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Auditor Tenure and the Ability to Meet or Beat Earnings Forecasts

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1. Introduction

This paper investigates the relation between auditor tenure and earnings management. The effects of mandatory auditor rotation on audit quality and financial reporting quality have been the subject of a long and often heated debate among regulators, investors, and the accounting profession (cf. American Institute of Certified Public Accountants [AICPA] 1978, 1992; Turner 1999; Turner and Godwin 1999; Elliott, Eddy, Kirtley, and Melancon 2000; Trumka 2001; Melancon 2002; Copeland 2002; PricewaterhouseCoopers 2002; Sarbanes-Oxley Act of 2002 [SOX] 2002; New York Stock Exchange [NYSE] 2003; Commission on Public Trust and Private Enterprise 2003; Cox 2006).[1] Recent interest in mandatory rotation stems from its possible use as a means of redressing the problems that led to the financial frauds of the early 21st century (cf. SOX; Commission on Public Trust and Private Enterprise 2003). In a 2003 report, the General Accounting Office (now the Government Accountability Office) (GAO) conducted a study on mandatory rotation and chose not to support its implementation. However, the GAO made clear that it might recommend mandatory rotation in the future if auditor independence concerns persisted in the post-SOX period. We examine the 1988–2006 period both in its entirety and when partitioned into the pre- and post-SOX periods.

Prior research investigating the relation between tenure and audit quality has focused on the pre-SOX period and reports conflicting results (cf. Raghunathan, Lewis, and Evans 1994; Geiger and Raghunandan 2002; Carcello and Nagy 2004; Myers, Myers, Palmrose, and Scholz 2004; Knechel and Vanstraelen 2007). Some have found that audit quality is lower in the early years of the auditor–client relationship, while others find no association. Most germane to this paper are studies investigating the relation between tenure and earnings management. Johnson, Khurana, and Reynolds (2002) and Myers, Myers, and Omer (2003) find that absolute discretionary accruals decrease with tenure. Moreover, Myers et al. (2003) further find that positive (negative) discretionary accruals decrease (increase) with auditor

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tenure. Similarly, Gul, Jaggi, and Krishnan (2007) report higher levels of earnings management in the early years of the auditor–client relationship, but find that the association between tenure and accruals is affected by client size and the level of nonaudit fees. In related work, Mansi, Maxwell, and Miller (2004) and Ghosh and Moon (2005) examine capital market perceptions of auditor tenure and find evidence consistent with the market rewarding increasing auditor tenure.

Our analyses address regulators' concerns that, as tenure increases, auditors' tolerance for earnings management increases and results in registrants being able to more frequently meet analysts' forecasts (GAO 2003; Biggs 2002; Levitt 1998; Pitt 2002). Specifically, we identify registrants that meet or beat analysts' earnings forecasts, but who would have missed the analysts' target in the absence of discretionary accruals. We then determine whether auditor tenure is associated with the frequency with which such registrants are able to use discretionary accruals to meet or beat forecasts.

Unlike previous studies that use only the presence of large discretionary accruals or earnings surprises as evidence of earnings management (e.g., Heninger 2001; Degeorge, Patel, and Zeckhauser 1999), we use a more restrictive definition by requiring a firm to have not only the desired reporting outcome, but also the incentive and means to successfully achieve it. More specifically, we require a firm to have nondiscretionary earnings (i.e., net income less discretionary accruals) that are below the consensus analyst forecast (the incentive). The firm must then report sufficient positive discretionary accruals (the means) that, when added to nondiscretionary earnings, allow reported income to be equal to or greater than the analyst forecast (the desired outcome). Thus, we consider an observation to provide evidence consistent with earnings management only if the observation represents a firm that met or beat its earnings target and would have missed that target in the absence of discretionary accruals.

Our sample includes 23,748 I/B/E/S firm-years encompassing the period 1988–2006. In the pre-SOX period (1988–2001), we observe an increase in the use of discretionary accruals to meet or beat earnings forecasts in both the early and the later years of the auditor–client relationship. This nonlinear relation between tenure and audit quality may explain, at least in part, the mixed findings observed in earlier studies. In the post-SOX period (i.e., 2002–6), we do not observe a relation between auditor tenure and discretionary accruals in either the early or later years of the auditor–client relationship. This is consistent with the results of Bartov and Cohen 2006 and Cohen, Dey, and Lys 2008, who find that earnings management decreased in the post-SOX period.

Our findings contribute to the literature as follows. Our pre-SOX results provide the first evidence consistent with a relation between long-term audit firm tenure and deteriorating audit quality in the form of a client's ability to use discretionary accruals to meet or beat forecasts. Second, our results provide evidence consistent with recent findings that there was a decline in earnings management following the passage of SOX (Bartov and Cohen 2006; Cohen et al. 2008). This change is consistent with increased audit quality, or a decline in managers' attempts to manage earnings, or both. What remains to be seen is whether this change is long-lasting or

merely transitory. Third, our results with respect to long tenure indicate that the tenure-related deterioration in audit quality occurs at a later point in the auditor tenure relation than that considered in prior research. We find statistically significant evidence of a long-term tenure effect only after the 14th year. Prior studies (e.g., Johnson et al. 2002; Carcello and Nagy 2004) define long tenure as more than 8 years and fail to find any evidence of a long-term tenure effect. This suggests that prior studies' inability to detect a long tenure effect may be due to their specification of what constitutes long tenure. Lastly, we provide a more direct test of the relation between tenure and earnings management. Previous studies implicitly assume increased levels of accruals to be evidence of greater earnings management. By examining the extent to which discretionary accruals are associated with meeting or beating forecasts, our approach more directly examines whether tenure is associated with firms' increased ability to manage earnings.

In the next section we provide background on mandatory auditor rotation and briefly present arguments for and against such regulation. In section 3, we review prior research and develop our hypotheses. Section 4 discusses our sample selection, empirical model, and variable measurement. The last two sections provide our empirical results and summarize the study, present conclusions, and discuss limitations.

2. Background

The efficacy of mandatory auditor rotation as a means of enhancing auditor independence has been debated off and on over the last 30 years (cf. AICPA 1978, 1987; Turner 1999; SOX 2002). The current interest in mandatory auditor rotation has its roots in two concerns expressed by the Securities and Exchange Commission (SEC) beginning in the mid-1990s about a perceived decline in the quality of financial reporting (Levitt 1998). The first concern was that firms were increasingly managing earnings to meet analysts' forecasts, and the second was that auditors were failing to serve as an effective check on earnings management as a result of alleged impaired independence (cf. Turner 1999; Turner and Godwin 1999).

These issues were highlighted in the SEC's *Staff Accounting Bulletin No. 99* (SEC 1999) on materiality. In that bulletin, SEC staff expressed concern that registrants might intentionally make small misstatements to hide "a failure to meet analysts' consensus expectations". The bulletin cautions registrants and their auditors against assuming "that even small intentional misstatements in financial statements, for example those pursuant to actions to 'manage' earnings, are immaterial" (SEC 1999).

The basic arguments for and against mandatory auditor rotation appear in numerous reports and articles.[2] Briefly, the basic argument for mandatory rotation is that it provides a "fresh look" at a client's financial statements and changes the economic incentives of the auditor. Proponents of mandatory auditor rotation claim that it will provide a powerful peer review effect (Seidman 2001; Biggs 2002; Public Oversight Board [POB] 2002). Further, they argue that mandatory rotation reduces the present value to the auditor of the auditor–client relationship, thus mitigating incentives to reduce objectivity (Biggs 2002; Bazerman, Morgan, and Lowenstein 1997; Moore, Tetlock, Tanlu, and Bazerman 2006).

Opponents of mandatory rotation argue that current regulations, the existing litigation climate, and auditors' economic incentives to preserve their reputations make mandatory rotation unnecessary. The profession asserts that the primary consequence of regulation will be increased costs to clients and investors (cf. AICPA 1997; PricewaterhouseCoopers 2002) and, in fact, a decline in audit quality due to reduced familiarity with clients (cf. AICPA 1978, 1992; Elliott et al. 2000; Copeland 2002; PricewaterhouseCoopers 2002).

