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Misstatement Discovery**

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# Auditor Tenure and the Timeliness of Misstatement Discovery

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**ABSTRACT:** Using the timeliness of misstatement discovery as a proxy for audit quality, we examine the association between audit firm tenure and audit quality in a setting that alleviates the endogeneity problem endemic to this line of research. We find that longer audit firm tenure leads to less timely discovery and correction of misstatements, which is consistent with a negative effect of long auditor tenure on audit quality. In addition, using the non-voluntary auditor change following the demise of Arthur Andersen in 2002 as a natural experiment, we show that the misstatements of its former clients were discovered faster than those of comparable companies that retained their auditors throughout the misstatement. This finding speaks to the benefit of a fresh look by a new auditor. An extended analysis shows that longer auditor tenure also leads to misstatements of greater magnitudes, and that the Sarbanes-Oxley Act has mitigated, but not eliminated, the negative effect of long auditor tenure. Last, we show that the negative association between auditor tenure and timely discovery of misstatements is mainly present in the first ten years of an audit engagement. Our study has implications for regulators who continue to express concern regarding lengthy auditor-client engagement.

**Keywords:** audit firm tenure; timeliness of misstatement discovery; misstatement duration; audit quality; non-voluntary auditor change.

**JEL Classifications:** K22; K23; L51; M41; M42; M48.

## I. INTRODUCTION

The impact of audit firm tenure and auditor rotation<sup>1</sup> on audit quality has long been debated, both within academia and by regulators in the United States (U.S.) and globally. The debate has centered on two main opposing views. The positive view argues that longer auditor tenure leads to a higher-quality audit via a learning effect, due to the accumulation of client-specific knowledge over time. An auditor that is more knowledgeable of the client is more likely to promptly identify financial reporting problems. Accordingly, regulatory intervention that limits the length of the auditor-client engagement is undesirable. The negative view argues that long auditor tenure may have a detrimental effect on audit quality for two reasons. First, long auditor tenure may lead to the development of economic and social bonds between the auditor and the client company due to continuous involvement. This, in turn, has the potential to impair the auditor's objectivity and increase the likelihood of audit failure. Second, because the audit is performed year in and year out, the auditor may become

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<sup>1</sup> Throughout the paper, we use the terms "audit firm tenure" and "auditor tenure" and the terms "audit firm rotation" and "auditor rotation" interchangeably.

complacent, due to the repetitive nature of the task. A complacent auditor, in turn, may fail to promptly detect misreporting, leading to audit failure. In contrast, a new auditor would bring a fresh viewpoint, which will benefit the audit engagement.<sup>2</sup> Consequently, under the negative view, it is desirable to limit the length of the auditor-client engagement.

For the most part, academic research on the effect of auditor tenure on audit quality shows evidence consistent with the positive view (e.g., Palmrose 1991; Chen, C. Lin, and Y. Lin 2008; Chi, Huang, Liao, and Xie 2009). Nonetheless, regulators continue to express concern about the negative effect of long auditor tenure on audit quality and have tightened regulations related to both audit firm tenure and audit partner tenure. In 2002, the Sarbanes-Oxley Act (SOX) accelerated the audit partner rotation period from seven to five years and expanded the cooling-off period from two to five years. Other countries have also introduced similar, or even stricter, legislation. In 2014, the European Union (EU 2014) passed regulations mandating audit firm rotation after ten years. In the U.S., the Public Company Accounting Oversight Board (PCAOB) tried to pass similar regulations, but was blocked by Congress in 2013.

A major limitation of prior studies that examine the effect of auditor tenure on audit quality is that in their research design, auditor tenure is endogenous. This is because companies with lower financial reporting quality may replace their auditors more often than other companies due to disagreements; as a result, their auditors will have shorter tenure. This makes causal inference problematic. Most of these studies find a positive association between auditor tenure and financial reporting quality and conclude that short auditor tenure is detrimental to audit quality. However, because of the endogeneity problem, an alternative interpretation of these findings is that lower financial reporting quality leads to shorter auditor tenure (DeFond and Zhang 2014; Lennox, Wu, and Zhang 2014).

In this study, we mitigate the endogeneity problem by examining the effect of auditor tenure on the timeliness of misstatement discovery. To account for the timeliness of the discovery, we use the length (or the duration) of the misstatement. We measure auditor tenure from the first year of the audit engagement up to the year the misstatement began, and we measure misstatement duration from the year that the misstatement began to the year it ended (see Figure 1). In this setting, auditor tenure is predetermined at the onset of the misstatement period and, therefore, unlikely to be endogenous to the misstatement duration. As a result, our examination avoids the issue of reverse causality (i.e., the possibility that misstatement duration affects auditor tenure).

We consider the timeliness of misstatement discovery a reasonable proxy for audit quality, as an auditor who discovers a misstatement promptly can be assumed to provide higher audit quality than an auditor who does not spot the misstatement until much later. Since only annual financial statements are audited, in our analysis, we set misstatement duration (the inverse measure of the timeliness of misstatement discovery) to the number of consecutive annual reports misstated. We set misstatement duration to 0 when at least one of the quarterly financial reports during the year was restated, but the annual financial report was free of material misstatements. This situation implies that a misstatement occurred, but was corrected before appearing in the annual report. We consider this situation as evidence that the auditor was effective in preventing misreporting. When the annual financial statements of only one year were restated, this suggests that the auditor failed to detect the misstatement once because the annual reports of the following year no longer contained a material misstatement. Accordingly, we set misstatement duration to 1. We follow this logic and set misstatement duration to 2 when two consecutive annual financial statements were restated, to 3 when three consecutive annual financial statements were restated, and so on.

Using an accelerated failure time parametric duration model, we find a *positive* association between auditor tenure and misstatement duration, implying a *negative* association between auditor tenure and timeliness of misstatement discovery. In other words, auditors with shorter tenures are faster to discover financial misreporting. This is consistent with a negative effect of long auditor tenure on audit quality. Economically, misstatements of companies with short (long) auditor tenure are approximately 9.4 percent (6.4 percent) shorter (longer) than those of companies with medium auditor tenure.

Next, to assess the importance of a fresh view by a new auditor, we use the demise of Arthur Andersen (Andersen) in 2002 as a natural experiment to examine whether a newly appointed auditor discovers misreporting more promptly than an incumbent auditor. The advantage of using this exogenous event is that the replacement of Andersen by a new auditor was non-voluntary and, therefore, was not affected by the client's financial reporting quality. Specifically, we identify a group of Andersen clients who had accounting misstatements starting in 2000 or 2001 and ending after Andersen's clients switched to another auditor in 2002. We ensure that these companies did not change auditors again before their misstatements were discovered. We match those companies with comparable companies that also had misstatements that started at the same time (year and quarter), but retained the same auditor throughout the misstatement. We find that the former Andersen clients had significantly shorter misstatement duration (i.e., ended earlier) than the control companies. This suggests that the incumbent

<sup>2</sup> Recently, CalPERS, one of the two largest public pension systems in California, said it is voting "against" the ratification of Wells Fargo auditor KPMG. CalPERS expressed "concerns over a potential lapse of internal controls during the extended period" and suggested that "the company should explore auditor rotation to ensure a fresh perspective" (see Kerber 2017).

auditors were slower in detecting the misreporting, which speaks to the benefit of a fresh view by a new auditor.<sup>3</sup> This result complements our finding of a positive association between auditor tenure and misstatement duration, thus providing support to our argument that long auditor tenure impairs audit quality.

We conduct several supplementary analyses. First, the enactment of SOX in 2002 brought unprecedented changes to auditing regulations that aimed to improve audit quality. We, therefore, examine whether the negative association between auditor tenure and the timeliness of misstatement discovery is attenuated after the implementation of SOX. We find that in the post-SOX era, the association becomes weaker, but remains significant. This finding suggests that while SOX has been successful in mitigating the negative effect of long auditor tenure on audit quality, it has not fully addressed the problem. Second, the EU has recently passed a regulation mandating audit firm rotation after ten years. We assess the effectiveness of such a regulation for the U.S. by examining the association between auditor tenure and misstatement duration in the early stage (Tenure  $\leq 10$  years) and in the late stage (Tenure  $> 10$  years) of the auditor-client relationship. We find that the association is positive and significant only in the early stage. Within the first ten years, a one-year increase in auditor tenure will prolong the misstatement duration by approximately 2.02 percent. In the late stage, the association is insignificant. This finding suggests that the deterioration in audit quality starts rather early in the auditor-client relationship. Thus, if U.S. regulators are to consider mandating auditor rotation, to make the regulation more effective, the maximum engagement period should be fewer than ten years. Third, we examine whether longer auditor tenure leads to misstatements of larger magnitudes. We conjecture that as the misstatement extends, it will allow misreporting to accumulate and increase over time. Indeed, we find a positive and significant association between audit firm tenure and misstatement magnitude, suggesting that longer auditor tenure not only results in less timely detection of misstatements, but also leads to misstatements of larger magnitudes.

We believe that our study makes significant contributions to the academic literature and has policy implications for regulators. First, since our measure of auditor tenure is not affected by our measure of audit quality, i.e., the length of the misstatement, we are able to mitigate the endogeneity problem endemic to prior studies. Using this innovative research design, we find that longer auditor tenure leads to a less timely discovery and correction of misstatements, suggesting that long auditor tenure is detrimental, rather than beneficial, to audit quality. Our analysis of former Andersen clients provides evidence on the benefits of a fresh view by a new auditor, which further strengthens the benefit of limiting the length of auditor tenure. Second, our findings should be of interest to regulators and the longstanding debate regarding the costs and benefits of mandatory audit firm rotation. Our results support the PCAOB's concern that long auditor tenure impairs audit quality. Third, to the best of our knowledge, we are the first to examine the timeliness of misstatement discovery.<sup>4</sup> The timely discovery of misstatements by an auditor is of great importance to companies and market investors, not only because it prevents misstatements from exacerbating, but also because it helps investors to promptly adjust their valuation, resulting in a lower likelihood of extreme stock price volatility and stock price crashes. While our study focuses on the effect of auditor tenure on the timeliness of misstatement discovery, future studies can examine other determinants of misstatement duration.

A limitation of our study is that it only examines companies that restated their financial statements. Thus, our results may not be generalizable to companies without accounting restatements. Also, because of data limitations, we do not consider in our analysis whether the restatement was initiated by the company, the auditor, or another party, such as the Securities and Exchange Commission (SEC). Finally, although our research design successfully alleviates one source of the endogeneity problem—reverse causality—we cannot rule out all other endogeneity problems, such as omitted correlated variables. Nonetheless, we believe that our study provides important new insight into the consequences of long auditor tenure.

The remainder of the paper is organized as follows. Section II provides a background on mandatory auditor rotation regulations. We survey the related literature and develop our hypothesis in Section III. In Section IV, we describe the sample construction and provide descriptive statistics. Section V reports the main empirical results. Section VI presents the supplementary tests, and Section VII concludes the study.

