZE, SHORT_TENURE, SALES_CHANGE, BOOK_TO_MARKET, LOSS, LEVERAGE, ISSUE, CFO, BIG4, SPECIALIST, AGE, CLIENT_IMPORTANCE, FEE_RATIO, LAGGED_ACCRUALS, LNDISTANCE) (2)

The dependent and independent variables in model (2) are defined in Appendix. Consistent with Kallapur et al. (2010), the argument is that to the extent that clients manage earnings, they are likely to seek to mitigate large positive earnings surprises (to avoid creating unrealistic expectations going forward), and may seek to manage income downward in good years and thereby reserve for the future.[17] As noted previously, the dependent variable AQ represents the negative value of absolute discretionary accruals, i.e., the absolute value of discretionary accruals DS_BS multiplied by (-1). Hence, consistent with Kallapur et al. (2010), the higher the AQ metric, the higher the accruals quality, and the higher the audit quality. In model (2), as discussed previously, HERF is the test variable. The control variables SIZE through LNDISTANCE were

[16] Kallapur et al. (2010) multiply the absolute value of discretionary accruals (DA_BS) by (-1) to give the discretionary accruals variable the interpretation of increasing audit quality. We do the same for ease of comparison with their results. Thus, a *positive* relation between auditor concentration and the negative value of absolute discretionary accruals suggests that higher concentration is associated with smaller absolute accruals, higher accruals quality and higher implied audit quality.

[17] Put differently, since accruals reverse over time, the argument is that earnings management behavior is better captured by absolute (rather than by income-increasing) accruals.

discussed previously in the context of model (1), and we do not repeat the discussion here for brevity.[18]

Table 6 reports the regression results for the discretionary accruals analysis, with Panel A using HERF as the test variable and Panel B using HERF_BIG4 and BIG4SHARE as the alternative test variables. In both panels, the first two regressions report results for the meet or beat full and reduced samples, respectively; the third regression is for "observations not in the meet or beat full sample" (discussed below). The control variables are generally significant with the expected signs. The findings for the control variables are consistent with prior research (e.g., Ashbaugh et al. 2003; Kallapur et al. 2010; Warfield et al. 1995) which basically suggests that the relation between discretionary accruals and the control variables are not always clear cut with coefficients differing in signs across studies.

In Table 6 (for both panels), in the first two regressions (for the meet or beat full and reduced samples, respectively) none of the test variables HERF, HERF_BIG4, and BIG4SHARE are significant. Recall that the test variable in Kallapur et al. (2010) is HERF. By contrast, variables HERF_BIG4 and BIG4SHARE are not examined by Kallapur et al. (2010) and we include it in Table 6 panel B only for completeness and consistency with Table 5.[19] In any event, the finding that HERF is not significant in the first two regressions in Table 6 (both panels) is *in*consistent

[18] From model (1) we omit the control variables HORIZON, ANALYSTS, FORSTD, and POS_UE since these variables relate specifically to forecast accuracy (Davis et al. 2009).

[19] As noted previously, (1) we include HERF_BIG4 and BIG4SHARE as test variables in our study for consistency with the international study by Francis et al. (2010), and (2) while HERF is highly correlated with HERF_BIG4 (pairwise correlation in excess of 0.92), the pairwise correlation between HERF_BIG4 and BIG4SHARE is not significant. Also recall that BIG4SHARE was not significant in Table 5.

with Kallapur et al. (2010) who indicate that audit clients in local audit markets with higher levels of auditor concentration have higher levels of negative absolute discretionary accruals. Thus, the results suggest that the Kallapur et al. (2010) finding does not hold for our focused (conditional) samples based on the client's incentive (as well as the means) to meet or beat the analysts' earnings forecast.

We repeat the discretionary accruals analysis for a new sample of 17,346 observations consisting of clients that reported discretionary accruals during 2003-2009 but did *not* meet the requirements for our restrictive (conditional) meet or beat analysis (i.e., non-IBES firms and IBES firms with earnings before discretionary accruals above the earnings target). Essentially, these 17,346 observations consist of the difference between the beginning 22,125 observations in Table 1 and the 4,779 observations in our focused meet or beat full sample.

In Table 6 (both panels), the third regression reports the regression results for this analysis. In panel A, the test variable HERF is significant with a *positive* sign indicating that higher auditor concentration is associated with negative absolute discretionary accruals. Similarly, in panel B, the test variable HERF_BIG4 is significant with a *positive* sign indicating that higher auditor concentration is associated with negative absolute discretionary accruals. These findings are consistent with Kallapur et al. (2010), and indicate that after controlling for various client characteristics that are likely to influence absolute discretionary accruals, clients in local audit markets with higher levels of auditor concentration have higher levels of negative absolute discretionary accruals. Thus, the finding suggests that auditor concentration has a beneficial effect audit quality by lowering earnings management.

Collectively, the results in Table 6 suggest that the Kallapur et al. (2010) finding that auditor concentration is associated with higher audit quality is driven by observations based on the implicit assumption that the mere presence of discretionary accruals is sufficient evidence of earnings management. By contrast, our meet or beat analysis (discussed previously) utilizing a

more restrictive sample of observations based on the client's incentive (and means) to manage earnings suggests the opposite, i.e., that concentration is associated with greater auditor tolerance for earnings management and potentially lower audit quality.[20]

Additional Analysis Controlling for Audit Fees

So far, we have conducted our empirical tests to examine the effects of concentration on audit quality by assuming away the effects of concentration on audit fees. However, if concentration impacts audit fees and audit fees impact audit quality, our documented association between concentration and audit quality may be due to the omission of fees from the audit quality model. Moreover, it is reasonable to expect that audit fees and audit quality may be jointly determined. Accordingly, in this section, we incorporate audit fees in the analysis and examine the joint effect of auditor concentration and audit fees on the auditor's tolerance for earnings management to meet or beat the consensus forecast (audit quality). For this analysis, our meet or beat (MBE) model is model (1) discussed previously. The audit fee model is based on Ashbaugh et al. (2003) and is as follows:

FEES = f(HERF, SIZE, BOOK_TO_MARKET, LOSS, LEVERAGE, ISSUE, BIG4, SPECIALIST, WAGE, MERGER, ROA, AR_IN, SPECIAL_ITEMS) (3)

In model (3), the dependent variable is the natural log of audit fees. The independent variables HERF through SPECIALIST also appear in model (1) and were discussed previously, while the variables WAGE through SPECIAL_ITEMS are unique to the audit fee model. Specifically, WAGE is the MSA median hourly wage rate of auditors and accountants as reported in the Occupational and Employment Statistics issued by the US Department of Labor Bureau of Labor Statistics (http://www.bls.gov/oes/oes_dl.htm); MERGER =1 if the client engaged in a merger as

[20] The analysis in Table 6 is based on the Kallapur et al. (2010) model for ease of comparison with the Kallapur et al results. Since this analysis utilizes absolute discretionary accruals, in alternative analysis we added the volatility of the client's sales, earnings, and cash flows as additional control variables (based on Hribar and Nichols 2007). Untabulated results indicated that the results were similar and the inferences unchanged from those reported in Table 6.

reported in SALE_FN of Compustat, =0 otherwise; ROA is net income divided by lagged total assets; AR_IN is the client's inventory plus receivables, deflated by total assets; and SPECIAL_ITEMS=1 if the client reports special items, =0 otherwise. Please see Appendix for other variable definitions.

To provide a benchmark for our two-stage analysis, we first present and discuss briefly the single-equation regression results *without* controlling for the joint effect of audit fees and concentration on the auditor's tolerance for earnings management. For our MBE model (model 1), we estimate a single-equation probit regression with variable MBE as the dependent variable, and variable FEES through POS_UE as the independent variables. These regression results, for the meet or beat full and reduced samples, are presented in the first column in Table 7 panels A and B, respectively, titled "Column 1: DV=MBE." In these regressions (both panels), note that variable HERF is significant with a positive sign indicating that concentration is associated with an increase in auditor tolerance for earnings management. However, the results indicate that the test variable FEES (audit fees) is not significant at conventional levels, suggesting that the audit fee has no effect on the auditor's tolerance for earnings management. However, the coefficient for FEES in this single equation analysis may be biased because FEES is potentially an endogeneous variable. However, note that the Smith-Blundell (1986) Chi-square statistics reported at the bottom of the first regression column in both panels A and B (Table 7) fail to reject the null hypothesis of no endogeneity.