In response to a congressional mandate contained in SOX, the GAO (2003) reviewed the arguments outlined above and the related empirical work. In addition, it conducted a survey of preparers, auditors, and users. The GAO concluded that mandatory rotation was likely not a cost-efficient means of enhancing independence and instead chose to recommend that other reforms (e.g., prohibition of certain consulting services) be relied on to enhance auditor independence. It was this conclusion that led the GAO to recommend that mandatory rotation not be implemented but be considered a future alternative if enacted reforms did not sufficiently strengthen auditor independence.

3. Prior research

Evaluating the relation between auditor tenure and audit quality is problematic given that audit quality is not directly observable. The original line of research investigating the effects of auditor tenure focused on audit failures (AICPA 1978, 1987; Raghunathan et al. 1994; Geiger and Raghunandan 2002; Carcello and Nagy 2004). A related work has examined the relation between tenure and earnings restatements (Myers et al. 2004). These studies have produced equivocal evidence. Geiger and Raghunandan (2002) and Carcello and Nagy (2004) find that audit failures are more likely to take place in the early years of an audit engagement. Raghunathan et al. (1994) observe that problem audits are more likely to occur in the first year and when auditor tenure is longer than five years. Dopuch, King, and Schwartz (2001) and Casterella, Knechel, and Walker (2004) find evidence of a positive relation between tenure and auditor reporting bias. However, Myers et al. (2004) find no relation between annual earnings restatements and auditor tenure.

The use of auditor opinions, *Accounting and Auditing Enforcement Releases* (*AAERs*), or restatements as measures of audit quality is both a strength and a limitation of the above studies. It is a strength in that they provide an unambiguous measure of quality. It is a weakness in that it may limit generalizability and work against finding a relation between tenure and audit quality. Failure to issue a going-concern opinion when the client subsequently goes bankrupt and the issuance of an *AAER* are relatively infrequent and extreme events. Further, they generally result from fairly egregious lapses in audit quality. It is likely that audit quality is gradually impaired long before it results in an outcome as dramatic as, for example, an *AAER*. Perhaps in recognition of these issues, the SEC has indicated that it does not find the results of audit failure studies persuasive and has explicitly stated that it is interested in more subtle ways in which auditor independence may be compromised (SEC 2001, 16).

Consistent with the SEC's expressed interest, studies have examined the relation between auditor tenure and discretionary accruals. Using the amount of discretionary accruals as a measure of earnings quality, both Johnson et al. (2002) and Myers et al. (2003) find evidence suggesting that earnings quality suffers with shorter tenure. Similarly, Gul et al. (2007) find evidence of greater earnings management in the early years of audit tenure. However, they find a more complex relationship, noting that the association between earnings management and short tenure is positive for smaller clients and for clients that pay higher levels of nonaudit fees.[3]

Auditor tenure studies focusing on accruals build on a substantial body of research that uses discretionary accruals to capture earnings quality (e.g., Becker, DeFond, Jiambalvo, and Subramanyam 1998; Francis and Krishnan 1999). However, with few exceptions (e.g., Gul et al. 2007), these studies examine the relation between auditor tenure and absolute or signed accruals unconditionally — that is, without a priori expectations about the kinds of firms that would have incentives to use discretionary accruals to manage earnings or the expected magnitude of discretionary accruals these firms would have to report to meet their earnings objectives. By examining accruals unconditionally, these studies implicitly assume that if discretionary accruals are large (small), earnings management is more (less) prevalent. We attempt to remedy this potential limitation by directly examining whether discretionary accruals are used successfully to meet a specific earnings objective in the form of analysts' forecasts — a specific activity about which the SEC has expressed concern (Levitt 1998).[4]

In two other related studies, Mansi et al. (2004) and Ghosh and Moon (2005) investigate the relationship between auditor tenure and capital market perceptions as measured by the cost of debt and earnings response coefficients (ERCs). Their results indicate that bond yields decrease and ERCs increase with tenure, and they interpret these results as evidence that earnings quality increases with tenure. An alternative interpretation is that if long tenure firms are better able to meet or beat earnings, then capital market participants may simply be rewarding them (Lopez and Rees 2002; Bartov, Givoly, and Hayn 2002; Kasznik and McNichols 2002).

We extend these two streams of research by examining the use of discretionary accruals to achieve targets — analysts' forecasts — that are relevant to the capital markets.

4. Hypotheses

Prior research has shown that the presence of analysts' forecasts affects auditor–client incentives and behavior (Brown and Caylor 2005; Bartov et al. 2002). For example, Graham, Harvey, and Rajgopal (2005) document that 73.5 percent of the chief financial officers (CFOs) they survey consider meeting or beating analysts' forecasts important. Consistent with this observation, there is both empirical and anecdotal evidence to suggest that firms manage their reported earnings in order to meet or beat analysts' forecasts (Abarbanell and Lehavy 2003; Degeorge et al. 1999; Kasznik and McNichols 2002). In response, regulators have expressed concern that auditors might succumb to client pressure in order to allow them to meet or beat analysts' expectations (Levitt 1998). Indeed, as noted previously, the SEC

goes so far as to warn auditors and registrants that quantitatively immaterial errors would be considered material (and require restatement) if the errors have the effect of allowing firms to meet analysts' expectations (SEC 1999).

In this context, we examine whether clients' ability to manage earnings to meet or beat analysts' earnings forecasts is related to auditor tenure. Assuming that an audit effectively curtails the client's ability to manage earnings, there should be no systematic relation between tenure and whether discretionary accruals allow firms to meet or beat earnings forecasts. However, if auditor tenure (either short or long) results in a lower quality audit, then it may be associated with an increased ability for the client to manage reported accruals to meet or beat forecasted earnings.

We also examine whether the relation between auditor tenure and clients' ability to manage earnings to meet or beat analysts' forecasts is different in the pre-SOX and post-SOX periods. Enacted reforms or increased scrutiny of financial reporting subsequent to the financial reporting frauds of the early 2000s may have made managers less aggressive and/or made auditors less tolerant of earnings management (Bartov and Cohen 2006; Cohen et al. 2008; Cahan and Zhang 2006). Under these conditions, any relation between auditor tenure and using accruals to meet forecasts should diminish in the post-SOX period.

To investigate these issues we test the following hypotheses:

HYPOTHESIS 1. *There is no association between auditor tenure and the frequency with which discretionary accruals allow firms to meet or beat earnings forecasts.*

HYPOTHESIS 1a. *There is no difference in the relation between auditor tenure and the frequency with which discretionary accruals allow firms to meet or beat earnings forecasts between the pre-SOX and the post-SOX periods.*

5. Sample selection and empirical model

The sample consists of firms on both COMPUSTAT and I/B/E/S for the period 1988–2006 with available accruals, auditor, and forecast data as described below. We limit the sample to the period after 1987 because Hribar and Collins (2002) show that accruals data are measured with error if not derived directly from the statement of cash flows. In addition, we exclude all firms that report a merger or acquisition in COMPUSTAT using the same approach as Myers et al. 2003 and Hribar and Collins 2002. We also exclude all firms with Standard Industrial Classification (SIC) codes from 6000–6999 (financial services) and 9000–9999 (nonclassifiable establishments) because accrual estimation is problematic for these industry sectors.

Consistent with prior studies (Johnson et al. 2002; Myers et al. 2003), we exclude the first year of any engagement. Firms that switch auditors are often financially distressed, and studies argue that managers and auditors behave differently in the initial year of the engagement and cite the unusual level of discretionary accruals reported in the first year (Schwartz and Menon 1985; DeFond and Subramanyam 1998). Consistent with Myers et al. 2003, we also exclude all observations

where firms keep their auditor for less than five years ("quick turnover firms") in order to provide comparability of the same auditor–client relationship across at least two different tenure groups. Furthermore, Myers et al. (2003) argue that the nature of the auditor–management relationship is atypical for these short tenure duration firms and find unusual levels of accruals for these firms. Thus, we exclude from our sample all observations for completed auditor–client relationships that lasted less than five years, but retain all observations, including years two through five, when the relationship lasted five years or more.[5]

We measure tenure using ordinal tenure variables as well as separate dichotomous variables for short and long tenure firms. Consistent with the approach of Myers et al. 2003 and Ghosh and Moon 2005, we measure tenure as the number of years of continuous service provided by the auditor as determined from COMPUSTAT as of 1974. A change in auditors due to an audit firm merger is treated as a continuation of the auditor–client relationship. We use 1974 as the initial year of calculating auditor tenure because COMPUSTAT did not identify auditors until 1974. This limits our ability to precisely measure auditor tenure for firms that have kept the same auditor prior to1974.