## II. BACKGROUND ON AUDITOR ROTATION REGULATIONS

Regulators and policymakers have long been concerned about the effect of extended auditor-client relationships on audit quality. Recently, two important regulatory developments occurred. First, in the U.S., the Congress decided not to support the PCAOB's (2011) effort to require mandatory audit firm rotation (U.S. House of Representatives 2013). Second, in contrast to the U.S., the EU (2013), in December 2013, adopted the proposal of the European Commission (2011) from November 2011, and in April 2014, passed regulation 537/2014 (European Parliament and European Council 2014) that aims at increasing the

<sup>3</sup> We thank Clive Lennox (the editor) for suggesting this test.

<sup>4</sup> Palmrose, Richardson, and Scholz (2004) and Hogan, Lambert, and Schmidt (2013) also use the measure of misstatement duration. However, they use it to proxy for misstatement materiality and do not examine the timeliness of misstatement discovery.



quality of auditing. The regulation went into effect on June 17, 2016. Among other requirements, this regulation mandates public interest entities to rotate their auditors after ten years.<sup>5</sup> In justifying its decision, the EU argued as follows:

Such a long professional relationship may undermine the statutory auditor's independence and negatively impact on its professional scepticism. Rotation of the key audit partner within an audit firm is insufficient because the main focus of the audit firm remains client retention. A new partner would be under pressure to retain a long-standing client of the firm. Mandatory audit firm rotation will help reduce excessive familiarity between the statutory auditor and its clients, limit the risks of carrying over repeated inaccuracies, and encourage fresh thinking, thus strengthening the conditions for genuine professional scepticism. Mandatory rotation will hence contribute to a better audit quality. (European Commission 2011, Memo 14-427)

At present, many jurisdictions impose limitations on audit partner tenure, but very few impose limitations on the length of audit firm tenure.<sup>6</sup> Countries that mandate audit firm rotation for all types of publicly traded companies include all the EU member states, Bangladesh, Bolivia, Bosnia Herzegovina, Costa Rica, Indonesia, Mongolia, Oman, Paraguay, Serbia, Tunisia, and Uzbekistan. Some other countries require audit firm rotation for specific types of listed entities, typically banks and insurance companies (Lennox 2014).

### III. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

#### Audit Firm Tenure and Audit Quality in a Voluntary Audit Firm Rotation Regime

Prior studies examine audit firm tenure in a regime of voluntary audit firm rotation. Most of these studies show a positive association between audit firm tenure and audit quality. Studies find shorter auditor tenure to be associated with lower earnings quality (e.g., Johnson, Khurana, and Reynolds 2002; Chung and Kallapur 2003; J. Myers, L. Myers, and Omer 2003; Chen et al. 2008; Gul, Fung, and Jaggi 2009; Chu, Dai, and Zhang 2016; Bratten, Causholli, and Omer 2017); more restatements (Stanley and DeZoort 2007); more fraudulent financial reporting (Carcello and Nagy 2004); less conservatism (Jenkins and Velury 2008); a lower likelihood of issuing a going-concern opinion immediately prior to bankruptcy (Geiger and Raghunandan 2002); and a higher risk of a stock price crash (Callen and Fang 2017). Using data from internal assessments of audit quality in a Big 4 audit firm, Bell, Causholli, and Knechel (2015) present evidence that audits of SEC registrants receive lower assessments of quality in the first year than in the following years.

Compared with the large body of evidence indicating a positive association between audit firm tenure and audit quality, far fewer studies report otherwise. Davis, Soo, and Trompeter (2009) examine the use of discretionary accruals to meet or beat analysts' earnings forecasts. They find evidence of lower audit quality in both the early and late years of the audit engagement, relative to the other years (nonlinear relation), but only in the pre-SOX period. Lennox and Pittman (2010) find inconclusive results regarding the association between misreporting and auditor tenure. Boone, Khurana, and Raman (2012) find no association between the likelihood of meeting or beating analyst earnings forecasts using discretionary accruals and short auditor tenure. Last, Chu, Church, and Zhang (2012) find a negative association between auditor tenure and the allowance for bad debts, suggesting that long auditor tenure leads to lower audit quality.

In regard to investors' perception of auditor tenure, prior studies mainly note a favorable view. Mansi, Maxwell, and Miller (2004) find that auditor tenure is negatively related to the cost of debt financing. Ghosh and Moon (2005) use the coefficient from returns-earnings regressions to proxy for perceived audit quality, and they document a positive association between the earning response coefficient and auditor tenure. They also find that the association between past earnings and one-year-ahead earnings forecasts increases with auditor tenure, which is consistent with financial analysts perceiving long auditor tenure as improving audit quality. Boone, Khurana, and Raman (2008) find some evidence that the *ex ante* equity risk premium for clients of Big 5 audit firms decreases with audit firm tenure, but eventually starts to increase for long auditor tenure. Reid and Carcello (2017) identify ten events between 2011 and 2013 that increased or decreased the likelihood of adopting mandatory audit firm rotation in the U.S. They document a negative (positive) market reaction to the events that increased (decreased) the potential adoption. This suggests that investors in the U.S. stock market did not favor limitation on auditor tenure.

<sup>5</sup> However, member states can establish shorter rotation periods (e.g., a maximum of seven or eight years). In addition, they can allow private interest entities to extend the audit engagement (1) by an additional ten years upon tender, or (2) by an additional 14 years in the case of a joint audit. The member states were given two years to implement this regulation.

<sup>6</sup> Audit partners are subject to mandatory rotation in Argentina, Australia, Belgium, China, Denmark, France, Germany, Hong Kong, Mexico, The Netherlands, New Zealand, Norway, Russia, Taiwan, the United Kingdom, and the United States, but none of these jurisdictions require the rotation of audit firms.

## Audit Firm Rotation and Audit Quality in a Mandatory Audit Firm Rotation Regime

Research on mandatory audit firm rotation and audit quality in a mandatory rotation regime is very limited because until recently, very few countries have imposed mandatory audit firm rotation. Using a Spanish setting, [Ruiz-Barbadillo, Gomez-Aguilar, and Carrera \(2009\)](#) compare the frequency of going-concern opinions in a period of mandatory audit firm rotation (1991–1994) and in a subsequent period when rotation was no longer mandatory (1995–2000). The authors find no evidence of a difference in the frequencies between the two periods. However, a major issue with their study is that the mandatory rotation policy was never actually implemented in Spain, as it had already been abandoned before the first rotation events took place.

Three studies use data from Italy, where mandatory auditor rotation has been required since 1975. During the period examined in those studies, the auditor appointment term in Italian companies was on a three-year basis, renewable two times for a maximum of nine years. [Cameran, Francis, Marra, and Pettinicchio \(2015\)](#) show that abnormal accruals are higher in the first three years following mandatory audit firm rotation, relative to later years of auditor tenure, which is consistent with auditor rotation impairing audit quality. [Cameran, Prencipe, and Trombetta \(2016\)](#) find that the auditor becomes more conservative in the last three-year period, right before the auditor must be rotated. Last, [Livne and Pettinicchio \(2012\)](#) find no evidence that earnings management changed in the year immediately after auditor rotation.

Using data from South Korea and Brazil, [Harris and Whisenant \(2016\)](#) find less earnings management and timelier loss recognition after the introduction of mandatory auditor rotation. After adding Italian companies to the sample, the authors observe that the median (but not the mean) discretionary accruals are higher in both the year before and the year after audit firm change. [Kwon, Lim, and Simnett \(2014\)](#) focus only on South Korean companies and find no significant improvement in audit quality, measured by abnormal accruals, after the introduction of mandatory audit firm rotation. Overall, evidence from this limited number of studies is inconclusive. [Lennox \(2014\)](#) concludes that there is insufficient evidence to determine whether mandatory auditor rotation is beneficial or harmful.<sup>7</sup>

## Limitations of the Prior Literature

The major limitation of prior studies is that the company's decision to replace the auditor is endogenous. As a result, it is difficult to make a clear causal inference regarding the association between auditor tenure and financial reporting quality. The common conclusion of prior studies is that short auditor tenure leads to low financial reporting quality because the new auditor lacks the client-specific knowledge accumulated over time. However, an alternative interpretation is that low financial reporting quality leads to short auditor tenure. This is because the auditor and the client are more likely to run into disagreements when financial reporting quality is low. To obtain a clean audit, the company may choose to replace the auditor with one who is more lenient, resulting in short auditor tenure in companies with low financial reporting quality. In addition, the auditor may choose to resign when the company aggressively manages earnings due to the increased audit risk ([Johnstone and Bedard 2004](#)). Due to the reverse causality problem, it is unclear how audit firm tenure affects financial reporting quality.

Another limitation of the literature is related to the measures of audit quality. A very common proxy for audit quality is (both signed and unsigned) abnormal accruals (e.g., [Francis, Maydew, and Sparks 1999](#); [Johnson et al. 2002](#); [Myers et al. 2003](#); [Cahan and Zhang 2006](#); [Carey and Simnett 2006](#); [Chen et al. 2008](#); [Chi et al. 2009](#); [Reichelt and Wang 2010](#)). However, [E. Bamber and L. Bamber \(2009\)](#) point out that the metric of abnormal accruals is a noisy measure of earnings quality, and even more so of audit quality. Furthermore, [Lennox et al. \(2014\)](#) provide evidence that abnormal accruals are a rather noisy measure of audit quality. The second common indicator of audit quality is the restatement of the financial statements (e.g., [Farber 2005](#); [Stanley and DeZoort 2007](#); [Romanus, Maher, and Fleming 2008](#); [Chin and Chi 2009](#)). However, this measure has its limitations, as well. The likelihood of a restatement is the product of the occurrence of a misstatement and its detection. Therefore, the finding of a negative association between restatement occurrence and auditor tenure can mean different things, such as: (1) long-tenured auditors are more likely to prevent misstatements, (2) long-tenured auditors are less likely to detect misstatements, and (3) companies that are more likely to misstate their financial statements are also more likely to change their auditors. Thus, it is difficult to draw a definite conclusion regarding the effect of auditor tenure on audit quality using this measure.

We believe that our setting overcomes the two limitations found in prior studies. First, in our setting, auditor tenure is predetermined at the onset of the misstatement and, therefore, is not affected by the length of the misstatement. As a result, reverse causality, i.e., the possibility that the misstatement duration affects auditor tenure, is very unlikely in our study, making it less problematic to draw a causal inference. Second, we use the timeliness of misstatement discovery to proxy for audit

<sup>7</sup> A related line of research examines the association between audit partner rotation and audit quality, both in regimes of voluntary rotation (e.g., [Carey and Simnett 2006](#); [Chen et al. 2008](#)) and of mandatory rotation (e.g., [Manry, Mock, and Turner 2008](#); [Chi et al. 2009](#); [Lennox et al. 2014](#)). Overall, results from these studies are rather mixed.

quality. We argue that this is a more direct measure of audit quality, because the main responsibility of the auditor is to express an opinion on whether the financial statements are presented in conformity with generally accepted accounting principles. A higher-quality auditor should be able to detect a misstatement faster than a lower-quality auditor. Taken together, an examination of the effect of audit firm tenure on the timeliness of misstatement detection allows us to draw a clear conclusion on how auditor tenure affects audit quality.