In Table 7, for brevity we do not tabulate the first stage regression results with the dependent variable FEES regressed on the independent variables common to the MBE and FEE models (1) and (3) as well as the independent variables unique to these two models. Adjusted-R^2 values for the first stage models were around 78% for both the meet or beat full and reduced samples, which is comparable to the 66% reported in Ashbaugh et al. (2003). Partial F-statistics for the (untabulated) first-stage regression indicated that the independent variables unique to the audit

fees model (i.e., variables WAGE through SPECIAL_ITEMS serving as instruments for FEES) add explanatory power, i.e., the coefficients of these explanatory variables are *not* jointly equal to zero. [21] However, the partial R^2 of these instruments (around 9%) was relatively modest. The Amemiya-Lee-Newey (Lee 1992) test of overidentifying restrictions rejects the null, indicating that one or more of these independent variables unique to the fees model are not exogenous. Given that the instruments for FEES are relatively weak (albeit statistically different from zero) and are themselves potentially endogenous, and the Smith-Blundell test indicates no endogeneity in FEES, it is unclear whether the instrumental variable estimate is preferred over the probit results reported in the first column. Interestingly, in the (untabulated) first-stage models, the variable HERF was statistically significant at the 0.01 level with a negative sign, indicating that higher concentration is associated with lower audit fees. This finding is consistent with Pearson and Trompeter's (1994) empirical finding as well as Danos and Eichenseher's (1986) argument that concentration results in market leaders who benefit from economies of scale that result in lower overall audit fees.

In Table 7 (panels A and B), the second column -- titled "Column 2: DV=MBE" -- presents the second-stage regression for the meet or beat (MBE) model. In this regression, the test variable FEES is now substituted by the instrument variable FEES_I representing the fitted values from the first-stage regression with FEES as the dependent variable. Once again, in most instances, the signs of the coefficient estimates in the second-stage regression are in the predicted direction.

[21] Based on Stock and Yogo (2002), a set of instruments is considered weak if the partial F-stat falls below a critical value benchmark. In the first-stage regressions for both Panels A and B, the reported partial F-stats exceeded the critical value of benchmark of 26.87 (Stock and Yogo 2002, Table 2, n=1, k=5, r=.10). Thus, the null of weak instruments is rejected for the analyses reported in Table 7 panels A and B.

Note also that the variable HERF is significant with a positive sign, indicating that concentration is associated with an increase in auditor tolerance for earnings management. Finally, note that the instrument variable FEES_I is not significant. This finding is consistent with the single-equation probit results in the first column discussed earlier, i.e., the notion that audit fees do not impact auditor tolerance for earnings management and that controlling for audit fees, the higher the concentration, the greater the auditor tolerance for earnings management. In summary, our results provide support for the notion that concentration affects auditor behavior with respect to earnings management to meet or beat the analysts' consensus earnings forecast.

Additional Analysis Based on Companies' Earnings Distributions

In this section, we provide additional evidence on the relation between auditor concentration and earnings management by following the approach in Altamuro et al. (2005). Specifically, we examine the earnings distributions of clients using the Burgstahler and Dichev (1997) method in above- and below-median auditor concentration markets to test for differences in their propensity to just beat (rather than just miss) the analysts' consensus forecast.

Using all client-years covered by IBES during 2003-2009 (with the HERF measure available), we calculate for each client-year the magnitude of the earnings surprise (i.e., IBES actual annual earnings per share less the analysts' forecasted earnings per share). We then partition these client-year observations into two groups based on the value of HERF (above-median and below-median HERF) and construct annual histograms of earnings surprises for each of the two partitions. Given 7 years of data and 2 data partitions, we construct a total of 14 histograms (14=7 years×2 data partitions). The bin width in each histogram is 1 cent per share and the histogram bins range from a negative earnings surprise of $(-0.60) per share to a positive earnings surprise of $0.60 per share for a total of 121 earnings surprise bins in each annual histogram. We have a total of 1,694 bins (1,694=7 years×2 data partitions×121 bins/histogram).

Each of these 1,694 bins forms the unit of observation in the statistical analysis that we describe next.

For each of these 1,694 earnings surprise bins, we calculated three variables that are used in our statistical analysis. First, we calculate the unexpected number of earnings surprises, DIFF, as the difference between the actual and expected number of client-year observations within that bin. Consistent with Burgstahler and Dichev (1997), the expected number of clients for each bin equals the average number of observations in the bins to the immediate right and the immediate left of the bin of interest. For example, if 25 clients report an earnings surprise of $0.01, 40 clients report an earnings surprise of $0.02, and 35 clients report an earnings surprise of $0.03, the value of DIFF for the $0.02 bin is calculated as 40-(25+35)/2. DIFF is the dependent variable in our analysis.

Second, we create an indicator variable NETBIN = 1 if the bin is the positive $0.01 bin, = -1 for the negative $(-0.01) bin, and = 0 for all other bins. Third, we create an indicator variable HERF_ABOVE=1 (=0) if the bin is in a histogram created from the above- (below-) median HERF partition. In turn, this indicator variable HERF_ABOVE is multiplied by NETBIN to create the interaction variable NETBIN×HERF_ABOVE.

Next, we use the 1,694 annual bin-level observations of DIFF, NETBIN, HERF_ABOVE, and NETBIN×HERF_ABOVE to estimate the following regression model by ordinary least squares.

$$DIFF = \alpha + \beta_1 NETBIN + \beta_2 HERF\_ABOVE + \beta_3 NETBIN \times HERF\_ABOVE + \varepsilon \quad (4)$$

In model (4), the slope coefficient β_1 measures the extent of discontinuity in the earnings surprise histogram. For example, $\beta_1 > 0$ implies that more client years than expected reported a positive 1 cent per share earnings surprise and fewer client years than expected reported a negative 1 cent per share earnings surprise. The slope coefficient β_3 measures the extent to which the discontinuity in the earnings surprise distribution differs between bins in the above-median HERF partition compared to the below-median HERF partition. For example, $\beta_3 > 0$ implies that in above-median

auditor concentration markets the extent of discontinuity in the earnings surprise histogram is more severe than in below-median auditor concentration markets.

Table 8 presents the results for model (4). In Table 8, NETBIN has a positive and statistically significant coefficient, which implies that more client-years than expected reported a 1 cent per share positive earnings surprise and fewer client-years than expected reported a 1 cent per share negative earnings surprise, i.e., a discontinuity in the earnings surprise histogram around zero. The positive and significant coefficient on the interaction term NETBIN×HERF_ABOVE suggests that the extent of discontinuity in the earnings surprise histogram is greater under conditions of above-median auditor market concentration, i.e., clients in above-median auditor concentration markets are more likely to just beat (rather than just miss) the analysts' earnings forecast than other clients.[22] These results are consistent with the notion that the higher the auditor concentration in local US audit markets, the greater the auditor's tolerance of earnings management.

Concluding Remarks

The relation between market concentration and audit quality remains an important public policy issue (GAO 2003, 2008; The American Assembly 2005; US Treasury 2008). Given the new auditor independence requirements under the Sarbanes Oxley Act, having only four large auditors greatly reduces a client's opportunity to switch auditors and thereby entrenches the incumbent auditor. Also, although prior research suggests that market-based institutional incentives (i.e., litigation exposure and reputation loss) promote auditor independence, they do not guarantee audit quality. Hence, to the extent that auditor entrenchment contributes to auditor complacency and a

[22] Note that this type of analysis does not lend itself to testing HERF because it would require the construction of a separate histogram for each value of HERF (a continuous variable) – an obvious impossibility.

more lenient and less skeptical approach to audits (as suggested by the GAO 2008), auditor concentration could lower service quality, i.e., be related to greater auditor tolerance for earnings management to meet or beat the analysts' consensus earnings forecast, and to *lower* audit quality. Alternatively, to the extent that auditor entrenchment strengthens auditor independence and allows for greater "pushback" by the auditor, concentration could have a beneficial effect on audit quality, i.e., be related to a lower tolerance for earnings management to meet or beat the earnings forcast, and to *higher* audit quality. Hence, the relation between auditor concentration and audit quality remains an empirical question.

