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ON THE ECONOMICS OF AUDIT PARTNER TENURE AND ROTATION: EVIDENCE FROM PCAOB DATA

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This study uses proprietary PCAOB data. To access these data, we submitted a research proposal to the PCAOB describing the research questions, the research design as well as the data necessary to conduct the study. As a condition of data access, our study is reviewed by the PCAOB with respect to the release of nonpublic information (but not for its results). The PCAOB, as a matter of policy disclaims responsibility for any private publication or statement by any of its economic research fellows, advisors, and employees. The views expressed in this paper are the views of the authors and do not necessarily reflect the views of the Board, individual Board members, or staff of the PCAOB. Brandon Gipper was an Economic Research Fellow of the PCAOB. Christian Leuz is Economic Advisor of the PCAOB's Center of Economic and Risk Analysis. We appreciate the helpful comments of Preeti Choudhary, Michael Gurbutt, Robert Knechel, Luigi Zingales, PCAOB staff, two partners from one audit firm in our sample, and seminar participants at the PCAOB's Center for Economic Analysis and Stanford Summer Camp. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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ABSTRACT

This paper provides the first partner tenure and rotation analysis for a large cross-section of U.S. publicly listed firms over an extended period. We analyze the effects on audit quality as well as economic tradeoffs related to partner tenure and rotation with respect to audit hours and fees. On average, we find no evidence for audit quality declines over the tenure cycle and little support for fresh-look benefits after rotations. Nevertheless, partner rotations have significant economic consequences. We find increases in audit fees and decreases in audit hours over the tenure cycle, which differ by partner experience, client size, and competitiveness of the local audit market. More generally, our findings are consistent with efforts by the audit firms to minimize disruptions and audit failures around mandatory rotations. We also analyze special circumstances, such as audit firm switches and early partner rotations, and show that they are more disruptive than mandatory rotations, and also more likely to exhibit audit quality effects.

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1. Introduction

Does the tenure of an audit partner at a given client influence audit quality? What economic forces play into the rotation of audit engagement partners? Questions like these are central to audit practice and regulation and have been studied extensively in academic research (see, e.g., DeFond and Zhang 2014, and Lennox and Wu 2016, for overviews). This literature recognizes information asymmetry, conflicts of interest, learning, and competition in the audit market as key forces, and highlights several economic tradeoffs. For instance, engagement partners with long tenure have developed close relationships with their clients, which could compromise audit quality or make them reluctant to update audit procedures. Partners that are assigned after rotation did not approve prior audit procedures and, hence, can take a "fresh look" at the engagement. Over the years, engagement partners develop a deeper understanding and specific knowledge of their clients and respective industries, which should enable them to perform audits better and more efficiently. But newly-assigned partners need time to acquire this knowledge, which is costly and could at least temporarily decrease audit quality.

Prior literature finds mixed evidence when it comes to the effects of partner tenure and rotation on audit quality.[1] However, many of these studies rely on relatively small samples obtained from individual audit firms or settings outside the U.S., in which engagement partner names must be disclosed. It is not obvious that the results from foreign settings carry over to the U.S. where partner tenure and rotation have not been observable to outside investors until recently. In fact, partner disclosure could alter the effects of tenure and rotation. Moreover, the

[1] For instance, studies on the effects of mandatory partner *rotation* find decreases (Litt, Sharma, Simpson, and Tanyi 2014), increases (Lennox, Wu, and Zhang 2014; and Laurion, Lawrence, and Ryans 2016), and no change (Chi, Huang, Liao, and Xie 2009) in audit quality. Studies on audit partner *tenure* find evidence of decreases (Carey and Simnett 2006; Fitzgerald, Omer, and Thompson 2015), increases (Chen, Lin, and Lin 2008; Manry, Mock, and Turner 2008), or an initial increase followed by a decrease (Chi and Huang 2005) in audit quality.

U.S. audit environment is characterized by substantial capital market monitoring by investors and analysts, relatively strict audit oversight, including mandatory partner rotation every five years, as well as major litigation risk for audit firms. These forces could substantially mitigate agency concerns relative to non-U.S. settings.

In this paper, we provide the first partner tenure and rotation analysis for a large cross-section of U.S. publicly listed firms over an extended period. We analyze the effects on audit quality and potential agency issues over the five-year partner tenure cycle. But we also go back to first principles and study the underlying economics of partner tenure and rotation, for instance in terms of audit fees and hours. We ask how audit firms manage the transition from one partner to the next, and how they respond to competitive pressures around partner rotations. Our analysis provides novel evidence on the economic tradeoffs related to tenure and rotation for U.S. audit firms. This evidence can serve as baseline for future research on the role of engagement partners using the disclosure of engagement partner names starting in 2017.