## Hypothesis Development

DeAngelo (1981, 186) defines audit quality as “the market-assessed joint probability that a given auditor will both (a) discover a breach in the client’s accounting system, and (b) report the breach.” According to this definition, a high-quality auditor should discover and report the misstatement more promptly than a low-quality auditor, resulting in a positive association between audit quality and the timeliness of misstatement discovery. Therefore, the effect of auditor tenure on the timeliness of misstatement discovery will depend on whether the audit quality is increasing or decreasing with auditor tenure.

The ongoing debate on the effect of audit firm tenure on audit quality revolves around two competing views. One view opposes mandatory audit firm rotation, arguing that long auditor tenure is beneficial because, over time, the auditor accumulates more client-specific knowledge. According to this view, longer auditor tenure should lead to higher audit quality and timelier discovery of accounting misstatements.<sup>8</sup> In contrast, the competing view argues that long auditor tenure may be detrimental to audit quality for two main reasons. The first is that long auditor tenure may lead to impairment of auditor independence due to the development of a strong bond with the client company over time. Once the auditor’s independence is compromised, he or she will become more lenient with the client and less likely to confront the client regarding issues of disagreement, resulting in lengthier misstatements (PCAOB 2011). The second reason is that, over time, the auditor can become complacent because of the repetitive nature of the audit task. A complacent auditor is more likely to continue applying the same audit procedures, even when new accounting issues arise and, as a result, is less likely to detect misreporting promptly. If independence deteriorated or complacency developed over time, then an auditor with shorter tenure should provide higher audit quality and detect financial misreporting in a timelier manner.

Because of the opposing arguments discussed above, it is an open empirical question whether longer auditor tenure leads to more or less timely detection of misstatements. For that reason, we do not make a signed prediction and the null hypothesis is expressed as follows:

**H1:** There is no association between audit firm tenure and the timeliness of misstatement discovery.

## IV. SAMPLE AND RESEARCH DESIGN

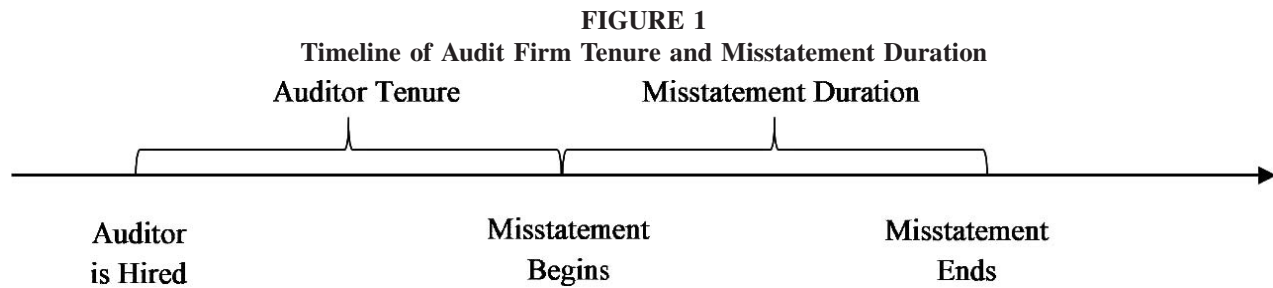
### Main Variables of Interest and Basic Model

The dependent variable for our multivariate tests is the duration of the misstatement, *Duration*, which is an inverse measure of the timeliness of misstatement discovery. We measure *Duration* as the number of consecutive annual financial statements misstated. We set *Duration* to 0 when at least one of the quarterly financial statements was misstated, but the annual financial statements were not.<sup>9</sup> We consider this as evidence of an effective audit, because even though the quarterly reports contained a misstatement, the annual financial statements were presented fairly.<sup>10</sup> In other words, the auditor “got it right” the first time. We set *Duration* to 1 when the annual financial statements were misstated for only one year. A value of *Duration* equal to 1 suggests that the auditor missed the misstatement only once, because the financial statements of the following year did not include a material misstatement. Following the same logic, we set *Duration* to 2 when two consecutive annual financial statements were misstated, to 3 when three consecutive annual financial statements were misstated, and so on.

<sup>8</sup> Opponents also argue that mandatory rotation will lead to increased audit costs in the early years of the audit, due to the start-up costs for a new engagement (General Accounting Office [GAO] 2003; Gerakos and Syverson 2015). The GAO (2003), for example, reported that incremental costs in the first year of an audit can be as high as 20 percent of the overall audit costs. Thus, even if audit firm rotation has some benefits, the additional costs can still outweigh them.

<sup>9</sup> For example, a misstatement started in the first fiscal quarter of 2005 and ended in the third fiscal quarter of 2005.

<sup>10</sup> One might argue that only the situation of having the third-quarter financial statements misstated, but the annual financial statements not misstated, should be considered as an effective audit (*Duration* = 0). However, we have read numerous announcements related to quarterly restatements, and many of them clearly state auditor involvement in the discovery process. One reason for the active role of the auditor in the discovery of quarterly misstatements is that quarterly reports are often reviewed by auditors. For example, Ship Finance International Limited restated its financial statements for the first two quarters of 2004. It claimed that the misstatement was discovered following a review by the company and its external auditors. Nonetheless, in an untabulated test, we set *Duration* to 0 only when the financial statements for the third quarter were misstated, but the annual reports were not. We obtain similar results to those reported in the paper.



This figure depicts the timeline over which audit firm tenure and misstatement duration are measured.

Our main independent variable of interest is auditor tenure, *Tenure*. We measure auditor tenure as the number of years from the time the audit firm was hired until the misstatement began.<sup>11</sup> By measuring auditor tenure only until the beginning of the misstatement, we ensure that there is no overlap between our measures of auditor tenure and misstatement duration and, thus, no mechanical association between the two. Figure 1 depicts the timeline of auditor tenure and misstatement duration. In addition to the continuous measure of auditor tenure, we also follow the literature (e.g., Johnson et al. 2002; Carey and Simnett 2006; Chen et al. 2008; Gul et al. 2009) and create two indicator variables to proxy for long and short auditor tenure. *Long\_Tenure* is set to 1 for auditor tenure longer than or equal to 11 years, and to 0 otherwise. *Short\_Tenure* is set to 1 for auditor tenure shorter than or equal to three years, and to 0 otherwise.<sup>12</sup>

Because our dependent variable is the duration of a misstatement, we use the accelerated failure time (AFT) parametric duration model, which is widely used in economics for duration analysis. The basic form of the AFT model is as follows:

$$\log T_i = X_i \beta + \varepsilon_i$$

where  $\log T_i$  is the natural logarithm of the survival time;  $X_i$  is a vector of covariates;  $\beta$  is a vector of the regression coefficients; and  $\varepsilon_i$  is the error with density  $f(\cdot)$ . We assume that misstatement duration follows a lognormal distribution because (1) compared to other distributions, the lognormal distribution yields the best model fit for our sample, and (2) a Wald test for the appropriateness of the lognormal distribution shows that it is an adequate distribution for our sample. To test the appropriateness of the lognormal distribution, we first fit a generalized gamma model to our data. The density function for the generalized gamma model is:

$$f(t) = \begin{cases} \frac{\gamma^\gamma}{\sigma t \sqrt{\gamma} \Gamma(\gamma)} \exp(z \sqrt{\gamma} - \mu), & \text{if } k \neq 0 \\ \frac{1}{\sigma t \sqrt{2\pi}} \exp(-z^2/2), & \text{if } k = 0 \end{cases}$$

where:  $\gamma = |k|^{-2}$ ,  $z = \text{sign}(k) \{\log(t) - \mu\} / \sigma$ ,  $\mu = \gamma \exp(|k|z)$ . Then, a Wald test of  $k = 0$  is used to evaluate the appropriateness of the lognormal distribution. Our regression model is as follows (company and year subscripts are omitted for brevity):

$$\begin{aligned} \text{Log}(1 + \text{Duration}) = & a + \beta_1 \text{Tenure}(\text{Short\_Tenure}, \text{Long\_Tenure}) + \beta_2 \text{Non\_Audit} + \beta_3 \text{Size} + \beta_4 \text{Lev} + \beta_5 \text{BM} + \beta_6 \text{Loss} \\ & + \beta_7 \text{ROA} + \beta_8 \text{Restructure} + \beta_9 \text{Comp\_Age} + \beta_{10} \text{Geo\_Segment} + \beta_{11} \text{Bus\_Segment} + \beta_{12} \text{Big} \\ & + \beta_{13} \text{TACC} + \beta_{14} \text{Inst\_Perc} + \beta_{15} \text{Inst\_HHI} + \text{Industry Fixed Effects} + \text{Year Fixed Effects} \end{aligned} \quad (1)$$

Since the log of 0 is undefined, we add 1 to the duration dependent variable before taking the log transformation. We include various control variables that may be associated with the timeliness of misstatement discovery. We include *Non\_Audit*, the natural logarithm of nonaudit service fees. *Non\_Audit* can speed up the detection of misstatements if the additional services create a knowledge spillover that improves audit quality. On the other hand, *Non\_Audit* can result in a slower misstatements detection if the provision of additional services impairs the auditor's independence (e.g., Beardsley, Lassila, and Omer 2015).

<sup>11</sup> When audit firms merge, we treat it as a continuation of the prior auditor (Gul et al. 2009).

<sup>12</sup> We choose three and 11 years as the thresholds because they correspond to the 25th and 75th percentiles of the auditor tenure in our sample, respectively.