In our study, we examine a restrictive sample of observations based on clients that have the incentive (as well as the means) to manage earnings to meet or beat earnings benchmarks during 2003-09, i.e., we focus on clients that met or beat the consensus earnings forecast but would have missed the target in the absence of income-increasing discretionary accruals. Our results suggest that higher concentration at the local (MSA) level is associated with greater auditor tolerance for earnings management, i.e., an increased likelihood of clients with nondiscretionary earnings (i.e., earnings before discretionary accruals) *below* the earnings target utilizing income-increasing discretionary accruals to meet or beat the earnings benchmark. In other words, utilizing a more focused definition of earnings management, our findings suggest that higher concentration is associated with *lower* audit quality. These findings are robust to several sensitivity tests, and controls for potential endogeneity.

In separate analysis, we also examined the earnings distributions for all companies covered by IBES during 2003-09 to test for the relation (if any) between auditor concentration and companies' propensity (likelihood) to just beat (rather than just miss) the analysts' earnings forecast. Once again, we find evidence that clients in more concentrated audit markets are more likely to just beat (rather than just miss) the earnings benchmark. Thus, these results also suggest that auditor concentration is associated with an increase in the auditor's tolerance for earnings management.

Given that auditor concentration is an important topic that has seen relatively little empirical research, our study contributes to the literature by providing more complete evidence on the relation between auditor concentration and audit quality.

REFERENCES

Altamuro, J., A. Beatty, and J. Weber. 2005. The effects of accelerated revenue recognition on earnings management and earnings informativeness. *The Accounting Review* 80(2): 373-401.

Ashbaugh, H., R. LaFond, and B. Mayhew. 2003. Do nonaudit services compromise auditor independence? Further evidence. *The Accounting Review* 78(3): 611-639.

Ball, R., and L. Shivakumar. 2006. The role of accruals in asymmetrically timely gain and loss recognition. *Journal of Accounting Research* 44(2): 207-242.

Bartov, E., D. Givoly, and C. Hayn. 2002. The rewards to meeting or beating earnings expectations. *Journal of Accounting and Economics* 33(2): 173-204.

Becker, C., M. Defond, J. Jiambalvo, and K. Subramanyam. 1998. The effects of audit quality on earnings management. *Contemporary Accounting Research* 15(1): 1-24.

Burgstahler, D., and I. Dichev. 1997. Earnings management to avoid earnings decreases and losses *Journal of Accounting and Economics* 24(1): 99-126.

Caramanis, C., and C. Lennox. 2008. Audit effort and earnings management. *Journal of Accounting and Economics* 45(1): 116-138.

Carey, P., and R. Simnett. 2006. Audit partner tenure and audit quality. *The Accounting Review* 81(3): 653-676.

Chaney, P., and K. Philipich. 2002. Shredded reputation: the cost of audit failure. *Journal of Accounting Research* 40(4): 1221-1245.

Danos, P., and J. Eichenseher. 1986. Long-term trends towards seller concentration in the US audit market. *The Accounting Review* 61(4): 633-650.

Davis, L., B. Soo, and G. Trompeter. 2009. Auditor tenure and the ability to meet or beat earnings forecasts. *Contemporary Accounting Research* 26(2): 517-548.

Dechow, P., R. Sloan, and A. Sweeney. 1995. Detecting earnings management. *The Accounting Review* 70(2): 193-225.

Dedman, E., and C. Lennox. 2009. Perceived competition, profitability and the withholding of information about sales and the cost of sales. *Journal of Accounting and Economics* 48(2-3): 210-230.

DeFond, M., K. Raghunandan, and K. Subramanyam. 2002. Do non-audit service fees impair auditor independence? Evidence from going concern audit opinions. *Journal of Accounting Research* 40(4): 1247-1274.

DeFond, M., J. Francis, and X. Hu. 2011. The geography of SEC enforcement and auditor reporting for financially distressed clients.
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1132885

Dranove, D., and W. White. 1994. Recent theory and evidence on competition in hospital markets. *Journal of Economics and Management Strategy* 3(1): 169-209.

Fields, L., D. Fraser, and M. Wilkins. 2004. An investigation of the pricing of audit services for financial institutions. *Journal of Accounting and Public Policy* 23(1): 53-77.

Francis, J., E. Maydew, and H. Sparks. 1999. The role of Big 6 auditors in the credible reporting of accruals. *Auditing: A Journal of Practice and Theory* 18(2): 17-34.

Francis, J., P. Michas, and S. Seavy. 2010. Cross-country differences in audit market structure and audit quality. (October 26).

Government Accountability Office (GAO). 2008. *Audits of Public Companies: Continued Concentration in Audit Market for Large Public Companies Does Not Call for Immediate Action*. Washington DC: GAO.

Government Accountability Office (GAO). 2003. *Public Accounting Firms: Mandated Study on Consolidation and Competition*. Washington DC: GAO.

Gow, I., G. Ormazabal, and D. Taylor. 2010. Correcting for cross-sectional and time-series dependence in accounting research. *The Accounting Review* 85(2): 483-512.

Graham, J., C. Harvey, and S. Rajagopal. 2005. The economic implications of corporate financial reporting. *Journal of Accounting and Economics* 40(1-3): 3-73.

Greene, W. 1997. *Econometric Analysis*. Upper Saddle River, NJ: Simon and Schuster.

Hribar, P., and D. Nichols. 2007. The use of unsigned earnings quality measures in tests of earnings management. *Journal of Accounting Research* 45(5): 1017-1053.

Jones, J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29(2): 193-228.

Kallapur, S., S. Sankaraguruswamy, and Y. Zang. 2010. Audit market concentration and audit quality. Working paper (December).

Khurana, I., and K. Raman. 2004. Litigation risk and the financial reporting credibility of Big 4 versus non-Big 4 audits: Evidence from Anglo-American countries. *The Accounting Review* 79(2): 473-495.

Kinney, W. 2005a. Twenty-five years of audit deregulation and re-regulation: What does it mean for 2005 and beyond? *Auditing: A Journal of Practice and Theory* 24 (Supplement): 89-109.

Kinney, W. 2005b. The auditor as gatekeeper: A perilous expectation gap. In: Lorsch, J., L. Berlowitz, and A. Zelleke (eds.). *Restoring Trust in American Business*. MIT Press: Cambridge, MA, 99-108.

Knechel, R. 2007. The business risk audit: origins, obstacles and opportunities. *Accounting, Organizations and Society* 32(4-5): 383-408.

Lee, L. 1992. Amemiya's generalized least squares and tests of overidentification in simultaneous equation models with qualitative or limited dependent variables. *Econometric Reviews* 11(3): 319-328.

Lemon, M., K. Tatum, and S. Turley. 2000. *Developments in the Audit Methodologies of Large Accounting Firm.* London, UK: Auditing Practices Board.

Pearson, T., and G. Trompeter. 1994. Competition in the market for audit services: The effect of supplier concentration on audit fees. *Contemporary Accounting Research* 11(1): 91-114.

Penno, M., and B. Walther. 1996. The concentration of local markets: A study of accounting, advertising and law. *Accounting Horizons* 10(2): 88-99.

Reynolds, J., and J. Francis. 2001. Does size matter? The influence of large clients on office-level auditor reporting decisions. *Journal of Accounting and Economics* 30(3): 375-400.

Shepherd, W. 1997. *The Economics of Industrial Organization*. Fourth Edition. Prentice Hall: NJ.

Smith, R., and R. Blundell. 1986. An exogeneity test for a simultaneous equation Tobit model with an application to labor supply. *Econometrica* 54(4): 679-686.

Stiglitz, J. 1987. Competition and the number of companies in a market: are duopolies more competitive than atomistic markets. *Journal of Political Economy* 95: 1041-161.

Stock, J., and M. Yogo. 2002. Testing for weak instruments in linear IV regression. National Bureau of Economic Research (NBER) Technical Working Paper No. 284.

The American Assembly. 2005. *The Future of the Accounting Profession: Auditor Concentration*. Columbia University: New York, NY.

US Treasury. 2008. *Advisory Committee on the Auditing Profession: Final Report.* October 6. http://www.tres.gov/offices/domestic-finance/acap/docs/final-report.pdf.