We use two approaches to control for potential nonlinearity in the relation between tenure and earnings management. First, we estimate a model that includes both tenure and tenure squared (*SQTENURE*). This results in a quadratic model with respect to tenure and, depending on the signs and relative magnitudes of the coefficients of tenure and tenure squared, would allow a convex (U-shaped) or concave (inverted-U-shaped) relation between tenure and the ability to meet or beat earnings.[6] For example, a negative coefficient on tenure and a positive (but smaller in magnitude) coefficient on tenure squared would produce a convex (U-shaped) function between tenure and the ability to meet or beat forecasts. This would be consistent with decreasing earnings management in the early years of the auditor–client relationship (as the auditor gains familiarity with the client), but increasing earnings management in the latter years (as the auditor loses objectivity). An advantage of using *TENURE* and *SQTENURE* is that they allow tenure to have a gradual impact rather than a fixed effect that begins or ends abruptly in discrete time intervals.

For comparability to prior research, we also estimate a second model using separate indicator variables for short and long tenure firms (e.g., Johnson et al. 2002). In addition to allowing the detection of nonlinear relationships between tenure and earnings management, using indicator variables does not suffer from the potential measurement error that arises from not knowing the auditor's identity prior to 1974 and therefore provides a more precise measure of when tenure starts to affect firms' ability to meet or beat earnings. Consistent with earlier studies that use this approach (Johnson et al. 2002; Carcello and Nagy 2004), we define short tenure as firms having auditor–client relationships lasting three years or less. Prior studies define long tenure to be as short as 5 years and as long as 9. Much of the justification for the choice of what constitutes long tenure is based on actual or proposed regulations that require audit firm or partner rotation after a period of 5 to 12 years (e.g., Arruñada and Paz-Ares 1997; SOX 2002; Institute of Chartered

Accountants in England and Wales 2002; Myers et al. 2003). However, the choice of long tenure remains arbitrary because no evidence has yet been documented as to why or how independence is impaired when tenure reaches 5 or 9 years (Johnson et al. 2002; Carcello and Nagy 2004). Indeed, if the costs to long-term tenure increase over time, the inability of earlier studies to find a cost to long-term tenure when defined as 5 to 9 years or more suggests that extending the cutoff for long tenure would result in more powerful tests. As such, for long tenure, we use a cutoff of 15 years or more because it represents the maximum length by which long tenure can be measured without error.[7] In additional analyses, we use alternative cutoffs of 4 and 5 years for short tenure, and 8, 10, 20, and 25 years for long tenure.

Meet or beat earnings model

The discretionary component of total accruals (*DA*) was estimated from the following Jones 1991 model estimated cross-sectionally by industry (two-digit SIC code) and year:

$$TA_{it} = \beta_0 + \beta_1 PPE_{it} + \beta_2 \Delta REV_{it} + DA_{it} \quad (1),$$

where:

TA = total accruals, defined as operating income after depreciation (COMPUSTAT data item 178) minus cash flow from operations (COMPUSTAT data item 308);

PPE = net property, plant, and equipment (COMPUSTAT data item 8);

ΔREV = change in annual net revenue (COMPUSTAT data item 12);

DA = discretionary accruals equal to the model residuals.

All variables are scaled by average total assets for the year. To mitigate the effects of outliers, we delete the top and bottom 1 percent of total accruals and cash flow from operations per industry-year (Dechow 1994). We also exclude all industry-years that had fewer than eight observations.

For each firm-year observation, we first calculate nondiscretionary EPS (*NDEPS*), which we define as:

NDEPS = Actual EPS − Discretionary accruals per share, or equivalently

= Cash flow from operations + Nondiscretionary accruals per share.

We then compute an adjusted forecast error (*ADJFE*) where:

ADJFE = *NDEPS* − Median consensus analysts' forecast.

Essentially, *ADJFE* represents the difference between analysts' estimated earnings and the earnings number that management would report if no discretionary

accruals were recorded. Stated differently, it represents the deficiency in earnings that management would have to eliminate through discretionary accruals in order to meet or exceed earnings forecasts. Firms whose earnings exceed analysts' forecasts without the benefit of discretionary accruals because their nondiscretionary earnings already exceed analysts' expectations are dropped from the sample because these firms have no incentive to manage earnings further. Our final sample consists of 23,748 firm-years representing 4,865 distinct firms.[8]

We then identify all firms whose earnings before discretionary accruals are initially below forecast ($ADJFE < 0$), but report sufficient positive discretionary accruals that allow earnings to meet or exceed analysts' forecasts (i.e., FE = [actual earnings per share − median consensus analysts' forecast] ≥ 0) as earnings managers. This metric is much stricter than that of previous studies that use only earnings surprises or positive discretionary accruals as evidence of earnings management (e.g., Burgstahler and Dichev 1997; Degeorge et al. 1999; Abarbanell and Lehavy 2003; Burgstahler and Eames 2003). In the context of our sample, we find that 49.7 percent of our firms met or exceeded earnings forecasts and 74.6 percent generated positive discretionary accruals, but only 45.8 percent reported sufficient positive discretionary accruals that allowed the firm to move from below target to meeting or beating the earnings forecast.[9]

We then examine whether this ability to use discretionary accruals to meet or beat earnings forecasts is related to auditor tenure by estimating the following probit models:

$$\begin{aligned} MBE_{i,t} = {} & \alpha_0 + \alpha_1 TENURE_{it} + \alpha_2 SQTENURE_{it} + \alpha_3 HORIZON_{it} \\ & + \alpha_4 \#ANLYST_{it} + \alpha_5 FORSTD_{it} + \alpha_6 INDSAL_{it} + \alpha_7 CFLOW_{it} \\ & + \alpha_8 BIGN_{it} + \alpha_9 SIZE_{it} + \alpha_{10} AGE_{it} + \alpha_{11} ROA_{it} \\ & + \alpha_{12} POSUE_{it} + \alpha_{13} LEVER_{it} + \Sigma \alpha_j YEAR_j + \Sigma \alpha_k IND_k + u_{it} \end{aligned} \quad (2),$$

$$\begin{aligned} MBE_{i,t} = {} & \beta_0 + \beta_1 SHORT_{it} + \beta_2 LONG_{it} + \beta_3 HORIZON_{it} + \beta_4 \#ANLYST_{it} \\ & + \beta_5 FORSTD_{it} + \beta_6 INDSAL_{it} + \beta_7 CFLOW_{it} + \beta_8 BIGN_{it} \\ & + \beta_9 SIZE_{it} + \beta_{10} AGE_{it} + \beta_{11} ROA_{it} + \beta_{12} POSUE_{it} \\ & + \beta_{13} LEVER_{it} + \Sigma \beta_j YEAR_j + \Sigma \beta_k IND_k + u_{it} \end{aligned} \quad (3),$$

where:

MBE = 1 if positive discretionary accruals are used to meet or beat analysts earnings forecast; 0 otherwise.

TENURE = auditor tenure, measured as the number of continuous years of auditor employment since 1974.

SQTENURE = auditor tenure squared.

SHORT = indicator variable equal to 1 if auditor tenure is greater than one but less than four years; 0 otherwise.

LONG = indicator variable equal to one if auditor tenure is 15 years or greater; 0 otherwise.

HORIZON = forecast horizon, equal to the number of months between earnings announcement and the month when the earnings forecast was made.

#ANLYST = number of analysts making an earnings forecast.

FORSTD = forecast dispersion, calculated as the standard deviation of earnings forecasts.

INDSAL = industry sales growth, calculated as the ratio of industry sales (per two-digit SIC code) in year t over year $t - 1$.

CFLOW = cash flow from operations, scaled by average total assets.

BIGN = indicator variable equal to 1 if firm is audited by a Big 8/6/5/4 auditor; 0 otherwise.

SIZE = natural log of total assets.

AGE = age of the firm, defined as the number of years the firm has been listed on COMPUSTAT since 1972.

ROA = return on assets, equal to income before extraordinary items divided by average total assets.

POSUE = indicator variable equal to 1 if I/B/E/S actual earnings per share in current year is greater than previous year; 0 otherwise.

LEVER = debt-to-total-assets ratio.

$YEAR_j$ = yearly dummies, equal to one for each of the years 1989 to 2006; 0 otherwise.