Company leverage and company growth are found to be associated with accounting restatements (Beneish 1999; Burns and Kedia 2006; Dechow, Ge, Larson, and Sloan 2011), and can be used to discover misstatements. We, therefore, include *Lev*, the ratio of total liabilities to total assets, and *BM*, the ratio of the book value of equity to the market value of equity. Companies with poor performance may have more difficulties in hiding their misreporting because weak-performing companies are suspected more often of accounting manipulation (Dechow et al. 2011). We account for weak performance using a loss indicator variable, *Loss*, return on assets, *ROA*, and an indicator variable for restructuring, *Restructure*. Lennox and Pittman (2010) find company age to be negatively associated with misreporting, suggesting that company age is a factor that can be used to detect misstatements. Moreover, auditor tenure is largely affected by company age, simply because a younger company cannot have long auditor tenure. Therefore, we add *Comp\_Age*, the number of years the company has been appearing on Compustat. Operation complexity can affect the timeliness of misstatement discovery because it may be more difficult for outsiders, including the auditor, to detect accounting misreporting of more complex companies. Following prior studies (e.g., Simon and Francis 1988; Bell, Landsman, and Shackelford 2001; Bushman, Piotroski, and Smith 2004), we measure company complexity using company size, *Size*, the number of geographic segments, *Geo\_Segment*, and the number of business segments, *Bus\_Segment*. A more capable auditor should detect the misreporting more promptly. We measure auditor ability using the indicator variable *Big*, which is equal to 1 if the company is audited by a Big N audit firm, and to 0 otherwise. A misstatement that starts with a relatively small misreporting amount may last longer than the one starting with larger overstatement, because it is likely to be more difficult to detect smaller misstated amounts. To proxy for the misstatement scale at the early stage, we use *TACC*, the total accruals scaled by average total assets in the first year of the misstatement. Finally, to control for external monitoring, we include *Inst\_Perc*, the percentage of institutional ownership, and *Inst\_HHI*, the institutional ownership concentration, measured using the Herfindahl-Hirschman index. Companies under more effective external monitoring are expected to have a timelier discovery of misstatements. A list of variable definitions is provided in Appendix A. All continuous variables are winsorized at the 1 and 99 percentiles to minimize the effect of extreme values. We also include industry and year fixed effects to account for systematic variations in the dependent variable across industries and years. All standard errors are clustered at the year level.<sup>13</sup>

### Sample Selection and Description

Our empirical analysis uses a sample of accounting misstatements from 2000 to 2013 obtained from the Audit Analytics Non-Reliance Restatements database. Our sample period begins in 2000 because this is the first year in which accounting misstatements data are available in the database. The database covers all SEC registrants that have disclosed a financial restatement in an electronic filing or in a press release, and it has two main advantages. First, it does not include restatements caused by (1) the adoption of or a change in accounting principles, (2) stock splits, (3) dividend distributions, or (4) mergers and acquisitions. Thus, restatements covered in this database are not due to technical issues. Second, and particularly important for our study, the database provides information on the period over which the accounting misstatement occurred.<sup>14</sup> Data on auditor tenure (available starting in 1974) and other financial information are obtained from Compustat. Our initial sample contains 9,422 misstatements. We exclude 2,318 misstatements for which there was an auditor change during the misstatement period, to ensure that each misstatement involves only one auditor, and 451 misstatements that were purely due to clerical error (Hennes, Leone, and Miller 2008). Next, we merge the misstatement data with the data from Compustat, which results in a loss of 882 observations. Consistent with prior studies (e.g., Myers et al. 2003; Davis et al. 2009; Brooks, Cheng, and Reichelt 2013; Bell et al. 2015), we exclude from the sample financial institutions and utility companies, which reduces the sample by 1,422 observations. We also eliminate 35 observations due to zero audit fees (which are likely missing values), and 687 observations because of missing data for the control variables. Last, we remove 162 observations with extremely long auditor tenure (tenure longer than 30 years).<sup>15</sup> The final sample comprises 3,465 accounting misstatements. A total of 2,249 of these observations have annual reports misstated (*Duration* > 0), and 1,216 observations have only quarterly reports, but not annual reports, misstated (*Duration* = 0). Table 1, Panel A summarizes the sample formation process. Panel B presents the distribution

<sup>13</sup> As most companies appear only once in our sample, we choose to cluster the standard errors at the year level. For robustness, we also cluster the standard errors at the company level, and our results remain qualitatively the same.

<sup>14</sup> Two other restatement databases that can be potentially used are (1) the GAO Financial Statement Restatement Database, and (2) the Accounting and Auditing Enforcement Releases (AAER) database. The GAO database does not specify the misstatement period. The AAER covers far fewer restatements. For robustness, we add restatements in the AAER database not covered by Audit Analytics. The sample increases by only 1 percent, and all of the results remain unchanged.

<sup>15</sup> Since auditor identity information is available starting in 1974, only observations from the later years of our sample could have extremely long auditor tenure. For example, auditor tenure of 35 years could only occur to observations from 2009 or later. To avoid any mechanical association because of this issue, we exclude observations with very long audit firm tenure (longer than 30 years). Nonetheless, adding back those observations does not change our results.

**TABLE 1**  
**Sample Formation and Yearly Misstatements Distribution**

**Panel A: Sample Selection**

All accounting misstatements from 2000 to 2013	9,422
Misstatements during which there was an auditor change	(2,318)
Misstatements that were caused by clerical errors	(451)
Observations that cannot merge with Compustat	(882)
Financial and utility companies	(1,422)
Observations with zero audit fees	(35)
Observations with missing control variables	(687)
Observations with auditor tenure longer than 30 years	(162)
Final sample	3,465
Annual reports misstated	2,249
Annual reports not misstated	1,216

**Panel B: Yearly Misstatements, Average Auditor Tenure, and Average Misstatement Duration**

<u>Fiscal Year</u>	<u>Obs.</u>	<u>Avg. Auditor Tenure</u>	<u>Avg. Misstatement Duration</u>
2000	169	8.053	1.870
2001	252	9.587	1.948
2002	301	8.635	1.714
2003	358	7.561	1.441
2004	339	7.165	1.035
2005	302	6.964	0.768
2006	289	6.689	0.952
2007	214	6.953	1.056
2008	199	7.789	1.246
2009	210	8.452	1.262
2010	225	9.236	1.160
2011	229	9.087	0.921
2012	218	9.454	0.615
2013	160	7.825	0.381

This table presents the sample formation and composition. Panel A describes the sample formation, and Panel B presents yearly information on the number of misstatements, average auditor tenure by the time the misstatement began, and average misstatement duration. We obtain information about accounting misstatements from the Audit Analytics Non-Reliance Restatements database. Financial data are from Compustat.

of accounting misstatements, the average auditor tenure, and the duration of misstatements across the sample years. The number of misstatements peaks in 2003–2004, which is consistent with the findings of [Burks \(2011\)](#) of a sharp increase in accounting restatements after the passage of SOX. The average misstatement duration is 1.184 years (1.824 when considering only the observations with annual misstatements), and becomes shorter after 2002.<sup>16</sup> Average auditor tenure is 8.033 years, with no clear time trend.

Table 2, Panel A presents the descriptive statistics for the variables we use in Model (1). On average, the sample companies have a book-to-market ratio of 0.471, a leverage ratio of 0.691, a return on assets ratio of  $-0.731$ , total assets of \$1.786 million, pay \$501,691 for nonaudit services, and their age is 13.185 years. A total of 63.0 percent of the companies use a Big N auditor. Also, 54.6 percent of the companies are unprofitable, and 41.8 percent of them undergo a restructuring. Institutional investors, on average, hold 29.4 percent of the companies' shares, with a concentration of 0.162. Last, the companies have average total accruals of  $-0.296$  and operate 2.049 and 2.083 geographic and business segments, respectively.

<sup>16</sup> The misstatement duration is much shorter in the last years of the sample. However, the reason is likely to be mechanical, as there are misstatements in those later years that have not yet been discovered and that are of long duration. The association between auditor tenure and misstatement duration remains unchanged if we exclude all observations in the years 2011–2013.

**TABLE 2**  
**Descriptive Statistics**

**Panel A: Descriptive Statistics—Entire Sample**

Variable	n	Mean	Median	SD	P25	P75
<i>Duration</i>	3,465	1.184	1.000	1.251	0.000	2.000
<i>Tenure</i>	3,465	8.033	6.000	6.431	3.000	11.000
<i>Short_Tenure</i>	3,465	0.294	0.000	0.456	0.000	1.000
<i>Long_Tenure</i>	3,465	0.314	0.000	0.464	0.000	1.000
<i>Non_Audit</i>	3,465	9.771	11.190	4.529	9.210	12.629
<i>Size</i>	3,465	4.740	4.996	2.718	3.126	6.593
<i>Lev</i>	3,465	0.691	0.527	0.651	0.307	0.778
<i>BM</i>	3,465	0.471	0.415	1.234	0.144	0.779
<i>TACC</i>	3,465	-0.296	-0.077	0.764	-0.194	-0.020
<i>Geo_Segment</i>	3,465	2.049	1.000	2.236	0.000	3.000
<i>Bus_Segment</i>	3,465	2.083	1.000	1.684	1.000	3.000
<i>Restructure</i>	3,465	0.418	0.000	0.493	0.000	1.000
<i>Loss</i>	3,465	0.546	1.000	0.498	0.000	1.000
<i>ROA</i>	3,465	-0.731	-0.017	2.700	-0.282	0.047
<i>Big</i>	3,465	0.630	1.000	0.483	0.000	1.000
<i>Comp_Age</i>	3,465	13.185	11.000	9.228	6.000	19.000
<i>Inst_Perc</i>	3,465	0.294	0.092	0.347	0.000	0.608
<i>Inst_HHI</i>	3,465	0.162	0.052	0.268	0.000	0.162