Wallman, S., 1996. The future of accounting, part III: Reliability and auditor independence. *Accounting Horizons* 10(4): 76-97.

Warfield, T. D., J. J. Wild, and K. L. Wild. 1995. Managerial ownership, accounting choices, and informativeness of earnings. *Journal of Accounting and Economics* 20(1): 61-91.

White, H., 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica* 48: 817-838.

TABLE 1
Sample selection

Client-year observations during 2003-2009 (excluding untilities and financial services firms) with complete data on control variables	22,125
Exclude client-years not in IBES or missing IBES data	-10,133
Exclude client-years followed by fewer than 3 analysts	-3,223
Exclude client-years in which nondiscretionary earings (i.e., earnings per share before discretionary accruals) exceed the analysts' consensus earnings forecast	-3,990
Meet or Beat Full sample	4,779
Exclude client-years in which the analysts' consensus earnings forecast exceeds nondiscretionary earnings (i.e., earnings before discretionary accruals) by more than 5% of total assets.	-1,791
Meet or Beat Reduced sample	2,988

The n=4,779 (2,988) client-year observations in the Meet or Beat Full (Reduced) sample are audited by local audit offices in a total of 87 (82) different Metropolitan Statistical Areas (MSAs).

TABLE 2
Descriptive Statistics for Test Variable *HERF*

Panel A. Meet or Beat Full Sample

Big 4 firms in MSA	Number of MSAs	Number of Client-Years	Mean	Median	Std. Dev.	25th	75th
0	5	20	0.4845	0.5171	0.1131	0.3899	0.5410
1	17	71	0.8767	0.9363	0.1414	0.7843	0.9946
2	7	67	0.5638	0.5206	0.0995	0.5068	0.6051
3	14	232	0.4366	0.4128	0.1196	0.3508	0.5105
4	44	4389	0.2662	0.2545	0.0575	0.2313	0.2961
	87	4779					

Panel B. Meet or Beat Reduced Sample

Big 4 firms in MSA	Number of MSAs	Number of Client-Years	Mean	Median	Std. Dev.	25th	75th
0	4	9	0.4799	0.5241	0.0867	0.3899	0.5359
1	13	55	0.8879	0.9363	0.1197	0.7843	0.9833
2	7	47	0.5667	0.5206	0.0909	0.5093	0.6301
3	14	171	0.4385	0.4156	0.1267	0.3438	0.5141
4	44	2706	0.2686	0.2555	0.0581	0.2326	0.2963
	82	2988					

TABLE 3
Descriptive Statistics and Pearson Correlation Matrix

Panel A. Descriptive Statistics

	Meet or Beat Full Sample (n=4,779)			Meet or Beat Reduced Sample (n=2,988)		
	Mean	**Median**	**Std.Dev.**	**Mean**	**Median**	**Std.Dev.**
MBE	0.6784	1.0000	0.4671	0.7018	1.0000	0.4575
AQ	-0.0607	-0.0366	0.0805	-0.0244	-0.0214	0.0210
HERF	0.2886	0.2565	0.1100	0.2950	0.2622	0.1180
SIZE	13.8358	13.7471	1.6934	14.1101	14.0256	1.6019
SHORT_TENURE	0.0437	0.0000	0.2045	0.0435	0.0000	0.2040
SALES_CHANGE	0.1598	0.1027	0.2805	0.1281	0.0879	0.2190
BOOK_TO_MARKET	0.4159	0.3530	0.4284	0.4456	0.3904	0.4375
LOSS	0.1477	0.0000	0.3549	0.1158	0.0000	0.3200
LEVERAGE	0.4793	0.4731	0.2696	0.4929	0.4965	0.2367
ISSUE	0.8485	1.0000	0.3586	0.8457	1.0000	0.3613
CFO	0.0853	0.1086	0.1964	0.1035	0.1088	0.1241
BIG4	0.9037	1.0000	0.2950	0.9337	1.0000	0.2488
SPECIALIST	0.2103	0.0000	0.4076	0.2293	0.0000	0.4204
AGE	2.6622	2.7081	0.6695	2.7239	2.7726	0.6387
CLIENT_IMPORTANCE	0.0877	0.0308	0.1556	0.0937	0.0334	0.1610
FEE_RATIO	0.1916	0.1527	0.1665	0.2005	0.1605	0.1693
LAGGED_ACCRUALS	-0.0541	-0.0458	0.1011	-0.0515	-0.0457	0.0747
LNDISTANCE	4.6354	4.9744	1.0920	4.6527	4.9744	1.0872
HORIZON	74.4160	77.3333	22.5701	73.9030	76.8377	22.3782
ANALYSTS	9.2013	7.0000	6.6400	9.4977	8.0000	6.6351
FORSTD	0.0825	0.0311	0.2540	0.0672	0.0300	0.1342
POS_UE	0.7091	1.0000	0.4542	0.6908	1.0000	0.4623

Panel B. Correlation Matrix (Meet or Beat Full Sample, n=4,779)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	*MBE*	1.00																					
2	*AQ*	0.01	1.00																				
3	*HERF*	0.05	0.05	1.00																			
4	*SIZE*	0.11	0.24	0.04	1.00																		
5	*SHORT_TENURE*	-0.03	-0.01	-0.02	-0.09	1.00																	
6	*SALES_CHANGE*	0.06	-0.24	-0.02	-0.14	0.01	1.00																
7	*BOOK_TO_MARKET*	-0.05	0.08	0.00	0.07	0.01	-0.10	1.00															
8	*LOSS*	-0.23	-0.14	-0.04	-0.33	0.02	-0.16	-0.01	1.00														
9	*LEVERAGE*	-0.04	0.04	0.02	0.33	-0.03	-0.11	-0.25	0.07	1.00													
10	*ISSUE*	-0.02	-0.04	0.01	0.01	0.02	0.05	-0.05	0.09	0.19	1.00												
11	*CFO*	0.17	0.24	0.02	0.29	0.00	0.10	0.00	-0.63	-0.09	-0.09	1.00											
12	*BIG4*	0.09	0.11	0.07	0.30	-0.17	-0.10	-0.05	-0.05	0.15	0.01	0.02	1.00										
13	*SPECIALIST*	-0.01	0.06	0.07	0.24	-0.05	-0.04	0.01	-0.06	0.11	-0.03	0.03	0.17	1.00									
14	*AGE*	0.06	0.20	0.08	0.48	-0.02	-0.22	0.05	-0.22	0.16	-0.09	0.17	0.08	0.13	1.00								
15	*CLIENT_IMPORTANCE*	0.01	0.05	0.42	0.23	0.03	-0.01	0.04	-0.06	0.09	0.01	0.04	-0.21	0.09	0.16	1.00							
16	*FEE_RATIO*	0.08	0.07	0.06	0.13	-0.08	-0.02	-0.03	-0.08	0.02	0.00	0.07	0.13	0.07	0.07	-0.02	1.00						
17	*LAGGED_ACCRUALS*	0.06	0.12	0.01	0.04	0.00	0.06	0.03	-0.15	-0.09	-0.02	0.05	-0.06	0.03	0.07	0.04	0.00	1.00					
18	*LNDISTANCE*	0.03	0.01	0.25	-0.03	0.00	0.01	0.05	0.00	-0.03	0.02	0.02	0.06	-0.04	0.00	0.20	0.01	-0.01	1.00				
19	*HORIZON*	0.01	-0.01	-0.01	-0.24	0.02	-0.02	-0.08	0.07	-0.07	-0.02	-0.08	-0.06	-0.06	-0.11	-0.07	-0.02	0.03	-0.03	1.00			
20	*ANALYSTS*	0.10	0.08	-0.02	0.56	-0.05	-0.05	-0.03	-0.17	0.04	0.01	0.22	0.16	0.06	0.19	0.08	0.05	-0.03	0.01	-0.24	1.00		
21	*FORSTD*	-0.09	-0.15	-0.03	0.05	-0.01	-0.01	0.04	0.12	0.07	0.03	-0.16	0.03	0.05	-0.05	0.00	-0.05	-0.05	-0.01	-0.12	0.02	1.00	
22	*POS_UE*	0.18	-0.06	0.02	0.05	0.00	0.21	-0.15	-0.19	-0.03	-0.02	0.17	0.05	0.00	0.02	0.00	0.03	-0.15	0.01	0.05	0.05	-0.05	1.00

MBE is the meet or beat dummy variable denoting use of positive discretionary accruals to meet or beat the analysts' consensus earnings forecast. Please see Appendix for other variable definitions.