IND_k = two-digit SIC industry code dummies, equal to 1 if the firm belongs to one of the first 52 two-digit SIC industries represented in the sample; 0 otherwise.

We include control variables that have been shown to influence forecast accuracy and the amount of discretionary accruals because they may also affect the ability to use discretionary accruals to meet or beat forecasts. Prior research has found that the closer the forecast is to the earnings announcement, the smaller the forecast error (Brown, Foster, and Noreen 1985; O'Brien 1988). Because the timing of the most recent forecast varies across firms, we include a control variable, *HORIZON*, that measures the number of months between earnings announcement and the most recent forecast available (similar results are obtained using only the earnings forecasts made at year-end). We also include the number of analysts following a firm *(#ANLYST*), forecast dispersion (*FORSTD*), and firm size (*SIZE*) to control for cross-sectional differences in the information environment that may explain variation in forecast accuracy. Prior studies show that analyst coverage and firm size are

positively related to forecast accuracy and forecast horizon and dispersion is negatively related (Atiase 1985; Lys and Soo 1995; Brown 1997; Chevis, Das, and Sivaramakrishnan 2002). Although the age of the firm has not been used in previous studies identifying the determinants of forecast error, we include age as an additional control variable to provide some assurance that any observed results on the tenure variables are not due simply to the likely correlated effects of age, but make no prediction on its expected sign. Consistent with the approach used by Myers et al. 2003, we define *AGE* as the number of years the firm has been listed on COMPUSTAT since 1972.[10]

Kothari, Leone, and Wasley (2005) find that discretionary accruals are highly affected by firm performance. To control for the possibility that any observed earnings surprise behavior is caused simply by tenure-related financial condition, we also include return on assets (*ROA*) as a control variable. Matsumoto (2002) and Chevis et al. (2002) find that firms with increasing earnings are more likely to meet or beat forecasts. Consistent with Matsumoto 2002, we include a dummy variable (*POSUE*) for firms whose earnings per share increased from the prior year to control for the positive relation between change in earnings and the forecast error. We also include the debt-to-asset ratio (*LEVER*) because Chevis et al. (2002) find that high-leverage firms are more inclined to meet or beat analysts' expectations. Previous studies have also found industry sales growth (*INDSAL*), operating cash flow (*CFLOW*), and auditor type (*BIGN*) to be negatively related to the level of discretionary accruals (e.g., Becker et al. 1998; Francis and Krishnan 1999; Dechow 1994; Dechow and Dichev 2002; Myers et al. 2003). Thus, we include them as control variables. Finally, to control for potential time period or industry-specific effects, we also include yearly dummies using 1988 as the base period and industry dummies for each of the first 52 two-digit SIC industry codes represented in the sample.

Sample characteristics

Table 1 provides some descriptive information about the sample distribution by year, number of auditors, and length of auditor tenure. Panel A shows that the sample is distributed across 19 years (1988–2006), with no single year representing more than 8 percent of the sample. Panel B classifies the sample according to the number of auditors employed by each firm over the period 1988–2006 and the mean number of years each client–auditor combination is represented in the sample. A large majority of the firms had the same auditor over the entire 19-year period (4,222 firms, representing 86.8 percent of the sample). Over 12 percent of the sample had two auditors (602 firms) and the remainder had three or four auditors (less than 1 percent). Firms with one or two auditors had, on average, four or more years of data in the sample, while those with three or four auditors had an average of only two to three years.[11] Panel C provides a distribution of the sample is length of tenure. Most of the firms in the sample are in their 2nd to 5th and 6th to 10th years of audit (25 percent and 30 percent of the sample, respectively). The rest of the firms in the sample are almost evenly distributed among 11–15, 16–20, and over 20 years of audit by the same auditor.

TABLE 1
Distribution by year, auditors, and tenure*

Panel A: Distribution by year

	No. of observations	Percent
1988	734	3.09
1989	1,118	4.71
1990	1,154	4.86
1991	1,193	5.02
1992	1,199	5.05
1993	1,342	5.65
1994	1,416	5.96
1995	1,583	6.67
1996	1,686	7.10
1997	1,780	7.50
1998	1,770	7.45
1999	1,660	6.99
2000	1,573	6.62
2001	1,383	5.82
2002	1,103	4.64
2003	1,052	4.43
2004	1,006	4.24
2005	909	3.83
2006	87	0.37
	23,748	100.0

Panel B: Number of auditors and average length of representation per firm

No. of auditors	No. of firms	% of firms	Mean no. of years in sample
One	4,222	86.8	4.5
Two	602	12.4	3.7
Three	39	0.8	3.0
Four	2	0.0	2.3
	4,865	100.0	

Panel C: Distribution by length of tenure

No. of years	No. of observations	% of firms
2–5	5,988	25.2
6–10	7,164	30.2
11–15	3,768	15.9
16–20	3,401	14.3
Over 20	3,427	14.4
	23,748	100.0

(The table is continued on the next page.)

TABLE 1 (Continued)

Notes:

* The sample consists of 23,748 firm-year observations representing 4,865 distinct firms that had accruals, auditor, and forecast data over the period 1988–2006. Firms in their first year with their auditor that retained the same auditor for less than five years (using data from as early as 1974 to determine the length of the auditor–client relationship) and whose nondiscretionary earnings exceed the consensus analysts' earnings forecast are excluded from the sample.

In results not reported in the tables, we find that the sample is spread over 53 different two-digit SIC codes with no single industry group constituting more than 10 percent of the sample. Reflecting the large firm composition of I/B/E/S, almost 97 percent of the firm-years had a Big N auditor.[12]

Descriptive statistics

Table 2 provides descriptive statistics for our sample. Mean (median) asset size is $3,000 ($500.9) million. As a point of reference, this is larger than the COMPUSTAT-only sample used in Myers et al. 2003.[13] Average cash flows and ROA (absolute discretionary accruals) are also greater (smaller) than their sample. Consistent with the forecast literature, there is evidence of analyst optimism in earnings forecasts, because the mean forecast error is negative (Fried and Givoly 1982; O'Brien 1988). The mean forecast horizon is just over one month before the earnings announcement, and the mean number of analysts covering each firm is almost nine.

Table 3 provides the Pearson correlation matrix among the independent variables. Not surprisingly, correlations among the tenure variables are high, with correlation coefficients (ρ) ranging from 0.20 to 0.86. Age, size, and tenure (ordinal and indicator variables) are also highly correlated with each other, and size is highly positively correlated with the number of analysts. ROA is also highly positively correlated with operating cash flow. The rest of the variables have correlation coefficients less than 0.31. Subsequent specification tests indicate that multicollinearity does not drive our results.

6. Empirical results

Estimation results from the probit model are reported in Table 4. Results for the pooled data are in columns 1 and 2, while results for the pre- and post-SOX periods are shown in columns 3 through 6. All z-scores are adjusted for cross-sectional and intertemporal dependence using two-way cluster-robust standard errors proposed by Petersen forthcoming and Gow, Ormazabal, and Taylor 2008. In combination, our results are consistent with the claim that tenure is related to firms' use of profit-increasing accruals to meet or exceed earnings forecasts in the pre-SOX period but not the post-SOX period.

For the pooled sample covering the entire 1988–2006 time period, *TENURE* is significantly negative and *SQTENURE* is significantly positive at the 1 percent level or better (two-tailed tests). The magnitude of the coefficient of tenure is

TABLE 2
Sample descriptive statistics

	Mean	Median	Standard deviation
Total assets (in millions of dollars)	3,000	500.9	9,767
Net income/average total assets (ROA)	0.031	0.049	0.138
Debt-to-asset ratio	0.202	0.178	0.183
Cash flow from operations/average total assets	0.071	0.081	0.117
Discretionary accruals/average total assets	0.026	0.025	0.067
Absolute discretionary accruals/average total assets	0.053	0.039	0.049
Tenure	11.54	9.0	7.4
Age	13.31	13.0	8.0
Signed forecast error/stock price	−0.006	−0.000	0.022
Absolute forecast error/stock price	0.009	0.002	0.021
Forecast horizon (in months)	1.012	1.0	0.256
Number of analyst forecasts	8.70	6.0	7.28
Forecast dispersion	0.072	0.030	0.144

Notes:

Descriptive statistics are calculated based on 23,748 firm-years over the period 1988–2006, excluding first-year engagements, firms that retained their auditor for less than five years, and firms whose nondiscretionary earnings exceed the consensus analysts' earnings forecast.