**Panel B: Descriptive Statistics—Companies with Short versus Long Auditor Tenure**

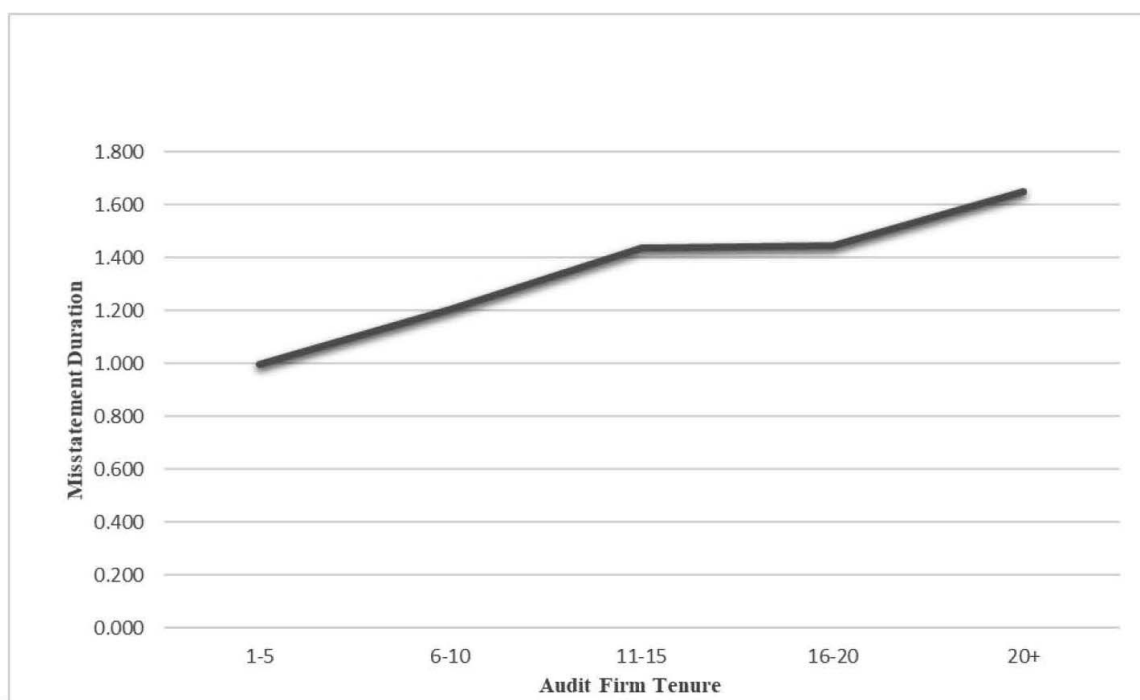
Variable	Short Auditor Tenure			Long Auditor Tenure			Short Tenure – Long Tenure	
	n	Mean	Median	n	Mean	Median	Difference	t-statistic
<i>Duration</i>	1,019	0.923	1.000	948	1.488	1.000	-0.565***	-10.185
<i>Non_Audit</i>	1,019	8.666	10.452	948	11.074	12.058	-2.408***	-12.051
<i>Size</i>	1,019	4.097	4.242	948	5.869	6.180	-1.772***	-15.589
<i>Lev</i>	1,019	0.695	0.509	948	0.626	0.528	0.069**	2.539
<i>BM</i>	1,019	0.464	0.357	948	0.567	0.499	-0.103*	-1.897
<i>TACC</i>	1,019	-0.356	-0.091	948	-0.171	-0.062	-0.185***	-5.726
<i>Geo_Segment</i>	1,019	1.819	1.000	948	2.483	2.000	-0.664***	-6.486
<i>Bus_Segment</i>	1,019	1.824	1.000	948	2.617	2.000	-0.793***	-9.912
<i>Restructure</i>	1,019	0.434	0.000	948	0.379	0.000	0.055**	2.486
<i>Loss</i>	1,019	0.626	1.000	948	0.409	0.000	0.217***	9.848
<i>ROA</i>	1,019	-0.859	-0.064	948	-0.287	0.018	-0.572***	-5.635
<i>Big</i>	1,019	0.477	0.000	948	0.830	1.000	-0.353***	-17.619
<i>Comp_Age</i>	1,019	10.065	7.000	948	19.655	18.000	-9.590***	-25.218
<i>Inst_Perc</i>	1,019	0.196	0.004	948	0.445	0.490	-0.249***	-16.616
<i>Inst_HHI</i>	1,019	0.190	0.050	948	0.122	0.051	0.068***	5.837

\*\*\*, \*\*, \* Denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

This table provides descriptive statistics for the sample observations. Panel A reports on the variables used in the test of H1, whereas Panel B provides a comparison between the subsamples of companies with short auditor tenure (*Short\_Tenure*) and long auditor tenure (*Long\_Tenure*). Variable definitions are provided in Appendix A.

In Panel B of Table 2, we report a univariate comparison between misstating companies with long auditor tenure (*Tenure*  $\geq 11$  years) and short auditor tenure (*Tenure*  $\leq 3$ ). Compared with an average *Duration* of 0.923 years for companies with short auditor tenure, the average *Duration* is 1.488 years (or 61.2 percent longer) for companies with long auditor tenure, and the difference is statistically significant. This provides preliminary evidence that longer auditor tenure is associated with less timely discovery of misstatements and suggests that long auditor tenure may impair audit quality. In addition, we observe many differences in the company characteristics between the two groups, which stresses the importance of controlling for company characteristics in multivariate tests. Figure 2 depicts the average misstatement duration along five intervals of auditor tenure.

**FIGURE 2**  
**Misstatement Duration and Audit Firm Tenure**



This figure depicts the mean misstatement duration for different intervals of audit firm tenure.

The pattern in the graph shows a gradual and almost monotonic rise in the misstatement duration as auditor tenure increases, except for a plateau between years 11 and 20.

Table 3 provides Pearson correlations for the variables used in Model (1). We find that *Duration* is positively correlated with *Tenure* and *Long\_Tenure*, and negatively correlated with *Short\_Tenure*, which is again consistent with a positive association between auditor tenure and the length of the misstatement. Second, the small correlations between our independent variable of interest and the other control variables suggest that the results are unlikely to be subject to multicollinearity. Nonetheless, we check the variance inflation factor (VIF) of each of the independent variables in all of our tests. They are all below 4, which is well below the threshold of 10 suggested by Kennedy (2008).

## V. EMPIRICAL RESULTS

### Auditor Tenure and Timeliness of Misstatement Discovery

Table 4 reports the multivariate results on the association between auditor tenure and the timeliness of misstatement discovery (H1). Column (1) presents the regression results with the continuous variable *Tenure* as the independent variable, whereas Column (2) presents the results with the indicator variables *Short\_Tenure* and *Long\_Tenure* as the independent variables. We find that the coefficient on *Tenure* is positive and statistically significant, which means that as auditor tenure increases, it takes a longer time to discover and correct the misstatements. The coefficients on *Long\_Tenure* and *Short\_Tenure* are positive and negative, respectively, and both are statistically significant. These results, once again, suggest that longer auditor tenure leads to less timely detection of misstatements. Economically, the misstatements of companies with short (long) auditor tenure are approximately 9.4 percent (6.4 percent) shorter (longer) than those of companies with medium auditor tenure (four to ten years). Overall, these results support the PCAOB's concern that a long auditor-client relationship may compromise audit quality.

With respect to the control variables, we find that company size is positively and significantly associated with misstatement duration, which suggests that it takes longer to detect financial misreporting of larger companies. The book-to-market ratio is negatively and significantly associated with misstatement duration, which means that growth companies have longer misstatements than mature companies. Loss companies and companies undergoing restructuring activities have shorter misstatements, possibly because it is more difficult for weakly performing companies to conceal their misreporting. Although



**TABLE 3**  
**Pearson Correlation Matrix**

**Panel A: Correlation Variables *Duration* to *TACC***

	<i>Duration</i>	<i>Tenure</i>	<i>Short_Tenure</i>	<i>Long_Tenure</i>	<i>Non_Audit</i>	<i>Size</i>	<i>Lev</i>	<i>BM</i>	<i>TACC</i>
<i>Duration</i>	1								
<i>Tenure</i>	0.179***	1							
<i>Short_Tenure</i>	-0.135***	-0.582***	1						
<i>Long_Tenure</i>	0.149***	0.837***	-0.396***	1					
<i>Non_Audit</i>	0.206***	0.209***	-0.158***	0.176***	1				
<i>Size</i>	0.254***	0.286***	-0.153***	0.255***	0.539***	1			
<i>Lev</i>	-0.128***	-0.059***	0.004	-0.061***	-0.214***	-0.478***	1		
<i>BM</i>	0.048***	0.051***	-0.004	0.048***	0.078***	0.259***	-0.479***	1	
<i>TACC</i>	0.142***	0.107***	-0.051***	0.100***	0.269***	0.535***	-0.636***	0.273***	1
<i>Geo_Segment</i>	0.108***	0.131***	-0.066***	0.119***	0.297***	0.401***	-0.189***	0.096***	0.213***
<i>Bus_Segment</i>	0.107***	0.221***	-0.099***	0.195***	0.269***	0.426***	-0.107***	0.082***	0.171***
<i>Restructure</i>	-0.078***	-0.041**	0.021	-0.048**	0.049***	-0.040**	0.109***	-0.037***	-0.094***
<i>Loss</i>	-0.201***	-0.175***	0.104***	-0.168***	-0.222***	-0.428***	0.270***	0.112***	-0.333***
<i>ROA</i>	0.132***	0.098***	-0.031*	0.101***	0.270***	0.561***	-0.638***	0.252***	0.263***
<i>Big</i>	0.233***	0.288***	-0.205***	0.254***	0.482***	0.652***	-0.302***	0.151***	0.343***
<i>Comp_Age</i>	0.102***	0.488***	-0.218***	0.414***	0.187***	0.312***	-0.067***	0.049***	0.163***
<i>Inst_Perc</i>	0.167***	0.293***	-0.183***	0.266***	0.335***	0.571***	-0.225***	0.093***	0.239***
<i>Inst_HHI</i>	-0.095***	-0.101***	0.067***	-0.093***	-0.120***	-0.183***	0.008	0.012	-0.003

**Panel B: Correlation Variables *Geo\_Segment* to *Inst\_HHI***

	<i>Geo_Segment</i>	<i>Bus_Segment</i>	<i>Restructure</i>	<i>Loss</i>	<i>ROA</i>	<i>Big</i>	<i>Comp_Age</i>	<i>Inst_Perc</i>	<i>Inst_HHI</i>
<i>Geo_Segment</i>	1								
<i>Bus_Segment</i>	0.335***	1							
<i>Restructure</i>	0.044**	-0.003	1						
<i>Loss</i>	-0.185***	-0.216***	0.228***	1					
<i>ROA</i>	0.191***	0.158***	-0.082***	-0.273***	1				
<i>Big</i>	0.324***	0.0268***	0.002	-0.269***	0.305***	1			
<i>Comp_Age</i>	0.196***	0.276***	-0.015	-0.209***	0.137***	0.205***	1		
<i>Inst_Perc</i>	0.281***	0.245***	-0.012	-0.314***	0.219***	0.493***	0.314***	1	
<i>Inst_HHI</i>	-0.112***	-0.080***	-0.016	0.079***	0.004	-0.198***	-0.052***	-0.217***	1

\*\*\*, \*\*, \* Denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. This table presents a correlation matrix of the variables used in Model (1).

institutional ownership is insignificantly associated with the misstatement duration, institutional ownership concentration has a negative and significant association with the length of the misstatement. This suggests that external monitoring by institutional investors helps to speed up the detection of misstatements. Last, the coefficient on the Big N indicator is insignificant. Thus, in the context of prompt misstatement discovery, Big N auditors do not seem to provide higher-quality audits. This is similar to the lack of strong evidence for an association between Big N auditors and the occurrence of restatements (DeFond and Jambalvo 1991; Archambeault, DeZoort, and Hermanson 2008; DeFond, Lim, and Zang 2016). The remaining control variables are statistically insignificant.