We use a proprietary dataset from the Public Company Accounting Oversight Board (PCAOB) that matches audit partners with client issuers. Aside from partner names and tenure, the dataset contains further relevant engagement information, including total audit hours, partner hours, audit fees, billing realization, review partner assignments and hours, and internal audit risk ratings of the clients. Many of these data have not been previously analyzed for a large sample of U.S. firms. Our sample covers 3,333 clients of six large U.S. auditors (henceforth "Big 6)[2] from 2008 to 2014, which is 46 percent of U.S. audit firms' clients covered by Audit Analytics (85 percent in terms of market capitalization) over those years. The sample comprises

[2] The six large audit firms are BDO USA, Deloitte & Touche, Ernst & Young, Grant Thornton, KPMG, and PwC PricewaterhouseCoopers. These firms are all subject to yearly PCAOB inspection and report partner and client data to the PCAOB annually in machine-readable form. Smaller audit firms are also required to report this information, but do so with lower frequency (see Franzel 2012).

more than 17,900 client-year observations containing 3,852 engagement partner rotations (62 percent of which are from mandatory five-year rotations) and 431 audit firm switches.

The analysis proceeds in several steps. First, we focus on audit quality and examine multiple proxies (i.e., absolute total and performance-matched discretionary accruals, restatements and their announcements, fraud scores, going concern and internal-control-weakness opinions, and PCAOB and audit-firm inspection findings). We show that, for the average engagement in our sample, these proxies are unrelated to partner tenure, except for the announcement of restatements, which are more frequent in the two years after rotation (see also Laurion et al. 2017). Importantly, this "no-result" for audit quality does not seem to be a matter of power. Our tests could detect effects in absolute (discretionary) accruals as small as 7 (9) basis points of total assets per year of the partner cycle, if they were present. As we examine many different audit quality proxies, it is also unlikely that the no-result reflects measurement error. Our audit quality findings are inconsistent with many prior studies using U.S. data (e.g., Manry et al. 2008; Litt et al. 2014; Fitzgerald et al. 2015) or foreign samples (e.g., Chen et al. 2008; Lennox et al. 2014). One potential reason is that we use tight models that include client, year, and audit-firm tenure-fixed effects. Another plausible interpretation is that, in the U.S. with its robust reporting and audit environment, the five-year rotation mandate is sufficiently short to prevent major declines in audit quality over the partner tenure cycle.

Second, we explore the economics of partner tenure and rotation and examine several proxies related to the audit process (i.e., audit and non-audit fees, total audit hours, lead partner hours, review partner hours, and billing realization).[3] For audit fees, we find a systematic

[3] Billing realization is a performance measure used in the audit industry to describe the relation between actual audit fees and the "sticker price" for the services provided. A higher billing realization suggests that the audit firm could charge the client a higher rate per hour on the engagement.

increase over the tenure cycle of a partner following a significant drop in the initial year after rotation. At the same time, total audit hours and engagement partner hours steadily decrease in partner tenure after displaying a substantially higher level in the first year after rotation. As a result, billing realization is positively related to partner tenure. Seeing opposite trajectories for audit fees and hours is intuitive. When a new partner begins a five-year cycle, she will need to spend additional time familiarizing herself with the client and the audit procedures in place. She might also consider updating procedures or ask staff to help her with the transition. As the new partner does not yet have a relationship with the client, it could be harder for her to ask for fee increases. Similarly, the client could use partner rotation to re-negotiate fees. Our audit fee findings are similar in spirit to the "low-balling" results around audit-firm switches (see Hay, Knechel, and Wong 2006, for an overview), but have not been documented for partner rotation or the partner cycle. They are also related to results in Bedard and Johnstone (2010) for planned (instead of actual) audit hours and planned billing realization. We find a negative relation between review partner tenure and review hours. We do not find that non-audit fees increase as lead partner tenure increases.

We expect rotation-related fee pressures to be particularly pronounced in competitive audit markets. Consistent with this notion, we find that, when local audit markets are competitive, audit fees are, on average, lower and also relatively lower in the initial year after partner rotation. Subsequently, over the course of the rotation cycle, fees increase more in competitive markets. These results support our interpretation that clients can make more credible threats to change auditors and/or mount larger fee pressures around partner rotation. We find no differential relation in audit effort in competitive markets, suggesting that the result is due to competition rather than the type of clients. In sum, combining the results for audit quality and hours suggests

that U.S. audit firms exert extra effort to compensate the potential decline in audit quality in the initial years when the partner is new. The absence of "fresh look" benefits after rotation suggests that, at least on average, audit quality does not substantially decrease towards the end of the partner cycle, even though lead partner hours exhibit a sizeable decline.