In Panel B, correlations of .024, .028, and .037 (in absolute value) are significant at the .10, .05, and .01 levels in a two-tailed test. Pairwise correlations for the Meet or Beat Reduced sample were similar and are not shown for brevity.

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TABLE 4
Probit Regression Results (Meet or Beat Analysis)

Panel A. Meet or Beat Full Sample (Dependent Variable: *MBE*)

	Expected	Client-Year Observations			MSA-Year Observations			MSA Observations		
	Sign	**Coef.**	**z-stat**	**p-value**	**Coef.**	**z-stat**	**p-value**	**Coef.**	**z-stat**	**p-value**
Intercept	?	-0.6326	-3.08	0.002	0.6804	0.63	0.529	1.9378	1.55	0.121
HERF	?	0.5391	3.91	0.000	0.9486	4.18	0.000	0.8552	2.94	0.003
SIZE	+	0.0416	2.34	0.019	-0.0034	-0.04	0.965	0.0079	0.08	0.933
SHORT_TENURE	+	-0.0526	-0.40	0.689	-0.5155	-1.58	0.113	-0.6992	-0.87	0.382
SALES_CHANGE	+	0.0986	0.95	0.342	0.1981	0.76	0.446	-0.8527	-1.42	0.156
BOOK_TO_MARKET	-	-0.0381	-0.54	0.591	0.1370	0.85	0.398	0.6134	1.60	0.110
LOSS	-	-0.5148	-13.01	0.000	-1.0931	-3.87	0.000	-1.5525	-2.31	0.021
LEVERAGE	+	-0.1067	-1.07	0.283	-0.2991	-0.87	0.386	-0.5909	-1.16	0.246
ISSUE	+	0.0411	0.81	0.419	0.1154	0.60	0.550	-0.0803	-0.25	0.802
CFO	?	0.2467	1.65	0.099	-0.1203	-0.23	0.819	-1.2616	-1.10	0.270
BIG4	-	0.2307	0.94	0.340	0.2360	1.24	0.214	0.2130	0.68	0.497
SPECIALIST	-	-0.1465	-4.98	0.000	-0.0291	-0.20	0.843	-0.2849	-1.19	0.234
AGE	-	-0.0091	-0.20	0.840	-0.2241	-1.94	0.053	-0.3673	-1.97	0.049
CLIENT_IMPORTANCE	?	-0.0876	-0.58	0.561	-0.4865	-2.20	0.028	-0.6441	-2.09	0.037
FEE_RATIO	?	0.2619	2.58	0.010	0.5060	1.41	0.158	1.6896	2.20	0.028
LAGGED_ACCRUALS	+	0.6419	2.30	0.022	-0.6294	-0.70	0.486	-1.7440	-0.96	0.335
LNDISTANCE	?	0.0221	1.00	0.317	0.0142	0.74	0.462	-0.0028	-0.12	0.905
HORIZON	-	0.0006	1.00	0.318	-0.0006	-0.22	0.824	-0.0124	-2.10	0.036
ANALYSTS	+	0.0122	3.00	0.003	0.0216	1.50	0.134	-0.0013	-0.07	0.946
FORSTD	-	-0.1832	-1.14	0.256	-0.7060	-2.66	0.008	-2.3583	-2.62	0.009
POS_UE	+	0.3917	9.89	0.000	0.1924	1.09	0.276	0.5675	1.36	0.175
N		4779			485			87		
Pseudo R^2		9.24%			2.91%			0.98%		
Model fit		p<.0001			p<.0001			p<.0001		
Industry dummies		Included			Included			Excluded		
Year dummies		Included			Included			Excluded		

Panel B. Meet or Beat Reduced Sample (Dependent Variable: *MBE*)

	Expected	Client-Year Observations			MSA-Year Observations			MSA Observations		
	Sign	**Coef.**	**z-stat**	**p-value**	**Coef.**	**z-stat**	**p-value**	**Coef.**	**z-stat**	**p-value**
Intercept	?	-0.7262	-2.35	0.019	-1.2847	-1.40	0.160	1.4901	0.94	0.349
HERF	?	0.5721	2.49	0.013	0.9384	3.51	0.000	0.7460	2.22	0.027
SIZE	+	0.0589	2.61	0.009	0.1250	1.68	0.092	0.0099	0.08	0.937
SHORT_TENURE	+	-0.0953	-0.55	0.582	-0.7032	-2.36	0.018	-0.5501	-0.60	0.546
SALES_CHANGE	+	-0.0860	-0.50	0.619	0.2386	0.85	0.394	-1.5065	-1.90	0.058
BOOK_TO_MARKET	-	-0.0198	-0.25	0.806	0.1809	1.20	0.229	0.5707	1.46	0.144
LOSS	-	-0.5603	-8.99	0.000	-0.4575	-1.60	0.110	-1.2521	-1.56	0.118
LEVERAGE	+	-0.1255	-0.81	0.415	0.0626	0.19	0.852	-0.8879	-1.51	0.131
ISSUE	+	0.0296	0.35	0.724	0.1427	0.79	0.427	0.0598	0.19	0.850
CFO	?	-0.0335	-0.13	0.897	0.2713	0.37	0.710	-0.8233	-0.52	0.600
BIG4	-	0.2441	0.16	0.869	0.2883	0.91	0.365	-0.0239	-0.04	0.965
SPECIALIST	-	-0.1969	-2.88	0.004	-0.2173	-1.52	0.129	-0.2171	-0.86	0.390
AGE	-	-0.0169	-0.60	0.547	-0.1553	-1.28	0.199	-0.1427	-0.68	0.499
CLIENT_IMPORTANCE	?	-0.1564	-1.00	0.317	-0.4523	-1.72	0.086	-0.4526	-1.24	0.213
FEE_RATIO	?	0.3398	1.26	0.206	1.1410	2.77	0.006	1.2602	1.37	0.170
LAGGED_ACCRUALS	+	0.8622	2.94	0.003	0.9337	0.94	0.347	-0.4214	-0.21	0.834
LNDISTANCE	?	0.0334	1.23	0.218	0.0166	0.81	0.416	0.0301	1.01	0.313
HORIZON	-	0.0006	2.07	0.039	-0.0037	-1.16	0.247	-0.0137	-1.99	0.047
ANALYSTS	+	0.0131	2.56	0.010	-0.0027	-0.16	0.869	-0.0103	-0.40	0.687
FORSTD	-	-0.7776	-1.62	0.105	-2.1589	-3.94	0.000	-1.9342	-1.21	0.228
POS_UE	+	0.3900	15.84	0.000	0.4691	2.58	0.010	0.8633	2.10	0.036
N		2988			439			82		
Pseudo R^2		9.82%			3.93%			1.09%		
Model fit		p<.0001			p<.0001			p=.0055		
Industry dummies		Included			Included			Excluded		
Year dummies		Included			Included			Excluded		

The dependent variable *MBE* is the meet-or-beat dummy variable denoting use of income-increasing discretionary accruals to meet or beat the consensus earnings forecast. *HERF* denotes the Herfindahl index for the metropolitan statistical area (MSA) of the audit firm's local practice office calculated using the market shares of all audit firms within the MSA. Please see Appendix for other variable definitions. Estimates reported under the Client-Year column are obtained from a standard probit model estimated from cross-sectional client-year observations for the period 2003-2009. These client-year observations are collapsed into a single MSA-Year (or MSA) observation by averaging each variable across all client-year observations within an MSA-Year (or MSA). Estimates reported under the MSA-Year column are obtained from a grouped probit model (Greene 1997, p. 894-896) in which all model variables are MSA-Year averages, while estimates reported under the MSA column are obtained from a grouped probit model in which all model variables are MSA averages.

Statistical inferences are based on "robust" z-statistics that are adjusted for residual correlation arising from pooling cross-sectional observations across time, i.e., the z-statistics are based on White (1980) heteroskedasticity-adjusted robust variance estimates that are adjusted for MSA and year clustering (Gow et al. 2010). Reported significance levels are based on two-tailed tests. VIF denotes the variance inflation factor.