### The Demise of Andersen

As suggested by the PCAOB's (2011) concept release, a limitation of the auditor rotation literature is that most studies focus on settings where auditor rotation is voluntary rather than mandatory. To overcome this limitation, we identify an exogenous event, the demise of Andersen in 2002, that left its clients no choice but to switch to another auditor. As such, the event represents a non-voluntary auditor change. We check whether the incoming auditors detect financial misreporting in a

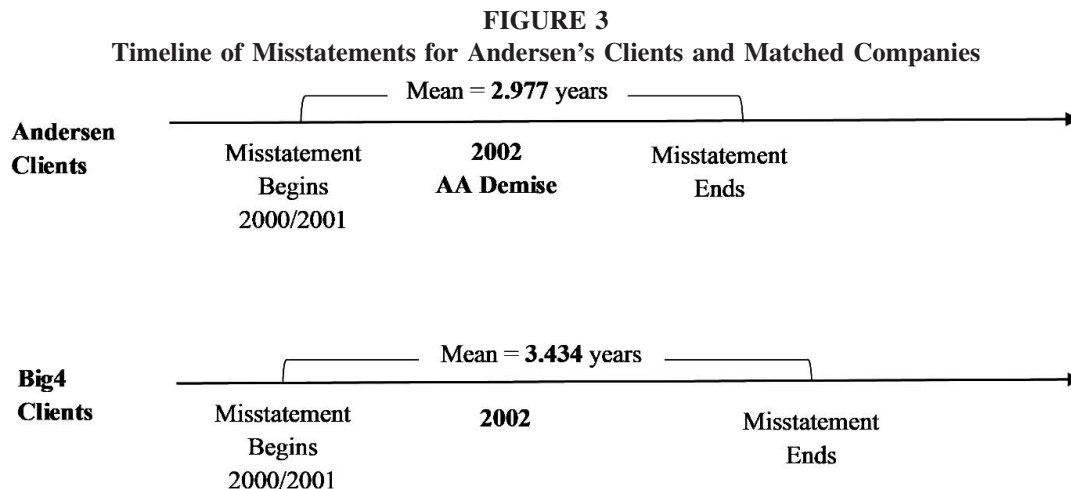
**TABLE 4**  
**Audit Firm Tenure and the Timeliness of Misstatement Discovery**  
**A Test of H1**

	(1)	(2)
<i>Tenure</i>	0.008*** (8.627)	
<i>Short_Tenure</i>		-0.090*** (-4.908)
<i>Long_Tenure</i>		0.062*** (3.033)
<i>Non_Audit</i>	0.001 (0.618)	0.001 (0.407)
<i>Size</i>	0.032*** (3.635)	0.033*** (3.569)
<i>Lev</i>	-0.000 (-0.013)	-0.003 (-0.187)
<i>BM</i>	-0.014* (-1.870)	-0.014* (-1.907)
<i>Loss</i>	-0.110*** (-5.499)	-0.107*** (-5.491)
<i>ROA</i>	-0.004 (-1.072)	-0.004 (-1.082)
<i>Restructure</i>	-0.066*** (-3.408)	-0.066*** (-3.511)
<i>Comp_Age</i>	-0.000 (-0.002)	0.001 (0.783)
<i>Geo_Segment</i>	0.003 (0.586)	0.003 (0.555)
<i>Bus_Segment</i>	-0.005 (-0.637)	-0.004 (-0.578)
<i>Big</i>	-0.021 (-0.510)	-0.027 (-0.662)
<i>TACC</i>	0.005 (0.280)	0.003 (0.555)
<i>Inst_Perc</i>	0.047 (1.282)	0.047 (1.256)
<i>Inst_HHI</i>	-0.071*** (-2.953)	-0.071*** (-2.894)
Intercept	0.001 (0.012)	0.094 (1.049)
Industry FE	Yes	Yes
Year FE	Yes	Yes
Log-Likelihood	-2,393	-2,388
Observations	3,465	3,465

\*\*\*, \*\*, \* Denote significance at the < 1 percent, 5 percent, and 10 percent levels, respectively.

This table presents the estimation results of H1. For testing the association between audit firm tenure and misstatement duration, we use a parametric duration model with a lognormal distribution. The dependent variable is the natural logarithm of 1 plus the length of the misstatement, *Duration*. The independent variables of interest are: *Tenure*, the number of years the auditor has served the company as its external auditor by the time the misstatement began; *Long\_Tenure*, an indicator variable that is equal to 1 if the tenure is longer than or equal to 11 years, and to 0 otherwise; and *Short\_Tenure*, an indicator variable that is equal to 1 if the tenure is shorter than or equal to three years, and to 0 otherwise. The t-statistics are reported in parentheses. All the other independent variables are described in Appendix A.

timelier manner than incumbent auditors. Such a finding will reinforce our earlier finding that long auditor tenure reduces the timeliness of misstatement discovery, and will speak to the benefit of a fresh view by a new auditor. Because the auditor change by Andersen's clients was non-voluntary, our test is not subject to the reverse causality problem, by which companies with poor financial reporting quality are more likely to replace their auditors.



This figure describes the research design for the “The Demise of Andersen” test. It depicts the timeline from the beginning to the end of misstatements for Andersen’s clients and for a matched sample of Big 4 clients.

Our treatment sample is a group of Andersen’s clients who had accounting misstatements starting in 2000 or 2001 and ending after Andersen’s clients switched to another auditor in 2002. We ensure that the treatment companies did not change auditors again before their misstatements were discovered. We create a control group by matching each treatment company with up to ten control companies that (1) were clients of another Big 4 auditor, (2) had accounting misstatements starting in the same calendar year and quarter and ending in 2002 or later, (3) were in the same decile of company size, and (4) retained their auditor throughout the misstatement period.<sup>17</sup> Thus, the treatment group is subjected to the effect of a fresh view, while the control group is not. Figure 3 depicts the timeline of this setting. Using this matching procedure, we successfully obtain 87 treatment companies and 868 control companies. Of these selections, 75 treatment companies and 750 control companies had data for all the control variables. We then estimate the following model:

$$\begin{aligned} \text{Log}(\text{Duration} + 1) = & a + \beta_1 \text{AA} + \beta_2 \text{Non\_Audit} + \beta_3 \text{Size} + \beta_4 \text{Lev} + \beta_5 \text{BM} + \beta_6 \text{Loss} + \beta_7 \text{ROA} + \beta_8 \text{Restructure} \\ & + \beta_9 \text{Firm\_Age} + \beta_{10} \text{Geo\_Segment} + \beta_{11} \text{Bus\_Segment} + \beta_{12} \text{TACC} + \beta_{13} \text{Inst\_Perc} + \beta_{14} \text{Inst\_HHI} \\ & + \text{Industry Fixed Effects} + \text{Year Fixed Effects} \end{aligned} \quad (2)$$

Our variable of interest is the indicator variable *AA*, which is equal to 1 for Andersen’s clients, and to 0 for the control companies. The control variables are the same as in Model (1). Table 5, Panel A provides summary statistics for the treatment and control groups. The univariate results show that the accounting misstatements of Andersen’s former clients lasted, on average, 2.977 years, significantly less than the 3.434 years for the control companies.<sup>18</sup> We also note that except for leverage, there are no significant differences between the two groups. In Panel B, we report the multivariate results. Consistent with the univariate results, the first column shows that *AA* is negative and significant, implying that Andersen’s former clients had a significantly shorter misstatement duration than the clients of the other Big 4 auditors. This finding provides strong support to our argument that long auditor tenure impairs audit quality and highlights the benefit of a fresh look at a company’s financial reports by a new auditor.

Blouin, Grein, and Rountree (2007) report that some of Andersen’s clients simply followed their audit team to another auditor, while others decided to sever ties with the Andersen audit team. It is reasonable to expect that if companies decided to follow their audit team, then they would experience a lesser degree of a “fresh view” than those that did not follow. If we indeed captured the effect of a fresh view, then our results should be more pronounced within the clients that did not follow

<sup>17</sup> If there were more than ten matches for a treatment company, then we retain the ten companies with the closest company size. Results are not sensitive to the use of up to five matches instead of ten.

<sup>18</sup> The mean misstatement duration for the Andersen sample is much longer than that for the main sample due to two reasons: (1) the Andersen sample does not include misstatements with *Duration* = 0; and (2) misstatements in 2000 and 2001 had longer durations, and the Andersen sample contains misstatements from those years only. In our main sample, after excluding misstatements with *Duration* = 0, the mean misstatement duration for years 2000 and 2001 is 2.680.

TABLE 5

## Timeliness of Misstatement Discovery and the Non-Voluntary Rotation of Andersen's Clients

## Panel A: Univariate Comparison: Andersen versus Non-Andersen Clients

Variable	Andersen Misstatements			Non-Andersen Misstatements			Andersen – Non-Andersen	
	n	Mean	Median	n	Mean	Median	Difference	t-value
<i>Duration</i>	87	2.977	3.000	868	3.434	3.000	−0.457***	−3.478
<i>Non_Audit</i>	87	9.612	12.155	868	9.718	12.139	−0.107	−0.169
<i>Size</i>	87	6.352	6.266	868	6.227	6.101	0.125	0.609
<i>Lev</i>	87	0.682	0.639	868	0.547	0.552	0.135***	3.937
<i>BM</i>	84	0.458	0.554	852	0.735	0.552	−0.277	−0.619
<i>TACC</i>	78	−0.114	−0.084	782	−0.093	−0.073	−0.021	−1.080
<i>Geo_Segment</i>	87	1.816	1.000	868	2.145	1.000	−0.329	−1.421
<i>Bus_Segment</i>	87	2.402	2.000	868	2.419	1.000	−0.017	−0.077
<i>Restructure</i>	87	0.402	0.000	868	0.374	0.000	0.028	0.511
<i>Loss</i>	87	0.437	0.000	868	0.362	0.000	0.075	1.383
<i>ROA</i>	87	−0.069	0.006	868	−0.052	0.019	−0.017	−0.591
<i>Comp_Age</i>	87	11.667	8.000	868	12.331	9.500	−0.664	−0.679
<i>Inst_Perc</i>	87	0.238	0.116	868	0.279	0.127	−0.041	−1.181
<i>Inst_HHI</i>	87	0.118	0.036	868	0.116	0.048	0.002	0.062

(continued on next page)

their audit team. Blouin et al. (2007) find that the likelihood of following the audit team is associated with the company's agency cost and switching cost. Furthermore, Kohlbeck, Mayhew, Murphy, and Wilkins (2008) find that Andersen's clients who did not follow their audit team experienced either a fee discount or fee premium with the new auditor.

Building on the findings of Blouin et al. (2007) and Kohlbeck et al. (2008), we create the discrete variable *Follow* to proxy for companies' likelihood of following their audit team. We assign *Follow* one point when each of the following conditions is met: (1) Andersen had the most clients in the company's industry and state, (2) the company's abnormal accruals were above the sample median, (3) company complexity was below the sample median, (4) company transparency was above the sample median, and (5) the company's absolute change in audit fees was above the sample median. We measure those five factors as in Blouin et al. (2007) and Kohlbeck et al. (2008).<sup>19</sup> Thus, *Follow* ranges from 0 to 5, with a higher number indicating higher likelihood of following the audit team. The mean value of *Follow* for the treatment companies is 2.529 (untabulated). We then interact *Follow* with *AA* and reestimate Model (2). The results reported in the second column of Table 5, Panel B show that the coefficient on the interaction term  $AA \times Follow$  is positive and significant. This suggests that the difference in the misstatement duration between Andersen's former clients and the control companies is less pronounced for Andersen's clients who were more likely to follow their audit team. This finding provides further evidence that what we document is the effect of a fresh view.