Third, to better understand the economics of partner rotation, we analyze several cross-sectional splits and special settings. Specifically, we consider (i) differences in partner experience, (ii) differences in the complexity and size of clients, (iii) switches of the audit firm, (iv) the rotation of the entire audit team (i.e., lead and review partner), and (v) non-mandatory rotations before the end of the five-year limit. We find that newer, less experienced partners exert more effort in the initial year after rotation, but that they experience greater declines in hours in years four and five, consistent with a steeper learning curve. We further find that audit firms manage rotations for larger, complex clients differently. Consistent with anecdotal evidence that, for large (and complex) clients, assignment decisions are made far in advance of mandatory rotation and that new partners "shadow" the outgoing partner ahead of the rotation, we find relatively higher total partner hours in the final year of the tenure cycle. Thus, learning takes place earlier and, in turn, we do not see increases in the audit hours of the new lead partner right after rotation, as we do for smaller clients.

"Fresh look" benefits of rotations could be much stronger when clients switch their auditor or when both the lead partner *and* the review partner rotate off at the same time.[4] Switches of the audit firm are rare events, occurring only in 2.3 percent of our client-year observations. A new client requires a substantial initial investment on the part of the audit firm and likely exerts

[4] We acknowledge that these two rotation types are not exogenous. They could reflect special circumstances such as poor client performance or aggressive reporting (e.g., Blouin, Grein, and Rountree 2007). These circumstances could also affect the audit quality and other audit variables in our analyses.

pressure on audit fees (e.g., by having multiple audit firms bid for the engagement). Consistent with these arguments, we find that, for new auditors, audit fees are substantially lower and audit hours are much higher in the first year (see also Bell, Causholli, and Knechel 2015), not only compared to the previous audit firm but also relative to regular partner rotations. However, we also find that the new auditor can make up for most of the first-year fee discount and extra effort over the initial five-year cycle. In addition, we find a higher likelihood that (i) the auditor issues an opinion indicating material control weaknesses and (ii) the PCAOB reports an inspection finding in the first year after the switch. Lack of familiarity with the new client and substantial learning effects in setting up new audit procedures by the incoming audit firm are likely explanations for these audit quality results. We find similar audit fee, hour and audit quality effects after an audit team rotation, but the magnitudes are much smaller. From a fresh-look perspective, we find a higher likelihood that a restatement is announced in the first year of the new audit team.

Finally, we examine non-mandatory rotations before the end of the five-year limit. We do not find significant fee effects around these rotations, as we did for mandatory rotations. There is a slight uptick in audit hours (and overall partner hours) spent on the engagement in the last year of the outgoing partner and the first year under the incoming partner, but most of these incremental changes are not significant. However, we do find that, in the year before the non-mandatory rotation, the client is more likely to restate its financials as well as to announce a restatement. Moreover, the likelihood of a PCAOB inspection finding is substantially elevated, but the effect is not statistically significant, likely due to lack of power. When we distinguish between explainable or planned non-mandatory rotations for reasons such as retirement, promotion, dislocation, or sabbatical, and the rest, only the unexplained non-mandatory rotations

exhibit significantly higher levels of restatements and PCAOB inspection findings. The results are particularly pronounced for inspection findings that do not support the auditor's opinion on a client's financial statements and internal controls or uncover likely GAAP departures by the client. Interestingly, we do not see higher likelihoods for these variables in the first year of the incoming partner. The findings for non-mandatory rotations suggest that at least some lead partners are rotated prior to the end of their five-year term when audit quality is low.

Our paper makes several contributions to the literature. Our primary contribution is that we provide the first analysis of partner tenure and rotation for a large cross-section of publicly-traded U.S. issuers. Prior studies on U.S. issuers use proprietary data from individual audit firms (Manry et al. 2008; Bedard and Johnstone 2010), survey data (Daugherty, Dickens, Hatfield, and Higgs 2012), the introduction of the five-year rotation mandate (Litt et al. 2014; Sharma, Tanyi, and Litt 2017), or disclosures of partner names in SEC comment letters (Laurion et al. 2017), leading to fairly small and selected samples.[6] Moreover, we have lead and review partner names and, hence, can distinguish between mandated and non-mandatory rotations, considering that term limits count both roles for the same client. Our large panel dataset also allows us to use an extensive fixed-effects structure to control for many unobservable factors.