Discretionary accruals are estimated from the following model:

$$TA = \beta_0 + \beta_1 PPE + \beta_2 \Delta REV + DA,$$

where:

TA = total accruals, defined as operating income after depreciation minus cash flow from operations;

PPE = net property, plant, and equipment;

ΔREV = change in annual net revenue; and

DA = discretionary accruals equal to the model residuals.

Forecast error is calculated as the difference between actual earnings per share and median forecasted earnings per share, divided by the stock price as of the beginning of the fiscal year. Forecast horizon is equal to the number of months between fiscal year-end and the month when the most recent median earnings forecast was made. Forecast dispersion is equal to the standard deviation of earnings forecasts per firm.

TABLE 3
Pearson correlation matrix

	LONG	*TENURE*	*HORIZON*	*#ANALYST*	*FORSTD*	*INDSAL*	*CFLOW*	*BIGN*	*SIZE*	*AGE*	*ROA*	*POSUE*	*LEVER*
SHORT	−0.204*	−0.353*	−0.009	−0.090*	0.015†	−0.002	−0.043*	−0.046*	−0.131*	−0.215*	−0.012‡	0.006	−0.037*
LONG	1.000	0.863*	−0.011‡	0.242*	−0.023*	0.002	0.137*	0.084*	0.351*	0.658*	0.118*	0.052*	0.020*
TENURE		1.000	−0.013‡	0.241*	−0.043*	−0.011‡	0.146*	0.085*	0.414*	0.773*	0.116*	0.050*	0.039*
HORIZON			1.000	−0.037*	0.056*	−0.002	−0.027*	−0.009	−0.039*	−0.022*	−0.045*	−0.034*	−0.002
#ANLYST				1.000	−0.059*	0.014†	0.224*	0.077*	0.603*	0.228*	0.164*	0.110*	0.017†
FORSTD					1.000	0.012‡	−0.183*	0.020*	0.068*	−0.038*	−0.268*	−0.197*	0.134*
INDSAL						1.000	0.009	0.006	−0.009	−0.018*	0.011‡	0.009	0.005
CFLOW							1.000	−0.006	0.235*	0.157*	0.725*	0.220*	−0.055*
BIGN								1.000	0.095*	0.015†	−0.031*	−0.004	0.057*
SIZE									1.000	0.467*	0.159*	0.056*	0.287*
AGE										1.000	0.129*	0.049*	0.086*
ROA											1.000	0.305*	−0.124*
POSUE												1.000	−0.080*
LEVER													1.000

(The table is continued on the next page.)

TABLE 3 (Continued)

Notes:

Correlations are based on 23,748 firm-years over the period 1988–2006, excluding first-year engagements, firms that retained their auditor for less than five years, and firms whose nondiscretionary earnings exceed the consensus analysts' earnings forecast.

Variable definitions:

SHORT = 1 if auditor tenure is 3 years or less; 0 otherwise.

LONG = 1 if auditor tenure is 15 years or more; 0 otherwise.

TENURE = auditor tenure, measured as the number of continuous years of auditor employment since 1974.

HORIZON = forecast horizon, equal to the number of months between earnings announcement and the month when earnings forecast was made.

#ANLYST = number of analysts making earning forecasts for the firm.

FORSTD = standard deviation of earnings forecasts made for firm.

INDSAL = industry sales growth, calculated as the ratio of industry sales (per two-digit SIC code) per year *t* divided by the prior year sales.

CFLOW = cash flow from operations divided by average total assets.

BIGN = indicator variable equal to 1 if firm is audited by a Big 8/6/5/4 auditor; 0 otherwise.

SIZE = natural log of total assets.

AGE = discrete number of years firm has been listed on COMPUSTAT since 1972.

ROA = income before extraordinary items divided by average total assets.

POSUE = 1 if earnings per share in current year is greater than last year.

LEVER = debt-to-total-assets ratio.

* Significant at the 1 percent level (two-tailed test).

† Significant at the 5 percent level (two-tailed test).

‡ Significant at the 10 percent level (two-tailed test).

almost 30 times that of squared tenure (−0.0221 versus 0.0008). This indicates that the likelihood of using accruals to meet or beat forecasts with respect to tenure follows a U-shaped pattern, initially declining with tenure, bottoming out at about year 14, and then reversing direction to increase as tenure gets longer. Consistent with this interpretation, both *SHORT* and *LONG* tenure indicator variables are positively related to firms' ability to increase accruals when nondiscretionary earnings are below forecasts, although the results are significant at the 5 percent level only for short tenure.[14]

To address the question of whether there is a change in the relation between tenure and accruals across the pre- and post-SOX periods, we reestimated our models after partitioning the sample into the pre-SOX period (1988–2001, columns 3 and 4 of Table 4) and the post-SOX period (2002–6, columns 5 and 6 of

TABLE 4
Meet or beat forecast probit results: Coefficients and *z*-scores

Variables	Predicted signs	Pooled observations (1)	Pooled observations (2)	Pre-SOX (3)	Pre-SOX (4)	Post-SOX (5)	Post-SOX (6)
INTERCEPT		−0.8882‡	−1.0312†	−1.3847*	−1.5333*	−0.3973	−0.3226
		(−1.86)	(−2.14)	(−2.82)	(−3.13)	(−0.59)	(−0.52)
TENURE	(±)	−0.0221*	—	−0.0298*	—	0.01357	—
		(−3.84)		(−5.05)		(0.94)	
SQTENURE (±)	(±)	0.0008*	—	0.0011*	—	−0.0003	—
		(3.68)		(4.84)		(−0.77)	
SHORT (±)	(±)	—	0.0751†	—	0.0678‡	—	−0.1538
			(2.13)		(1.87)		(−0.90)
LONG (±)	(±)	—	0.0345	—	0.0511‡	—	−0.0030
			(1.28)		(1.75)		(−0.09)
HORIZON	(−)	−0.2310*	−0.2317*	−0.2162*	−0.2160*	—	—
		(−2.89)	(−2.86)	(−2.82)	(−2.79)		
#ANLYST	(+)	0.0089*	0.0084*	0.0067†	0.0063‡	0.0173*	0.0175*
		(3.11)	(2.95)	(2.05)	(1.941)	(7.11)	(7.24)
FORSTD	(+)	−1.3035*	−1.3071*	−1.1996*	−1.2024*	−1.8478*	−1.8504*
		(−7.51)	(−7.47)	(−6.68)	(−6.64)	(−4.69)	(−4.66)
INDSAL	(+)	0.0015*	0.0016*	0.0013*	0.0014*	−0.3797*	−0.3795*
		(3.28)	(2.99)	(3.62)	(3.52)	(−2.64)	(−2.61)
CFLOW	(−)	−2.8106*	−2.8265*	−3.1302*	−3.1447*	−1.8627*	−1.8598*
		(−10.62)	(−10.65)	(−12.20)	(−12.19)	(−3.35)	(−3.32)

(The table is continued on the next page.)

TABLE 4 (Continued)

Variables	Predicted signs	Pooled observations (1)	Pooled observations (2)	Pre-SOX (3)	Pre-SOX (4)	Post-SOX (5)	Post-SOX (6)
BIGN	(−)	0.1869*	0.1840*	0.1902*	0.1836*	0.1352	0.1417
		(3.21)	(3.16)	(3.00)	(2.96)	(1.00)	(1.03)
SIZE	(+)	0.0251†	0.0261*	0.0214	0.0218‡	0.0691*	0.0688*
		(2.33)	(2.41)	(1.61)	(1.64)	(6.14)	(6.38)
AGE	(?)	0.0003	0.0003	−0.0010	−0.0021	0.0054†	0.0069†
		(0.17)	(0.17)	(−0.42)	(−1.32)	(2.21)	(2.41)
ROA	(+)	4.2417*	4.2560*	4.7103*	4.7278*	2.9197*	2.9172*
		(10.01)	(9.97)	(10.22)	(10.17)	(3.73)	(3.72)
POSUE	(+)	0.6375*	0.6364*	0.6689*	0.6666*	0.5107*	0.5117*
		(23.98)	(24.08)	(26.79)	(26.27)	(10.37)	(10.10)
LEVER	(+)	0.3589*	0.3579*	0.3796*	0.3781*	0.3298*	0.3300*
		(6.97)	(7.02)	(6.76)	(6.82)	(4.34)	(4.56)
Industry indicators included?		Yes	Yes	Yes	Yes	Yes	Yes
Yearly indicators included?		Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2		0.152	0.152	0.160	0.159	0.145	0.145
Number of observations		23,748	23,748	19,591	19,591	4,157	4,157

(The table is continued on the next page.)