TABLE 5
Probit Regression Results (Meet or Beat Analysis, Alternative Test Variables, Client-Year Observations)

Dependent Variable: *MBE*

	Expected	Meet or Beat Full Sample			Meet or Beat Reduced Sample		
	Sign	**Coef.**	**z-stat**	**p-value**	**Coef.**	**z-stat**	**p-value**
Intercept	?	-0.7923	-3.22	0.001	-0.826	-3.36	0.001
HERF_BIG4	?	0.3613	2.21	0.027	0.387	2.42	0.018
BIG4SHARE	?	0.2639	0.83	0.379	0.212	1.14	0.243
SIZE	+	0.0429	2.35	0.019	0.056	2.53	0.011
SHORT_TENURE	+	-0.0556	-0.41	0.679	-0.114	-0.67	0.500
SALES_CHANGE	+	0.0953	0.89	0.372	-0.085	-0.47	0.637
BOOK_TO_MARKET	-	-0.0510	-0.69	0.493	-0.029	-0.37	0.711
LOSS	-	-0.5236	-12.17	0.000	-0.566	-8.69	0.000
LEVERAGE	+	-0.1098	-1.06	0.289	-0.118	-0.73	0.464
ISSUE	+	0.0448	0.87	0.385	0.033	0.38	0.701
CFO	?	0.2428	1.56	0.119	-0.037	-0.14	0.890
BIG4	-	0.2376	0.24	0.828	0.263	0.31	0.697
SPECIALIST	-	-0.1460	-5.18	0.000	-0.196	-2.90	0.004
AGE	-	-0.0065	-0.14	0.889	-0.010	-0.36	0.719
CLIENT_IMPORTANCE	?	-0.0629	-0.33	0.739	-0.106	-0.54	0.591
FEE_RATIO	?	0.2512	2.62	0.009	0.326	1.24	0.214
LAGGED_ACCRUALS	+	0.6403	2.27	0.023	0.875	2.92	0.003
LNDISTANCE	?	0.0219	1.20	0.231	0.034	1.43	0.153
HORIZON	-	0.0005	0.81	0.417	0.001	1.65	0.099
ANALYSTS	+	0.0119	2.90	0.004	0.013	2.50	0.013
FORSTD	-	-0.1829	-1.13	0.259	-0.782	-1.60	0.109
POS_UE	+	0.3918	10.09	0.000	0.392	15.22	0.000
N		4779			2988		
Pseudo R^2		9.35%			9.93%		
Model fit		p<.0001			p<.0001		
Industry dummies		Included			Included		
Year dummies		Included			Included		

The dependent variable *MBE* is the meet-or-beat dummy variable denoting use of income-increasing discretionary accruals to meet or beat the consensus earnings forecast. Consistent with Francis et al. (2010), *HERF_BIG4* denotes the Herfindahl index for the MSA of the audit firm's local practice office calculated using the market share of only Big 4 audit firms within the MSA, and *BIG4SHARE* denotes the percentage of listed companies that use a Big 4 auditor in the MSA of the audit firm's local practice office. Please see Appendix for other variable definitions. Reported estimates are obtained from a standard probit model estimated from cross-sectional client-year observations for the period 2003-2009.

Statistical inferences are based on "robust" z-statistics that are adjusted for residual correlation arising from pooling cross-sectional observations across time, i.e., the z-statistics are based on White (1980) heteroskedasticity-adjusted robust variance estimates that are adjusted for MSA and year clustering (Gow et al. 2010). Reported significance levels are based on two-tailed tests.

TABLE 6
Regression Results (Discretionary Accruals Analysis, Client-Year Observations)

Panel A. Test variable *HERF* (Dependent Variable: *AQ*).

	Expected Sign	Meet or Beat Full Sample (n=4,779) Coef.	t-stat	p-value	Meet or Beat Reduced Sample (n=2,988) Coef.	t-stat	p-value	Observations Not in Meet or Beat Full Sample (n=17,346) Coef.	t-stat	p-value
Intercept	?	-0.1386	-13.64	0.000	0.0037	1.10	0.270	-0.2453	-12.18	0.000
HERF	?	0.0123	0.97	0.334	0.0000	0.00	0.999	0.0259	2.56	0.010
SIZE	+	0.0053	8.27	0.000	0.0014	2.42	0.016	0.0157	18.88	0.000
SHORT_TENURE	+	0.0049	0.97	0.333	-0.0014	-0.35	0.725	0.0087	1.41	0.159
SALES_CHANGE	-	-0.0688	-6.84	0.000	-0.0090	-5.21	0.000	-0.0468	-11.17	0.000
BOOK_TO_MARKET	+	0.0110	1.97	0.049	0.0029	1.84	0.066	0.0041	2.47	0.014
LOSS	-	0.0134	1.69	0.092	-0.0036	-1.62	0.105	-0.0250	-3.73	0.000
LEVERAGE	-	0.0047	0.94	0.346	-0.0006	-0.21	0.836	-0.0196	-3.07	0.002
ISSUE	-	0.0003	0.23	0.821	-0.0007	-0.52	0.606	-0.0090	-3.60	0.000
CFO	+	0.0940	5.78	0.000	0.0121	1.48	0.139	0.0727	13.69	0.000
BIG4	+	0.0105	1.26	0.209	0.0020	1.70	0.090	0.0119	2.24	0.025
SPECIALIST	+	-0.0024	-0.61	0.540	-0.0017	-1.66	0.098	-0.0106	-3.43	0.001
AGE	+	0.0060	2.40	0.017	-0.0001	-0.36	0.716	0.0054	3.05	0.002
CLIENT_IMPORTANCE	?	-0.0024	-0.24	0.809	-0.0008	-0.34	0.737	-0.0110	-1.66	0.098
FEE_RATIO	?	-0.0022	-0.38	0.702	-0.0008	-0.23	0.817	-0.0132	-1.44	0.150
LAGGED_ACCRUALS	-	0.0919	5.73	0.000	0.0101	0.67	0.503	0.0581	6.58	0.000
LNDISTANCE	?	-0.0002	-0.24	0.808	-0.0003	-1.16	0.246	0.0001	0.03	0.973
N		4779			2988			17346		
R^2		19.75%			6.92%			33.06%		
Model fit		p<.0001			p<.0001			p<.0001		
Industry dummies		Included			Included			Included		
Year dummies		Included			Included			Included		

Panel B. Alternative Test Variables *HERF_BIG4* and *BIG4SHARE* (Dependent Variable: AQ)

	Expected Sign	Meet or Beat Full Sample (n=4,779) Coef.	t-stat	p-value	Meet or Beat Reduced Sample (n=2,988) Coef.	t-stat	p-value	Observations Not in Meet or Beat Full Sample (n=17,346) Coef.	t-stat	p-value
Intercept	?	-0.1372	-11.61	0.000	0.0037	1.08	0.282	-0.254	-13.22	0.000
HERF_BIG4	?	0.0130	0.63	0.534	0.0007	0.36	0.721	0.034	2.84	0.005
BIG4SHARE	?	-0.0055	-1.23	0.218	-0.0006	-0.45	0.650	0.021	0.40	0.687
SIZE	+	0.0054	8.12	0.000	0.0015	2.61	0.009	0.015	17.09	0.000
SHORT_TENURE	+	0.0044	0.85	0.394	-0.0013	-0.32	0.749	0.007	1.12	0.263
SALES_CHANGE	-	-0.0685	-6.75	0.000	-0.0090	-4.95	0.000	-0.046	-10.98	0.000
BOOK_TO_MARKET	+	0.0109	1.88	0.060	0.0029	1.75	0.080	0.004	2.54	0.011
LOSS	-	0.0132	1.65	0.099	-0.0037	-1.61	0.107	-0.025	-3.67	0.000
LEVERAGE	-	0.0044	0.86	0.388	-0.0007	-0.25	0.806	-0.020	-3.00	0.003
ISSUE	-	0.0004	0.29	0.769	-0.0008	-0.54	0.590	-0.008	-3.53	0.000
CFO	+	0.0934	5.76	0.000	0.0119	1.42	0.157	0.073	12.12	0.000
BIG4	+	0.0110	1.45	0.147	0.0018	1.53	0.126	0.010	2.01	0.045
SPECIALIST	+	-0.0023	-0.58	0.559	-0.0017	-1.63	0.104	-0.010	-3.27	0.001
AGE	+	0.0059	2.38	0.017	-0.0002	-1.06	0.291	0.006	3.61	0.000
CLIENT_IMPORTANCE	?	-0.0049	-0.53	0.594	-0.0014	-0.56	0.574	-0.016	-2.42	0.016
FEE_RATIO	?	-0.0021	-0.41	0.683	-0.0009	-0.26	0.796	-0.016	-1.77	0.077
LAGGED_ACCRUALS	-	0.0919	5.76	0.000	0.0103	0.68	0.494	0.057	6.05	0.000
LNDISTANCE	?	0.0000	-0.04	0.966	-0.0003	-1.49	0.136	-0.001	-0.59	0.552
N		4779			2988			17346		
R^2		19.76%			7.08%			33.00%		
Model fit		p<.0001			p<.0001			p<.0001		
Industry dummies		Included			Included			Included		
Year dummies		Included			Included			Included		