In addition, we provide a number of novel findings on the economics of partner rotation and tenure, adding to prior work by Bedard and Johnstone (2010) and Bell et al. (2015). We show fee pressures around partner rotations and that audit firms can make up for fee pressures and extra effort after rotation in subsequent years, but without compromising audit quality. We show that the fee effects differ depending on competition in the local audit market. We also provide results consistent with partner learning and "shadowing" as well as novel evidence for review partners.

[6] An exception is Fitzgerald et al. (2015) who study a large sample of U.S. not-for-profit firms. For these entities, audit partner information is publicly available in Federal Audit Clearinghouse filings.

These insights rely heavily on data, such as partner names, their tenure and hours, which were previously not available for a large cross-section of U.S. issuers.

Finally, we find very limited audit quality effects over partner tenure and around rotation for the average engagement in our sample. This finding is in contrast to many prior studies and highlights that, at least on average, mandatory five-year rotation is short enough and/or the U.S. audit environment robust enough that we do not see major declines in audit quality over the partner cycle. However, we find associations with audit quality in circumstances that are potentially more disruptive (e.g., around audit firm switches or non-mandatory rotations of the lead partner). For the latter, our evidence suggests that low-quality audits can give rise to early, non-scheduled reassignments of partners.

2. Institutional and conceptual underpinnings, prior literature and PCAOB data

Partner rotation has been an important feature of U.S. audits for several decades, dating back to the 1970s when the AICPA mandated rotation along with the peer review process for SEC Practice Section members. These new measures were largely a response to congressional investigations into the accounting industry in the mid-1970s (Zeff 2003). Prior to Sarbanes Oxley (SOX), lead partners had to rotate at the latest after seven years and then had a two-year "cooling-off" period before they could again become the lead partner for the same engagement.[7] The idea was that rotation would make it less likely that audit quality suffers because the lead partner and the client developed a close relationship and also that rotation would provide a new perspective on the engagement, so-called "fresh look" benefits.[8] Partner rotation, like many other

[7] The AICPA rule stated a limit of five consecutive years as the norm but allowed for several exceptions. For instance, in unusual circumstances, a firm's chief executive partner (or designee) was allowed to grant a two-year extension so long as there was an in-depth supplemental review by another partner (AICPA 1978).

[8] The term "fresh look" and its economic intuition are not well defined in the literature. DeFond and Zhang (2014) discuss it in the context of mandated audit firm rotation (e.g., Section 5.2.1.1). Lennox and Wu (2016) use the

features of the U.S. audit regime, came under scrutiny in the wake of Enron's bankruptcy and Arthur Andersen's demise. SOX reduced the maximum term for lead and review (also called "concurring") partners (Section 203). The SEC's rules implementing Section 203 stipulate that the lead and review partners are required to rotate off an engagement after five consecutive years in either capacity and, upon rotation, must be off the engagement for five years (17 C.F.R. § 210.2-01(c)(6)). The new rules came into effect for fiscal years beginning after May 2003 for lead partners and a year later for review partners.[9] In their comment letters to the SEC regarding the implementation of Section 203, many large audit firms expressed support for the goals of rotation, highlighting the importance of fresh-look benefits, but also often recommended shorter cooling-off periods, especially for review partners.[10] Their comment letters also emphasized that client-specific knowledge and audit-team continuity can improve audit quality.

The regulatory debate points to a number of important economic tradeoffs (see also DeAngelo 1981; Watts and Zimmerman 1983). On one hand, there are agency concerns that can arise in long-term relationships. Over time, the lead partner could become less vigilant. Moreover, the lead partner could develop a personal relationship with management, which could compromise independence and in turn reduce audit quality (e.g., Bamber and Iyer 2007). Frequent rotation makes it harder for personal relationships to form. In addition, the incoming

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term when discussing papers that find results consistent with "fresh look" in the context of mandatory partner rotation. SEC Chairman Harvey Pitt (2002) appears to be one of the first to use the phrase in Senate testimony.

[9] The wording of the rule "fiscal years beginning after May 2003" indicates when the SEC considers partner independence as impaired. If the current lead partner's tenure equals or exceeds five years for the first fiscal year ending after May 2003, the partner must rotate next year. For example, if 2003 is the lead partner's fifth year auditing a December 31 client, the partner will rotate, and a new partner will begin in 2004. This implementation could contribute to a relatively large number of five-year rotations of lead partners after 2008 and review partners after 2009 (see Table 1, Panel B, for descriptive statistics). We also use assumptions to expand the partner history data in the early years of our sample (i.e., a fifth-year rotation prior to an observed switch). This assumption could also contribute to a larger number of five-year rotations in 2008.