An alternative explanation for the timelier discovery of misstatements of Andersen's clients is that auditors considered Andersen's clients riskier and, therefore, put more effort into the audit of those clients, which led to a faster discovery of the misstatements. Kohlbeck et al. (2008) identify certain Andersen offices that were involved in high-profile legal cases and consider them as offices of high risk. Those offices were Houston and San Antonio (Enron), Fort Lauderdale (Sunbeam), Chicago (Waste Management), Phoenix (Bishop's Charities), and Denver (Boston Chicken). We follow Kohlbeck et al.'s (2008) approach and create a high-risk indicator variable, *High\_Risk*, which we code as 1 for Andersen offices in the above locations, and as 0 for other Andersen offices. Approximately 16 percent of the treatment companies were audited by the high-risk offices (untabulated). We interact *AA* with *High\_Risk* and rerun Model (2). If our results were driven by the perceived higher risk of Andersen's clients, then they should be more pronounced for clients of the high-risk offices. That is, the coefficient on the interaction term  $AA \times High\_Risk$  would be negative and significant. However, the results reported in the third

<sup>19</sup> Blouin et al. (2007) also find weak evidence that the presence of outside blockholders and an accounting financial expert on the audit committee were associated with Andersen's clients' proclivity to follow their audit team. We do not consider these two variables because their effects on the likelihood of following Andersen's audit team are much weaker compared to the other variables.



TABLE 5 (continued)

## Panel B: Multivariate Analysis

	(1)	(2)	(3)
AA	-0.128*** (-3.182)	-0.260*** (-2.980)	-0.119*** (-2.652)
AA * High_Risk			-0.068 (-0.973)
High_Risk			-0.000 (-0.020)
AA * Follow		0.069** (2.258)	
Follow		-0.008 (-0.812)	
Non_Audit	0.003 (1.409)	0.001 (0.373)	0.003 (1.405)
Size	0.032*** (4.484)	0.036*** (4.635)	0.033*** (4.521)
Lev	-0.179*** (-3.630)	-0.208*** (-3.901)	-0.179*** (-3.646)
BM	-0.012** (-2.219)	-0.020*** (-3.352)	-0.012** (-2.258)
Loss	-0.012 (-0.434)	-0.009 (-0.292)	-0.012 (-0.413)
ROA	0.163*** (3.419)	0.181*** (3.604)	0.162*** (3.384)
Restructure	0.086*** (4.170)	0.090*** (4.004)	0.086*** (4.175)
Comp_Age	0.000 (0.018)	0.001 (0.379)	-0.000 (-0.042)
Geo_Segment	0.006 (1.073)	0.004 (0.650)	0.006 (1.059)
Bus_Segment	-0.022*** (-3.554)	-0.025*** (-3.512)	-0.022*** (-3.488)
TACC	-0.304*** (-4.218)	-0.322*** (-4.170)	-0.301*** (-4.157)
Inst_Perc	0.013 (0.425)	-0.000 (-0.004)	0.015 (0.493)
Inst_HHI	0.050 (1.020)	0.059 (1.158)	0.053 (1.086)
Intercept	1.278*** (14.793)	1.345*** (15.453)	1.275*** (14.249)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Log-Likelihood	-116	-132	-117
Observations	825	638	825

\*\*\*, \*\*, \* Denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

This table presents the estimation results of the effect of non-voluntary auditor rotation on misstatement duration. The treatment sample is a group of Andersen's clients who had accounting misstatements starting in 2000 or 2001 and ending after the replacement of Andersen by a new auditor. We match each treatment company with up to ten control companies who (1) had accounting misstatements starting in the same year and quarter and ending in 2002 or afterwards, (2) were audited by another Big 4 audit firm, (3) were in the same decile of company size, and (4) did not switch auditors during the misstatement period. We also require that the treatment companies did not change auditors again until the end of the misstatement. Panel A reports the summary statistics for the treatment and control samples. Panel B reports the multivariate results. A parametric duration model with a lognormal distribution is used. The dependent variable is the natural logarithm of 1 plus the length of the misstatement, *Duration*. The independent variable of interest is *AA*, an indicator variable that is equal to 1 if the company was audited by Andersen, and to 0 otherwise. *High\_Risk* is an indicator variable that is equal to 1 for Andersen offices located in Houston, San Antonio, Fort Lauderdale, Chicago, Phoenix, and Denver, and to 0 for the other offices. *Follow* is an index ranging from 0 to 5, corresponding to the likelihood that Andersen's clients followed their audit team. The t-statistics are reported in parentheses. All the other independent variables are described in Appendix A.

column of Table 5, Panel B show that the coefficient on *AA* remains significant, while the coefficient on  $AA \times High\_Risk$  is insignificant. Thus, we do not find empirical support for this alternative explanation.

Overall, the results reported in Table 5 suggest that a fresh view by a new auditor expedites the discovery of financial misreporting and, thus, has a positive effect on audit quality.

## VI. SUPPLEMENTARY ANALYSES

### The Effect of the Sarbanes-Oxley Act

SOX represents the most significant regulatory intervention to the auditing profession in the U.S., as it has changed the auditing profession from self-regulated to government-regulated (DeFond and Zhang 2014). In this section, we examine whether SOX mitigates the negative association between auditor tenure and the timeliness of misstatement discovery. We reestimate Model (1) after interacting *Tenure* with *SOX*, an indicator variable for the post-SOX period. The results are presented in Table 6. The coefficient on *Tenure* is 0.014 and is statistically significant, whereas the coefficient on the interaction term  $Tenure \times SOX$  is  $-0.007$  and is also statistically significant. This indicates that the association between auditor tenure and misstatement duration is approximately 50 percent weaker after SOX. However, the sum of the coefficients on *Tenure* and  $Tenure \times SOX$ , reported at the bottom of Table 6, is positive and significant. This shows that the positive association between auditor tenure and misstatement duration still exists after SOX. Because there has been a structural change in nonaudit fees after SOX,<sup>20</sup> we run a second model where we also interact *Non\_Audit* with *SOX*. Under this specification, the coefficient on *Tenure* is 0.012, and on the interaction term  $Tenure \times SOX$ , it is  $-0.004$ . These results once again suggest that in the post-SOX era, the negative effect of long auditor tenure on the timeliness of misstatement discovery is attenuated, but still exists. Overall, the results indicate that SOX did not eliminate the negative effect of long auditor tenure on audit quality.

### Is a Ten-Year Rotation Effective?

The recent regulation by the EU mandating all public companies to rotate their auditors after a maximum of ten years implies that regulators believe audit quality is likely to be compromised after ten years. To examine whether this is the case in the U.S., we divide our sample into an early stage ( $Tenure \leq 10$  years) and a late stage ( $Tenure > 10$  years) of auditor-client relationship subsamples and reestimate Model (1). Table 7 presents the findings for the two subsamples. It shows that the association between auditor tenure and misstatement duration is positive and significant only in the early stage, but not in the late stage of the auditor-client relationship. Economically, when tenure is shorter than or equal to ten years, a one-year increase in auditor tenure increases the misstatement duration by approximately 2.02 percent. This means that, on average, misstatements are 18.18 percent longer after ten years of auditor tenure than after one year. Beyond ten years of auditor tenure, the association between auditor tenure and misstatement duration is insignificant.<sup>21</sup> In conclusion, the benefits of a fresh look exist only in the first ten years of the auditor-client relationship.

### The Effect of Long Auditor Tenure on Misstatement Magnitude

One potential consequence of slower detection of a misstatement is a larger misstatement magnitude, since a longer misstatement allows the misreporting amount to accumulate and increase over time. In this section, we directly test this conjecture. We obtain information on the misstatement magnitude from the Audit Analytics Advanced Restatements database. We then reestimate Model (1) by replacing the dependent variable *Duration* with *ABS\_Res\_Amt*, the absolute amount of net income restated, scaled by average total assets. We lose 1,060 observations due to missing misstatement magnitude data. The results are presented in Table 8 and show a significant positive association between audit firm tenure and misstatement magnitude. The coefficient on *Tenure* is 0.047, which means that a one-year increase in auditor tenure leads to an increase in the misstated amount by approximately 0.05 percent of average total assets. As the average misstatement amount is 2.575 percent of total assets, in economic terms, an auditor tenure increase from one to ten years leads to a relative increase of 17.5 percent in misstatement magnitude. We also note that the indicator variable *Big* is negative and significant, suggesting that the

<sup>20</sup> SOX Section 201(a) prohibits the provision of many nonaudit services to audit clients, such as bookkeeping, financial information system design and implementation, appraisal, valuation and actuarial services, internal audit outsourcing services, and more. However, services not specifically banned by SOX are still permitted with audit committee pre-approval.

<sup>21</sup> Table 4 shows that companies with long auditor tenure ( $Tenure > 10$  years) have significantly longer misstatements than companies with medium tenure (tenure of four to ten years). In Table 7, when focusing only on companies with long auditor tenure, we do not find linearity in the relationship between misstatement duration and auditor tenure. Therefore, the two tests examine different things, and there is no inconsistency between the two findings.

TABLE 6

The Effect of SOX on the Association between Audit Firm Tenure and the Timeliness of Misstatement Discovery

	(1)	(2)
<i>Tenure</i>	0.014*** (8.307)	0.012*** (14.504)
<i>Tenure * SOX</i>	-0.007*** (-3.750)	-0.004*** (-3.452)
<i>Non_Audit</i>	0.001 (0.613)	0.017* (1.728)
<i>Non_Audit * SOX</i>		-0.017* (-1.715)
<i>Size</i>	0.029*** (3.183)	0.028*** (3.209)
<i>Lev</i>	-0.004 (-0.204)	-0.003 (-0.188)
<i>BM</i>	-0.015 (-1.507)	-0.014 (-1.478)
<i>Loss</i>	-0.097*** (-5.266)	-0.097*** (-5.285)
<i>ROA</i>	-0.004 (-1.011)	-0.004 (-0.937)
<i>Restructure</i>	-0.066*** (-3.222)	-0.067*** (-3.282)
<i>Comp_Age</i>	0.000 (0.069)	0.000 (0.235)
<i>Geo_Segment</i>	0.003 (0.544)	0.003 (0.538)
<i>Bus_Segment</i>	-0.005 (-0.636)	-0.005 (-0.655)
<i>Big</i>	0.003 (0.064)	0.005 (0.132)
<i>TACC</i>	0.002 (0.137)	0.003 (0.162)
<i>Inst_Perc</i>	0.045 (1.151)	0.046 (1.194)
<i>Inst_HHI</i>	-0.076*** (-3.016)	-0.076*** (-2.979)
Intercept	0.040 (0.396)	0.045 (0.444)
Industry FE	Yes	Yes
Year FE	Yes	Yes
Log-Likelihood	-2,165	-2,162
Observations	3,164	3,164
Wald test: <i>Tenure</i> + <i>Tenure * SOX</i>	0.007***	0.008***
(Chi-square statistic)	(33.24)	(33.65)

\*\*\*, \*\*, \* Denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

This table reports the estimation results of the effect of the Sarbanes-Oxley Act, *SOX*, on the association between audit firm tenure and misstatement duration. A parametric duration model with a lognormal distribution is used. The dependent variable is the natural logarithm of 1 plus the length of the misstatement, *Duration*. The independent variable of interest is the interaction between *Tenure*, the number of years the auditor has served the company as its external auditor by the time the misstatement began, and *SOX*, an indicator variable that is equal to 1 if observations are from 2003 onward, and to 0 if observations are from 2000 or 2001. The t-statistics are reported in parentheses.