The dependent variable *AQ* is the negative value of absolute discretionary accruals defined as (-1)×|*DA_BS*|, where *DA_BS* is the client- and year-specific discretionary abnormal accruals (see Appendix). Consistent with Kallapur et al. (Dec 2010), the higher the value of *AQ*, the higher the accruals quality. In Panel A, *HERF* denotes the Herfindahl index

for the metropolitan statistical area of the audit firm's local practice office calculated using the market shares of all audit firms within the MSA. In Panel B, consistent with Francis et al. (2010), *HERF_BIG4* denotes the Herfindahl index for the MSA of the audit firm's local practice office calculated using the market share of only Big 4 audit firms within the MSA, and *BIG4SHARE* denotes the percentage of listed companies that use a Big 4 auditor in the MSA of the audit firm's local practice office. Please see Appendix for other variable definitions. The model is estimated from cross-sectional observations for the period 2003-2009. Statistical inferences are based on "robust" t-statistics that are adjusted for residual correlation arising from pooling cross-sectional observations across time, i.e., the t-statistics are based on White (1980) heteroskedasticity-adjusted robust variance estimates that are adjusted for MSA and year clustering (Gow et al. 2010). Reported significance levels are based on two-tailed tests. VIF denotes the variance inflation factor.

For the analysis in the last column (i.e., Observations Not in Meet or Beat Full Sample), the n=17,346 is obtained as the difference between the beginning n=22,125 observations in Table 1 and the n=4,779 in the Meet or Beat Full sample.

TABLE 7
Instrumental Variable Probit Regression Results (Meet or Beat Analysis, FEES is Potentially Endogenous Variable)

Panel A. Meet or Beat Full Sample

		Meet or Beat Probit (with *FEES*) Column 1: DV=*MBE*				**Second Stage Meet or Beat Probit (with *FEES* Instrument)** Column 2: DV=*MBE*		
	Exp. Sign	**Coef.**	**z-stat**	**p-value**	**Exp. Sign**	**Coef.**	**z-stat**	**p-value**
Intercept		-0.6982	-1.71	0.086		-0.5118	-0.52	0.605
Endogenous variable								
FEES	?	-0.0091	-0.25	0.799				
FEES_I					?	0.0145	0.11	0.914
Control variables								
HERF	?	0.5287	2.39	0.017	?	0.5231	2.31	0.021
SIZE	+	0.0463	1.68	0.094	+	0.0344	0.45	0.649
BOOK_TO_MARKET	-	-0.0386	-0.75	0.456	-	-0.0332	-0.64	0.525
LOSS	-	-0.5146	-6.96	0.000	-	-0.5058	-6.61	0.000
LEVERAGE	+	-0.1049	-1.17	0.243	+	-0.1136	-1.82	0.069
ISSUE	+	0.0412	0.72	0.471	+	0.0416	0.73	0.466
BIG4	-	0.2341	1.12	0.262	-	0.2221	1.00	0.317
SPECIALIST	-	-0.1452	-2.79	0.005	-	-0.1411	-2.54	0.011
SHORT_TENURE	+	-0.0537	-0.56	0.577	-	-0.0366	-0.35	0.729
SALES_CHANGE	+	0.0994	1.25	0.211	+	0.1015	1.39	0.165
CFO	?	0.2441	1.76	0.079	?	0.2720	1.98	0.048
AGE	-	-0.0089	-0.25	0.806	-	-0.0092	-0.29	0.773
CLIENT_IMPORTANCE	?	-0.0791	-0.49	0.627	?	-0.1019	-0.49	0.624
FEE_RATIO	?	0.2546	1.81	0.070	?	0.2966	2.33	0.020
LAGGED_ACCRUALS	+	0.6413	3.15	0.002	+	0.7011	2.85	0.004
LNDISTANCE	?	0.0217	1.12	0.262	?	0.0220	1.08	0.279
HORIZON	-	0.0006	0.63	0.531	-	0.0004	0.52	0.601
ANALYSTS	+	0.0122	2.94	0.003	+	0.0121	2.32	0.021
FORSTD	-	-0.1835	-2.38	0.017	-	-0.1773	-1.27	0.204
POS_UE	+	0.3918	8.59	0.000	+	0.3939	8.08	0.000
Pseudo R^2		9.24%				9.27%		
Test for endogeneity								
Smith-Blundell Chi-square		0.04[a]						
Partial F-stat		99.97[a]						
Partial R^2		9.35%						
Over-identifying restrictions test								
Amemiya-Lee-Newey Chi-square		24.186[a]						

Panel B. Meet or Beat Reduced Sample

	Meet or Beat Probit (with *FEES*) Column 1: DV=*MBE*				Second Stage Meet or Beat Probit (with *FEES* Instrument) Column 2: DV=*MBE*			
	Exp. Sign	**Coef.**	**z-stat**	**p-value**	**Exp. Sign**	**Coef.**	**z-stat**	**p-value**
Intercept		-0.9149	-1.71	0.087		-0.7438	-0.61	0.541
Endogenous variable								
FEES	?	-0.0259	-0.56	0.573				
FEES_I					?	-0.0046	-0.03	0.977
Control variables								
HERF	?	0.5436	2.48	0.014	?	0.5620	2.30	0.022
SIZE	+	0.0722	1.99	0.047	+	0.0619	0.70	0.486
BOOK_TO_MARKET	-	-0.0207	-0.33	0.740	-	-0.0090	-0.13	0.899
LOSS	-	-0.5596	-5.53	0.000	-	-0.5374	-5.28	0.000
LEVERAGE	+	-0.1195	-0.87	0.384	+	-0.1358	-0.98	0.327
ISSUE	+	0.0301	0.41	0.680	+	0.0292	0.40	0.692
BIG4	-	0.2516	0.19	0.850	-	0.2448	0.10	0.912
SPECIALIST	-	-0.1930	-2.98	0.003	-	-0.1946	-2.89	0.004
SHORT_TENURE	-	-0.0984	-0.79	0.427	-	-0.0800	-0.65	0.516
SALES_CHANGE	+	-0.0825	-0.64	0.519	+	-0.1008	-0.70	0.481
CFO	?	-0.0455	-0.16	0.872	?	-0.0100	-0.03	0.978
AGE	-	-0.0153	-0.32	0.745	-	-0.0200	-0.58	0.559
CLIENT_IMPORTANCE	?	-0.1325	-0.63	0.526	?	-0.1612	-0.71	0.476
FEE_RATIO	?	0.3201	1.74	0.081	?	0.3951	2.04	0.041
LAGGED_ACCRUALS	+	0.8644	2.37	0.018	+	0.8965	2.06	0.039
LNDISTANCE	?	0.0320	1.26	0.207	?	0.0291	1.30	0.193
HORIZON	-	0.0006	0.50	0.617	-	0.0007	0.64	0.525
ANALYSTS	+	0.0131	2.47	0.013	+	0.0130	2.04	0.042
FORSTD	-	-0.7791	-3.88	0.000	-	-0.7702	-2.41	0.016
POS_UE	+	0.3898	6.66	0.000	+	0.3871	7.34	0.000
Pseudo R^2		9.83%				9.76%		
Test for endogeneity								
Smith-Blundell Chi-square		0.03[a]						
Partial F-stat		67.17[b]						
Partial R^2		10.22%						
Over-identifying restrictions test								
Amemiya-Lee-Newey Chi-square		21.122[c]						

[a]Based on Smith-Blundell (1986), statistic fails to reject the null hypothesis that *FEES* is exogenous.