TABLE 4 (Continued)

Note:

Models estimated using probit, respectively, are:

Columns 1, 3, and 5:

$$MBE_{i,t} = \alpha_0 + \alpha_1 TENURE_{it} + \alpha_2 SQTENURE_{it} + \alpha_3 HORIZON_{it} + \alpha_4 \#ANLYST_{it} + \alpha_5 FORSTD_{it} + \alpha_6 INDSAL_{it} + \alpha_7 CFLOW_{it} + \alpha_8 BIGN_{it} + \alpha_9 SIZE_{it} + \alpha_{10} AGE_{it} + \alpha_{11} ROA_{it} + \alpha_{12} POSUE_{it} + \alpha_{13} LEVER_{it} + \Sigma \alpha_j YEAR_j + \Sigma \alpha_k IND_k + u_{it}.$$

Columns 2, 4, and 6:

$$MBE_{i,t} = \beta_0 + \beta_1 SHORT_{it} + \beta_2 LONG_{it} + \beta_3 HORIZON_{it} + \beta_4 \#ANLYST_{it} + \beta_5 FORSTD_{it} + \beta_6 INDSAL_{it} + \beta_7 CFLOW_{it} + \beta_8 BIGN_{it} + \beta_9 SIZE_{it} + \beta_{10} AGE_{it} + \beta_{11} ROA_{it} + \beta_{12} POSUE_{it} + \beta_{13} LEVER_{it} + \Sigma \beta_j YEAR_j + \Sigma \beta_k IND_k + u_{it}.$$

MBE = equals 1 if forecast error is non-negative and adjusted forecast error (earnings less discretionary accruals less analysts forecast) is less than zero; 0 otherwise.

YEAR = yearly dummies for each of the years 1989–2006.

IND = industry dummies for each of the first 53 two-digit SIC industry codes represented in the sample.

All other variables are as defined in Table 3.

Parameter estimates and statistics for the yearly and industry dummies are not reported although some of them are significant. All *z*-scores are calculated using two-way cluster-robust standard errors adjusted for cross-sectional and time-series dependecies (Petersen forthcoming and Gow, Ormazabal, and Taylor 2008).

* Significant at the 1 percent level (two-tailed test).

† Significant at the 5 percent level (two-tailed test).

‡ Significant at the 10 percent level (two-tailed test).

Table 4). The results for the pre-SOX period indicate that auditor tenure is significantly associated with a firm's ability to use discretionary accruals to meet or beat earnings. Once again indicative of a U-shaped relation between tenure and the use of accruals to meet forecasts, ordinal tenure is significantly negative and squared tenured is significantly positive, with the estimated coefficient for tenure being approximately 27 times that of the coefficient for squared tenure. Consistent with the results for tenure and squared tenure, the categorical short and long tenure variables are both significantly positive (at the 10 percent level or better, two-tailed test). The results for the post-SOX period indicate that the relation between tenure and the use of accruals to meet or beat forecasts no longer exists. None of the tenure variables is significant in the post-SOX period. These results are consistent

with recent studies that have found that the level of accruals-based earnings management declined following the passage of SOX (Cohen et al. 2008; Bartov and Cohen 2006).

The coefficients for the control variables are generally significant and have the expected signs. One exception is that we find Big N clients to be significantly more likely to use profit-increasing accruals to meet or beat earnings in the pre-SOX period. Given the small number of non–Big N clients in our sample, caution must be exercised in relying on this result. For brevity, we do not report the results of the individual industry and yearly indicator variables, although some of them are significant.[15]

In sum, we find evidence consistent with auditor tenure being related to firms having greater ability to use income-increasing accruals to meet or beat earnings forecasts during the pre-SOX period. However, we find that the relationship is nonlinear. In particular, we observe that both short and long tenure firms are more likely to use discretionary accruals to meet or exceed earnings forecasts. We do not find evidence consistent with auditor tenure being related to firms' use of accruals to meet or beat forecast during the post-SOX period.

Additional tests

Forecast error tests

To provide additional evidence of a relation between tenure and earnings management that is not dependent on an accruals estimation model that is susceptible to measurement error, we also examine whether auditor tenure is related simply to a firm's ability to meet or beat earnings forecasts. We estimate a model similar to (2) and (3) using absolute and signed forecast errors, scaled by stock price at the beginning of the fiscal year, as dependent variables, without the accruals control variables *INDSAL*, *BIGN*, and *CFLOW*.[16] In untabulated results, we observe that when absolute forecast error is the dependent variable, the ordinal tenure variable is significantly positive and squared tenure is significantly negative, at the 5 percent level or better (two-tailed test), for both the pooled data and the pre-SOX period. This indicates that absolute forecast error is increasing at the early end of the auditor tenure spectrum and declining at the latter end, consistent with a nonlinear (inverted-U-shaped) relation between absolute forecast error and auditor tenure — that is, firms are better able to meet earnings forecasts at both short and long ends of auditor tenure. Consistent with the ordinal results, we also find significantly negative coefficients for both *SHORT* and *LONG* variables (10 percent level or better, two-tailed tests) using pooled and pre-SOX data. However, no tenure variables are significant in the post-SOX period.

With signed forecast error as the dependent variable, we find that tenure is significantly negative and squared tenure, short tenure, and long tenure are significantly positive (5 percent level or better, two-tailed test) for both pooled data and the pre-SOX period. As in the previous models, no tenure variables are significant in the post-SOX period. These results indicate that positive earnings surprises are more likely for firms in the early and later years of the auditor–client relationship

and are consistent with short and long tenure firms being better able to beat earnings forecasts than intermediate tenure firms in the pre-SOX period.

Discretionary accrual tests

Previous studies have found tenure to be inversely related to the magnitude of discretionary accruals, yet we find that long tenure firms are more likely to meet or beat earnings forecasts. This raises the question of whether our findings are due to differences in sample composition (COMPUSTAT versus I/B/E/S) or systematic differences in accrual needs of varying tenure firms to meet earnings objectives; for example, if long tenure firms are more profitable, they may require less discretionary accruals to meet or beat earnings forecasts. To differentiate between the two, we examine whether discretionary accruals are related to auditor tenure using models similar to those of Myers et al. 2003 and Johnson et al. 2002 on our I/B/E/S sample. Unlike Myers et al. (2003), we allow for a nonlinear relation between accruals and tenure by including both ordinal tenure and squared tenure, and unlike Johnson et al. 2002, we define long tenure to be an association of more than 14 years.

As in Myers et al. 2003, we exclude firms that retained their auditor for less than five years and first-year engagements. In untabulated results, we find *TENURE* (*SQTENURE*) to be significantly negatively (positively) related to absolute and positive discretionary accruals in the pooled and pre-SOX periods, but not in the post-SOX period. Myers et al. (2003) find that tenure is significantly negatively (positively) related to absolute and positive (negative) discretionary accruals over the pre-SOX period. Because they only include ordinal tenure in their model, they interpret their results as being consistent with audit quality improving with auditor tenure. The inclusion of squared tenure, however, suggests the opposite at the long end of the tenure spectrum. Together with our earlier forecast error tests, these results suggest that both short and long tenure I/B/E/S firms have more accruals to meet or beat earnings forecasts.[17]

These results also suggest that our I/B/E/S sample is systematically different from that of the general COMPUSTAT sample used in Myers et al. 2003. Because I/B/E/S firms face public pressure to meet or beat analysts' forecasts, they likely have greater earnings management incentives than firms that are not as widely followed (Graham et al. 2005). Given that our tests focus on I/B/E/S firms only, we cannot generalize our results to firms that are not under similar pressure to meet analysts' forecasts. However, while our sample is limited to firms that are covered by I/B/E/S, it must be noted that firms seeking to "meet their numbers" at all costs perform precisely the types of activities that spurred regulators' interest in auditor rotation (Levitt 1998). Furthermore, although I/B/E/S firms constitute less than half of all COMPUSTAT firms, they represent well over 80 percent of the total assets and profits of the COMPUSTAT population.[18]

Alternative tenure specifications

We also reran the model using different specifications of the *SHORT* and *LONG* variables. For *SHORT* tenure, we use cutoffs of 4 and 5 years and for *LONG* tenure, we use cutoffs of 8, 10, 20, and 25 years in place of the previous 15 years or

more. Results remain significant for specifications of *SHORT* tenure of 4 to 5 years and became significant when *LONG* was specified at 20 or 25 years or more. Under these alternative specifications, both *SHORT* and *LONG* tenure firms remained significantly positively related to the ability to use positive discretionary accruals to meet or beat earnings forecasts for the pre-SOX period and *SHORT* tenure remained significantly positive using pooled data. Neither tenure variable was significant in the post-SOX period.