All the other independent variables are described in Appendix A.

TABLE 7

The Association between Audit Firm Tenure and the Timeliness of Misstatement Discovery in Early Stage and Late Stage of Auditor-Client Engagement

	Tenure $\leq$ 10	Tenure $>$ 10
<i>Tenure</i>	0.020*** (6.840)	-0.001 (-0.300)
<i>Non_Audit</i>	0.001 (0.462)	-0.001 (-0.303)
<i>Size</i>	0.023*** (2.654)	0.057*** (4.883)
<i>Lev</i>	-0.006 (-0.326)	0.007 (0.187)
<i>BM</i>	-0.013 (-1.490)	-0.019 (-1.414)
<i>Loss</i>	-0.002 (-0.112)	0.054 (1.314)
<i>ROA</i>	0.001 (0.242)	0.011 (1.523)
<i>Restructure</i>	-0.062*** (-2.647)	-0.083** (-2.188)
<i>Comp_Age</i>	0.001 (0.907)	-0.001 (-0.395)
<i>Geo_Segment</i>	-0.000 (-0.061)	0.016* (1.828)
<i>Bus_Segment</i>	-0.009 (-0.909)	0.001 (0.092)
<i>Big</i>	-0.009 (-0.241)	-0.103 (-1.593)
<i>TACC</i>	0.003 (0.156)	0.043 (0.724)
<i>Inst_Perc</i>	0.053 (1.190)	-0.046 (-0.883)
<i>Inst_HHI</i>	-0.064** (-2.503)	-0.111* (-1.833)
Intercept	0.007 (0.068)	0.087 (0.304)
Industry FE	Yes	Yes
Year FE	Yes	Yes
Log-Likelihood	-1,739	-604
Observations	2,517	948

\*\*\*, \*\*, \* Denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

This table reports the estimation results of the association between audit firm tenure and misstatement duration for the subsamples of audit firm tenure of ten years or less, and of more than ten years. A parametric duration model with a lognormal distribution is used. The dependent variable is the natural logarithm of 1 plus the length of the misstatement, *Duration*. The independent variable of interest is *Tenure*, the number of years the auditor has served the company as its external auditor by the time the misstatement began. The t-statistics are reported in parentheses.

All the other independent variables are described in Appendix A.

misstatement magnitude is lower when companies use a Big N auditor. In sum, longer auditor tenure results in both prolonged misstatements and misstatements of a larger magnitude.

### Sensitivity Tests

We conduct several sensitivity tests to ensure the robustness of our results. To conserve space, we discuss these untabulated results briefly in this section. First, in the prior literature, there are no clear-cut measures for short and long auditor tenure (e.g., [Davis et al. 2009](#); [Gul et al. 2009](#); [Boone et al. 2012](#); [Bell et al. 2015](#)). We, therefore, run various sensitivity tests



**TABLE 8**  
**Audit Firm Tenure and Misstatement Magnitude**

<i>Tenure</i>	0.047*** (2.789)
<i>Non_Audit</i>	-0.025 (-0.481)
<i>Size</i>	-0.438*** (-3.360)
<i>Lev</i>	-1.161* (-1.691)
<i>BM</i>	-0.345* (-1.671)
<i>Loss</i>	-1.063*** (-2.725)
<i>ROA</i>	-3.318*** (-5.473)
<i>Restructure</i>	0.426** (2.029)
<i>Comp_Age</i>	-0.031*** (-2.894)
<i>Geo_Segment</i>	-0.069 (-0.989)
<i>Bus_Segment</i>	0.013 (0.243)
<i>Big</i>	-1.438** (-2.515)
<i>TACC</i>	-1.146 (-0.653)
<i>Inst_Perc</i>	-0.538* (-1.805)
<i>Inst_HHI</i>	-0.550 (-0.656)
Intercept	4.505*** (2.695)
Industry FE	Yes
Year FE	Yes
R <sup>2</sup>	0.266
Observations	2,405

\*\*\*, \*\*, \* Denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

This table reports the estimation results of the association between audit firm tenure and misstatement magnitude. An Ordinary Least Squares (OLS) model is employed. The dependent variable is *ABS\_Res\_Amt*, the absolute magnitude of the net income amount misstated, scaled by average total assets in the year prior to the misstatement and multiplied by 100. The independent variable of interest is *Tenure*, the number of years the auditor has served the company as its external auditor by the time the misstatement began. The t-statistics are reported in parentheses.

All the other independent variables are described in Appendix A.

using other cutoff points for short and long auditor tenure. Specifically, we rerun Model (1) with various combinations of *Short\_Tenure*, ranging from two to four years, and *Long\_Tenure*, ranging from nine to 11 years. Our results, using these alternative cutoff points, remain unchanged.

Second, prior studies have shown that corporate governance plays an important role in financial reporting quality and the audit process (e.g., [Cohen, Krishnamoorthy, and Wright 2002, 2004](#)). Therefore, we augment Model (1) with three more corporate governance measures: (1) the number of members on the board of directors, (2) the percentage of independent directors on the board, and (3) the percentage of financial experts on the audit committee. This results in a loss of more than 90 percent of the observations. Still, for the reduced sample of 313 observations for which the data are available, our results remain qualitatively the same (coefficient on *Tenure* of 0.008 and t-statistic of 2.584).

Third, one concern about the results reported in Table 6 is that the post-SOX period is substantially longer than the pre-SOX period. Moreover, the post-SOX period also includes the financial crisis of 2007–2009. To make the post- and pre-SOX periods more comparable, we repeat the test using the two years prior to SOX (2000 and 2001) and the three years after SOX (2003–2005). Our conclusions remain unchanged. The coefficient on *Tenure*  $\times$  *SOX* is still negative and significant ( $-0.005$ ,  $t$ -statistic  $= -2.62$ ), and the sum of the coefficients on *Tenure* and *Tenure*  $\times$  *SOX* remains positive and significant ( $0.007$ ,  $\chi^2 = 6.27$ ).

## VII. CONCLUSIONS

The debate concerning audit firm rotation is ongoing, with legislation mandating audit firm rotation recently approved in the EU, but rejected in the U.S. This issue is highly controversial due to two opposing views. Opponents of mandatory auditor rotation claim that long auditor tenure is advantageous because it allows for the accumulation of client-specific knowledge arising from a learning effect. This, in turn, helps the auditor to provide a higher-quality audit. Proponents, on the other hand, claim that long auditor tenure may lead to the development of economic and social bonds between the auditor and client, which will erode auditor independence and audit quality. Additionally, they voice concerns that long auditor tenure could lead to the development of complacency because of the repetitive nature of the audit task. To prevent this, they suggest a mandatory audit firm rotation after a certain number of years in order to bring in a fresh perspective.

Using an innovative research design that mitigates the endogeneity problem afflicting prior studies, we examine the effect of auditor tenure on the timeliness of misstatement detection. We show that longer auditor tenure leads to a less timely discovery and correction of misstatements. Thus, we provide evidence of a *negative* effect of long audit firm tenure on financial reporting quality, which contrasts with the findings of the majority of the literature. Next, we use the demise of Andersen to determine the effect of forced auditor change on the timeliness of misstatement discovery. We show that misstatements of Andersen's former clients end significantly earlier than misstatements of other Big 4 clients that retained their auditors throughout the misstatement. In other words, misstatements were discovered faster in the companies that were forced to change their auditor during the misstatement period. This result complements our finding of a negative association between auditor tenure and timeliness of misstatement discovery. It also provides direct evidence for the benefit of a fresh look at financial statements by a new auditor.

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## APPENDIX A

### Variable Definitions

Variable	Definition
<i>Duration</i>	The number of consecutive annual reports misstated.
<i>Tenure</i>	The number of consecutive years the auditor has served the company as its external auditor by the time the misstatement began.
<i>Short_Tenure</i>	An indicator variable that is equal to 1 if the tenure is shorter than or equal to three years, and to 0 otherwise.
<i>Long_Tenure</i>	An indicator variable that is equal to 1 if the tenure is longer than or equal to 11 years, and to 0 otherwise.
<i>Non_Audit</i>	The natural logarithm of nonaudit service fees in the first year of the misstatement.
<i>Size</i>	The natural logarithm of total assets, in millions, in the year prior to the misstatement.
<i>Lev</i>	The ratio of total liabilities to total assets in the year prior to the misstatement.
<i>BM</i>	The ratio of the book value per share to the market value per share in the year prior to the misstatement.
<i>TACC</i>	Total accruals scaled by average total assets (beginning balance plus ending balance, divided by 2) in the first year of the misstatement.
<i>Geo_Segment</i>	The number of geographic segments in the first year of the misstatement.
<i>Bus_Segment</i>	The number of business segments in the first year of the misstatement.
<i>Restructure</i>	An indicator variable that is equal to 1 if the company had special items larger than 1 percent of average total assets in the year prior to the misstatement, and to 0 otherwise.
<i>Loss</i>	An indicator variable that is equal to 1 if the company had a loss in the year prior to the misstatement, and to 0 otherwise.
<i>ROA</i>	The ratio of net income to average total assets in the year prior to the misstatement.
<i>Big</i>	An indicator variable that is equal to 1 for a Big N audit firm, and to 0 otherwise.
<i>Comp_Age</i>	The number of years the company has been appearing on the Compustat database by the time the misstatement began.
<i>Inst_Perc</i>	The proportion of shares held by institutional investors in the first year of the misstatement.
<i>Inst_HHI</i>	The concentration of institutional ownership measured using the Herfindahl-Hirschman index in the first year of the misstatement.
<i>AA</i>	An indicator variable that is equal to 1 for Andersen's clients, and to 0 otherwise.
<i>High_Risk</i>	An indicator variable that is equal to 1 for Andersen offices located in Houston, San Antonio, Fort Lauderdale, Chicago, Phoenix, and Denver, and to 0 for the other offices.
<i>Follow</i>	An index ranging from 0 to 5, corresponding to the likelihood that Andersen's clients followed their audit team.
<i>SOX</i>	An indicator variable that is equal to 1 for observations from 2003 onward, and to 0 for years before 2002.
<i>ABS_Res_Amt</i>	The absolute magnitude of the net income amount misstated divided by average total assets in the year prior to the misstatement and multiplied by 100.