[b]Based on Stock and Yogo (2002), a set of instruments is considered weak if the partial F-stat falls below a critical value benchmark. In both Panels A and B, the reported partial F-stats exceed the critical value of benchmark of 26.87 (Stock and Yogo 2002, Table 2, n=1, k=5, r=.10).

[c]Based on Lee (1992), statistic rejects the null hypothesis that all instruments are exogenous.

The dependent variable *MBE* is the meet-or-beat dummy variable denoting use of income-increasing discretionary accruals to meet or beat the consensus earnings forecast. *FEES* is the natural log of audit fees.

All models are estimated from cross-sectional observations for the period 2003-2009. Results reported in Column 2 as "second-stage" are based on two-step estimation in which the endogenous variable *FEES* is replaced with its instrument, *FEES_I*, which is the fitted value from a "first-stage" regression. The dependent variable in the first-stage regression is *FEES*. The independent variables in the first-stage regression are the control variables shown in the table plus the instruments for *FEES*, which are *WAGE*, *MERGER*, *ROA*, *AR_IN*, and *SPECIAL_ITEMS*. *WAGE* is the MSA median hourly wage rate of auditors and accountants as reported in the Occupational and Employment Statistics issued by the U.S. Department of Labor Bureau of Labor Statistics (http://www.bls.gov/oes/oes_dl.htm); *MERGER* =1 if the client engaged in a merger as reported in *SALE_FN* of Compustat, =0 otherwise; *ROA* is net income divided by lagged total assets; *AR_IN* is the client's inventory plus receivables, deflated by total assets; *SPECIAL_ITEMS*=1 if the client reports special items, =0 otherwise. Please see Appendix for other variable definitions.

Statistical inferences for the second-stage model are based on "robust" test statistics that are corrected for MSA clustering (Gow et al. 2010). Reported significance levels are based on two-tailed tests. The lower part of each panel shows results from (1) a test of the endogeneity of *FEES* based on Smith and Blundell (1986), (2) "weak-instrument" test of the null hypothesis that the coefficients on the *FEES* instruments (i.e., explanatory variables that are unique to the FEES model) are jointly equal to zero, and (3) "overidentifying restriction" test of the exogeneity of the *FEES* instruments based on Lee (1992).

TABLE 8
Regression Testing the Extent of Discontinuity in the Earnings Surprise Distribution

$$DIFF_{(b,t)} = \alpha + \beta_1 NETBIN_{(b,t)} + \beta_2 HERF\_ABOVE + \beta_3 NETBIN_{(b,t)} \times HERF\_ABOVE + \varepsilon$$

	Coef	**t-stat**	**p-value**
Intercept	-0.0012	-0.01	0.992
NETBIN	5.3214	5.86	<.0001
HERF_ABOVE	-0.0006	0.00	0.997
NETBIN×HERF_ABOVE	4.3929	3.42	0.001
Nobs [a]	1,694		
Adj. R^2	7.92%		

[a]Unit of observation is the bin from a yearly histogram of annual earnings surprises (i.e., IBES actual annual earnings per share less analysts' consensus forecast earnings per share). Each histogram contains 121 bins (bin width = $.01) consisting of earnings surprises from $ -0.60 to $0.60 per share. One histogram was prepared for each fiscal year 2003-2009 using only earnings surprises for client-years in which *HERF* was above the sample median, and another yearly histogram was prepared using only earnings surprises for client-years in which *HERF* was at or below the sample median. This yields 2 histograms per year for a total of 14 yearly histograms. Since each histogram contains 121 bins, our dataset consists of 14 yearly histograms times 121 bins/year = 1,694 observations. The histograms were prepared from all observations in IBES during 2003-2009 with the *HERF* measure available.

The dependent variable $DIFF_{(b,t)}$ is the difference between the expected number of clients and the actual number of clients for each bin b during fiscal year t for the earnings surprise histogram. The bin width is $0.01 per share. The expected number of firms for each bin equals the average number of observations in the bins to the right and to the left of the bin of interest.

$NETBIN_{(b,t)}$=1 for the $0.01 bin, $NETBIN_{(b,t)}$=-1 for the $-0.01 bin, $NETBIN_{(b,t)}$=0 otherwise.

HERF_ABOVE =1 if the bin was taken from the histogram prepared using only earnings surprises for client-years in which *HERF* was above the sample median. Similarly, *HERF_ABOVE* =0 if the bin was taken from the histogram prepared using only earnings surprises for client-years in which *HERF* was at or below the sample median. Reported significance levels are based on two-tailed tests.

Appendix
Definition of Variables

Variable	Description
Dependent Variables	
MBE	=1 if positive (income increasing) discretionary accruals are used to meet or beat the consensus (median) analysts' earnings forecast; =0 otherwise. (For the Meet or Beat Analysis).
AQ	The negative value of absolute discretionary accruals defined as $(-1)\times\lvert DA\_BS\rvert$, where DA_BS is the residual from the Ball and Shivakumar (2006) specification of the Jones model estimated by industry-year for those industries with at least 10 observations. Industry is defined based on two-digit SIC code. Consistent with Kallapur et al. (2010), the higher the metric (AQ), the higher the accrual quality and the higher the implied audit quality. (For the Discretionary Accruals Analysis).
Test Variables	
HERF	Herfindahl index for the metropolitan statistical area (MSA) of the audit firm's local practice office, calculated by summing (over all audit firms within the MSA) the squared fractional market share of each audit firm. MSA definitions are based on "core based statistical areas" as defined by the U.S. Census Bureau. The higher the metric, the higher the auditor concentration.
HERF_BIG4	Herfindahl index for the metropolitan statistical area (MSA) of the audit firm's local practice office, calculated by summing (over only Big 4 firms within the MSA) the squared fractional market share of each Big 4 audit firm. MSA definitions are based on "core based statistical areas" as defined by the U.S. Census Bureau. The higher the metric, the higher the concentration within Big 4 auditors.
BIG4SHARE	Consistent with Francis et al. (2010), percentage of listed companies that use a Big 4 auditor in the metropolitan statistical area (MSA) of the audit firm's local practice office.
Control Variables	
SIZE	Log of total assets (in thousands).
SHORT_TENURE	=1 if auditor tenure is two years or less; =0 otherwise.
SALES_CHANGE	Change in sales between current and prior fiscal year deflated by total assets at the end of the prior fiscal year.
BOOK_TO_MARKET	Book value of common equity divided by the market value of common.
LOSS	=1 if net income<0; =0 otherwise.
LEVERAGE	Total liabilities divided by total assets.
ISSUE	=1 if the cumulative debt and equity issuances during the current and preceding two years exceeds 5% of total assets (AT); =0 otherwise.

CFO	Cash flow from operations deflated by lagged total assets.
BIG4	=1 if client uses a Big 4 auditor; =0 otherwise.
SPECIALIST	=1 if auditor is an industry specialist, i.e., the auditor's audit fee market share in the two-digit SIC exceeds 40% at both the national and MSA level; =0 otherwise (consistent with Reichelt and Wang 2010).
AGE	Log of the number of years (since 1974) that Compustat reports positive total assets for the client.
CLIENT_IMPORTANCE	Audit fees paid by the client divided by total fees earned by that auditor's local practice office.
FEE_RATIO	Non-audit fees paid by the client divided by all fees paid by the client to the auditor.
LAGGED_ACCRUALS	One year lagged asset-deflated total accruals.
LNDISTANCE	Distance between the audit firm’s local MSA practice office and the nearest regional SEC office.
HORIZON	Number of months between the most recent available earnings forecast and the earnings announcement.
ANALYSTS	Number of analysts issuing an earnings forecast for the client.
FORSTD	Standard deviation of the analysts earnings forecasts
POS_UE	=1 if IBES actual earnings per share in current year is greater than previous year actual earnings per share; =0 otherwise.