At a cutoff of 8 or 10 years, *LONG* was not significant in any of the models. The lack of significance of long tenure defined as 8 or 10 years or more suggests that previous studies' inability to find a significant result for long tenure may be due to the shorter time frame in which long tenure is defined. Additional sensitivity tests indicate that long tenure starts to be significantly related to the ability to meet or beat forecasts beginning at 16 years or more. Although there is no theoretical justification for why long tenure has to be defined as greater than 15 years, it is also not evident from the existing literature at which exact point in time audit quality begins to suffer from an extended auditor–client relationship. The sensitivity of the *LONG* tenure specification suggests that a model that allows for ordinal measures of tenure better captures the increasing effects of tenure on earnings management than a dichotomous measure that allows only a fixed effect beyond an arbitrary point in time.[19]

Additional control variables

Prior studies have argued that a firm's earnings and cash flows (and hence their accruals) are a function of where the firm is in its growth cycle. Because auditor tenure may be correlated with the life-cycle stage of the firm, we reestimate the models by including proxy measures for the firm's stage in its life cycle to control for the potential association between accruals and life-cycle stage. We use the same approach as Anthony and Ramesh 1992 in identifying a firm's life cycle. In untabulated results, we find none of the life-cycle proxies to be significantly associated with a firm's ability to meet or beat earnings. In contrast, the significances of ordinal tenure and squared tenure are unaffected by the presence of the life cycle proxies in any of the models. *SHORT* and *LONG* (at cutoffs of 16 years or more) tenures also remain significantly positive in the pooled and pre-SOX periods, but not during the post-SOX era.[20]

A firm's ability to meet or beat earnings is also likely to depend on the amount of discretionary accruals necessary to close the gap between nondiscretionary earnings and earnings forecasts — that is, the larger the difference, the less likely it is for the firm to report sufficient discretionary accruals to close the gap. To control for the possibility that the magnitude of the gap is related to auditor tenure, we include the magnitude of the accruals gap (scaled by forecast or stock price) as an additional control variable. As expected, we find that the magnitude of the gap is significantly negatively related to a firm's ability to use accruals to meet or beat earnings, but the significances of the tenure variables remain unaffected.

Randomization tests

Elgers, Pfeiffer, and Porter (2003) show that the "backing out" approach to measuring nondiscretionary earnings can create patterns in estimated discretionary accruals consistent with anticipatory income smoothing (DeFond and Park 1997) even in the absence of earnings management. This mechanical result arises because both discretionary accruals and nondiscretionary earnings are determined jointly and are, therefore, negatively correlated by construction (McNichols and Wilson 1988).

To alleviate this concern, we imitate the approach used in Elgers et al. 2003 by generating a random normal distribution of forecast errors and discretionary accruals with the same mean and standard deviation as our sample to formulate our dependent variables. We repeated this random generation process and model estimation 1,000 times and found that the mean coefficients of the tenure variables are not statistically significant in any of the models and periods. These results show that the observed association between tenure and earnings surprises and the use of profit-increasing accruals to meet or beat analysts' forecasts is not a result of correlated estimation error.

Expectations or earnings management?

Matsumoto (2002) and Bartov et al. (2002) argue that earnings surprises are consistent not only with earnings management, but also with firms guiding analysts' forecasts downward in order to facilitate meeting or beating earnings. We attempt to eliminate "pure" expectations managers by requiring earnings managers to report discretionary accruals in a manner consistent with managing earnings to meet or beat forecasts. To further distinguish the two, we also use Bartov et al.'s 2002 approach to identifying the most likely expectations managers as firms whose initial forecast at the beginning of the year exceeded actual earnings but ended the year with a zero or positive earnings surprise. We then reran the models excluding this sample of expectations managers (3,857 firm-years, representing 16.2 percent of the sample). Consistent with the less sensitive nature of categorical measurement, short and long tenure were no longer significant, but ordinal (squared) tenure remained significantly negatively (positively) related to the ability to meet or beat earnings using discretionary accruals in the pooled and pre-SOX periods.

Additional specification tests

Kothari et al. (2005) argue that using performance-matched discretionary accruals reduces the likelihood of overstating Type I errors (but increases the chance of Type II errors) when the variable of interest (auditor tenure) is correlated with performance. We attempt to mitigate the confounding impact of performance on our measures of discretionary accruals by including *ROA* as a control variable in all of our models. As an additional control, we reestimated our probit models using performance-matched discretionary accruals — that is, the discretionary accruals were adjusted by the discretionary accruals of the firm with the closest *ROA* and in the same industry and year as the sample firm. Over the full sample and pre-SOX periods, ordinal tenure, squared tenure, and long tenure (cutoffs of 16 years or longer) continue to remain significantly related to the ability to meet or beat

earnings. Short tenure was positive but no longer significant as were the tenure variables in the post-SOX period.

As an additional sensitivity test, we limit our definition of firms that meet or beat earnings using positive discretionary accruals to only those firms that meet exactly or beat forecasts by only a penny (Frankel, Johnson, and Nelson 2002). The argument is that firms that barely meet or beat forecasts are more likely to be earnings managers than those that exceed forecasts by a considerable margin. This reduced our sample of earnings managers to 19.2 percent of the sample from 45.8 percent. Under this specification, ordinal tenure remains significantly negative and squared tenure significantly positively related to the ability to meet or beat forecasts over the pooled and pre-SOX periods. Long tenure also remained significantly positive (10 percent level or better, two-tailed test), while short tenure became insignificant.

7. Conclusion, limitations, and future research

Our analysis indicates that both short- and long-term auditor tenure are associated with increased use of discretionary accruals to meet or beat earnings forecasts in the pre-SOX period, but the results disappear following SOX. These results are important because they provide evidence consistent with the arguments put forth by both proponents and opponents of mandatory auditor rotation. Consistent with some past studies, we find evidence of increased earnings management in the earlier years of the auditor–client relationship. Unlike prior research, we also find evidence in the pre-SOX period that long-term auditor–client relationships were associated with greater auditor tolerance for earnings management, albeit only after the auditor–client relation extends beyond 15 years or more. Previous studies have tested for the effects of long tenure at an earlier point in the auditor–client relationship. The nonlinear relation between tenure and earnings quality may also explain the mixed evidence observed in prior research. Further, our results indicate that the relation between auditor tenure and earnings management has not persisted into the post-SOX period. Increased scrutiny and the threat of legal sanctions likely led to a reduction in both managers' use of accruals to manage earnings and auditors' tolerance for earnings management.

The implications of these findings for regulators considering mandatory rotation depend on whether the change in the auditor tenure/earnings management relation between the pre- and post-SOX period is transitory or permanent. If the relation between earnings management and tenure that we find in the pre-SOX period re-emerges in the post-SOX period, the implications of our results for mandatory rotation would focus primarily on the trade-offs between the costs of inefficiency and the loss of independence. The challenge to regulators will be to determine the right balance when contemplating new regulations. If the change in the relation between tenure and earnings management following SOX proves to be permanent, then implementation of mandatory rotation to constrain earnings management is unnecessary.

While we address issues of earnings management, reduced auditor independence, and low audit quality, we acknowledge that we do not directly observe such

behavior. For instance, we do not directly observe whether the increased use of accruals to meet or beat forecasts in the earlier or later years of the auditor–client relationship is attributable to a lack of client-specific knowledge or decreased auditor objectivity. Rather, we identify conditions that are consistent with such phenomena. What is difficult to explain is why the incidence of such behavior is related to auditor tenure, other than through our assertion that both short-term and long-term auditor–client relations result in impaired audit and financial reporting quality. Further, our findings on the association between auditor tenure and increased earnings management may not be generalizable to firms that are not followed by analysts. These firms do not face the same public pressure to meet analysts' expectations and thus may not have the same incentive to manage earnings. Lastly, we focus on only one dimension of audit quality: auditor tolerance for the use of accruals to meet forecasts. Although our post-SOX results suggest that the relation between tenure and reported accruals no longer exists, it is possible that long-term auditor–client relationships continue to impair independence in other ways.

Ghosh and Moon (2005) find that firms with long tenure have greater earnings response coefficients and equate that with higher earnings quality. Our finding of a negative association between long tenure and earnings quality, as measured by firms' use of discretionary accruals to meet earnings forecasts, appears inconsistent with this finding. However, Lopez and Rees (2002) and Bartov et al. (2002) find that the market rewards firms that meet or beat earnings with an earnings multiple premium. An alternative interpretation of the Ghosh and Moon (2005) result, therefore, is that the market is simply rewarding the long tenure firms for their increased ability to meet or beat earnings expectations. We leave disentangling these two competing explanations to future research.

Future research is also needed to determine whether the post-SOX reduction in earnings management is permanent or transitory and whether it is attributable to a reduction in managers' attempts to manage earnings or to decreased auditor tolerance for such actions. Given our results, future research might also want to reexamine the extent to which the findings reported in prior studies are sensitive to potential nonlinearities in the relation with tenure and the extent to which long tenure is defined. Lastly, development of measures associated with the cost of adopting and not adopting mandatory rotation would be of value to regulators who address this issue in the future.

Endnotes

1. We define financial reporting quality as the extent to which reported income is measured in accordance with generally accepted accounting principles. Financial reporting quality is a function of audit quality: the performance of an audit in conformity with generally accepted auditing standards and the rendering of an opinion based on the evidence gathered. Audit quality is, in turn, dependent on auditor independence — that is, the extent to which the auditor renders an unbiased opinion (DeAngelo 1981).
2. For extended discussion of the arguments for and against rotation, see the Commission on Auditor Responsibilities (AICPA 1978); the National Committee on Fraudulent

Financial Reporting (AICPA 1987; the AICPA White Paper 1992), the SEC's chief accountant's call for academic research (Turner 1999); the AFL-CIO petition to the SEC (Trumka 2001); as well as Brody and Moscove 1998 and Myers et al. 2003.

3. Caramanis and Lennox (2008), using a unique data set of audit engagements in Greece, find evidence of a negative relationship between tenure and positive abnormal accruals. However, the auditing profession in Greece was nationalized until the early 1990s. Consequently, their sample's average audit tenure is 4 years and more than 95 percent of the sample has a tenure of less than 10 years. Thus, their study offers limited insight into the association between accruals and relatively long auditor–client relationships.
4. DeFond et al. (2002) assert that auditors have only an indirect effect on reported accruals. However, this indirect relation is consistent with the types of subtle effects in which regulators are interested and should result in a bias against finding empirical evidence of the relation.
5. Myers et al. (2003, 785) also indicate that drafts of congressional bills "provided a range of suggested mandatory rotation periods, and groups of 3 to 5 years and more than 5 years are representative of the suggested periods". Thus, it is likely that shorter relationships would be unaffected by legislation adopting mandatory auditor rotation.

   We conduct additional tests that include and separately identify the quick turnover and first-year engagement firms as sensitivity analyses. Their inclusion did not affect the significance of the tenure variables. Results were similarly unaffected by the exclusion of ongoing auditor–client relationships of five years or less.
6. We thank the associate editor for making this suggestion. The use of squared variables to capture a nonlinear functional form is similar to restating a nonlinear function into a polynomial by means of a Taylor series expansion (Kennedy 1985), and has been used in an accounting context by, for example, Thomas and Tung 1992 and Hanlon, Rajgopal, and Shevlin 2003.
7. Recall that COMPUSTAT identifies auditor identity commencing 1974. Because our sample begins in 1988 due to the availability of cash flow data, the longest tenure cutoff that can be defined with precision would be 15.
8. Results are similar and, in fact, stronger if this subsample of firms remains part of the control sample of non-earnings managers.
9. In sensitivity tests reported later in the paper, we also limit our earnings management sample to only those firms that meet or beat forecasts by one cent (see section titled "Additional Specification Tests"). Results remain consistent with those of the full sample.
10. Because age is correlated with tenure, we also considered the square of age (*AGESQ*) as an additional control variable in regressions involving squared tenure. The inclusion of both age and age squared does not affect the significance of the tenure and squared tenure variables. Hence, we do not include *AGESQ* in our main models.
11. Although the sample includes only those firms that remained with their auditors for a minimum of five years, we used all available data on COMPUSTAT from 1974 onward to determine the length of association. Inferences are similar when we limit our tests to auditor–client relationships that have a minimum of five years' representation in our sample.

12. The period examined includes years prior to the merger of the Big 5 firms and subsequent to the demise of Arthur Andersen. For brevity, we refer to the Big 8, Big 6, Big 5, and Big 4 firms uniformly as the Big N. All the results are consistent when we exclude the non–Big N firms.
13. Myers et al. (2003) do not report descriptive statistics for their entire sample but provide them by length of tenure. Comparisons are made on the basis of the largest subgroup (tenure greater than four years). Inferences will, however, be consistent with the full sample because the other subgroups are at the other end of the comparison — that is, the other subgroups have even less assets and cash flow and greater absolute discretionary accruals than the largest subgroup.
14. In untabulated results, we find that 45.6 percent and 49.2 percent of firms with tenure of 2 or 3 years and 15 years or more, respectively, reported profit-increasing accruals to meet or beat forecast. In contrast, 44.1 percent of firms with auditor tenure of 4–14 years engaged in similar actions. We easily reject the null hypothesis that there is no association between tenure and the frequency with which successful profit-increasing actions are taken (chi-square statistics of 51.8, which is significant at less than the 1 percent level).
15. We calculated condition indices to check for evidence of multicollinearity and found them to be over 50 in both of the regressions with maximum variance inflation factors (VIFs) of over 25. Condition indices of 30–100 and VIFs of over 10 are generally considered evidence of moderate to strong dependencies (Belsley, Kuh, and Welsch 1980; Neter, Wasserman, and Kunter 1990). Further analyses reveal that once the industry and year dummies are excluded, condition indices drop below 30 and maximum VIFs to less than 5, with ordinal tenure and squared tenure, long (at 16 years or greater) and short tenure variables remaining significant. These results suggest that multicollinearity is not driving the significance of the tenure variables.
16. We use the median consensus forecast closest to the earnings announcement date and the I/B/E/S actual earnings per share from the I/B/E/S Historical Summary tape in our calculation of forecast error. To eliminate the effects of outliers, we winsorize all forecast data at the 1 percent and 99 percent levels.
17. High levels of discretionary accruals are also consistent with "efficient" earnings management — that is, discretionary accruals are used to communicate information about the firm's future performance (Gul, Chen, and Tsui 2003). Subsequent tests reveal, however, that our tenure results are not limited to cases where large discretionary accruals are reported and hold even when we control for the magnitude of the earnings gap and when the sample is limited to firms that report just enough accruals to exactly meet or barely beat earnings expectations.
18. Another potential explanation for the inconsistency in results is the difference in size of the COMPUSTAT and I/B/E/S samples. However, when we reestimated the model dividing the I/B/E/S sample at the median asset size, we find that both tenure and squared tenure remain significant for both subsamples.
19. Long tenure, defined as 16 or more years, remains significant even when we exclude all observations from 1988. Recall that because auditor identity is not available in COMPUSTAT until 1974, precise identification of tenure greater than 15 years is not possible for observations in 1988.

20. Firms are classified into one of three life-cycle stages (growth, mature, and stagnant) on the basis of the ranking of its dividend yield and sales growth. Firms in the top and bottom thirds of the combined ranking are classified as growth or stagnant stage firms (we reversed the ranking of dividend yield to be consistent with that of sales growth in terms of identifying early growth or stagnant stage firms). Anthony and Ramesh (1992) use two other variables to identify the firm's life-cycle stage: age of the firm, which we already include in our model, and the relative amount of capital expenditures, which they subsequently dropped from their analyses because they found it not to have significant explanatory power.

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