[10] See, e.g., Deloitte (2003), Ernst & Young (2003), KPMG (2003), PricewaterhouseCoopers (2003). However, other commentators (e.g. Turner, 2003) pointed out that shorter cooling-off periods can allow partners to bridge cycles between lead partner positions with the same client in a role described as "relationship partner."

partner is not (or less) tied to prior reporting choice or audit procedures, which could bring fresh look benefits and greater independence, and in turn increase audit quality (e.g., Hamilton, Ruddock, Stokes, and Taylor 2005). On the other hand, engagements can be very complex, with clients operating businesses around the world having myriad types of transactions. Over time, partners learn about these complexities through repeated audits. This client-specific knowledge can improve audit quality (e.g., Beck, Frecka, and Solomon 1988; Knapp 1991). Incoming partners lack this specific knowledge and need time to acquire it. Partner rotation disrupts this built-up knowledge and could lower audit quality until the new incoming partner is up to speed.

Thus, there are important economic tradeoffs that make the pattern of audit quality over the lead partner's cycle and around rotation not obvious. Specifically, fresh look benefits and partner capture suggest an initial increase and then a decrease in audit quality over the partner's tenure. Learning effects go in the opposite direction and predict an increase in audit quality over the tenure cycle. Similar tradeoffs and forces apply to the review partner on an engagement.

However, it is important to recognize that there are other economic and institutional forces affecting financial reporting and audit quality. In the U.S., clients and audit firms face strong capital-market forces, e.g., monitoring by analysts and investors. In addition, there is substantial regulatory oversight by the SEC and the PCAOB. These forces could mitigate the aforementioned agency concerns and hence attenuate tenure effects. Moreover, audit firms can take actions to reduce disruptions from rotation events. For instance, they can put client-specific systems in place, have the incoming partner "shadow" the outgoing one, and can keep the audit team in place even though the lead or the review partner rotates. These actions likely attenuate the learning effects that one would otherwise see around rotation or over the cycle.

In addition, there are other economic forces related to audit pricing: competitive pressures and audit firm management of rotations. For instance, as the incoming partner knows the client management or audit committee less well, it could be harder for the new partner to push for fee increases. Similarly, it is conceivable that clients actively use partner rotations to renegotiate audit fees and/or to explore their outside options for audit work, which would likely also generate fee pressures to retain the client. These effects could depend on the competition in the local audit market. Specifically, clients headquartered in less concentrated markets are likely to have lower audit fees, all else equal, and could see larger fee cuts around rotation. It is also conceivable that audit firms attempt to regain engagement profitability with larger subsequent increases over the tenure cycle. Moreover, we expect that the discussed economic tradeoffs manifest in audit and partner hours. For example, the described learning effects predict increases in audit and partner hours in the early years after partner rotation. Studying the underlying audit process should also facilitate the interpretation of observed changes in audit outcomes or quality.

There is an extensive prior literature on partner tenure and rotation, primarily focusing on reporting and/or audit quality. A small subset also performs analyses using audit fees or audit hours. Audit hours are usually not publicly available and hence less commonly studied.[11] We briefly summarize prior work, differentiating between studies on U.S. and foreign auditors. Studies based on U.S. auditors tend to have relatively small samples, either made available by an audit firm or obtained by making assumptions about rotations observed in other sources (e.g., SEC comment letter responses). Studies with foreign samples rely on partner name disclosure, which are mandated in several countries.

[11] E.g., Cameran, Francis, Marra, and Pettinicchio (2014) use public fee data and proprietary hour data from many audit firms in Italy. Kwon, Lim, and Simnett (2010) examine hours and fees around mandatory audit *firm* rotation in South Korea; they find evidence for low-balling effects and startup costs as predicted by DeAngelo (1981).

In the U.S., Manry et al. (2008) and Bedard and Johnstone (2010) obtain private samples from undisclosed audit firms. Manry et al. (2008) have 90 observations and find that discretionary accruals decrease as partner tenure increases, consistent with experience increasing audit quality. Bedard and Johnstone (2010) examine planned audit hours and planned billing realization for over 500 observations. They find that planned hours increase and planned realization declines for an incoming partner. This evidence is consistent with learning effects, but the authors caution that, without measures of audit quality, it is not possible to disentangle learning over the tenure cycle from "decreased skepticism, with negative implications for audit quality". Fitzgerald et al. (2015) examine internal control opinions for not-for-profit entities receiving federal funds, as these entities have to obtain internal control audits, for which the engagement partners are identified. They find results consistent with partner capture.[12] Laurion et al. (2017) use partner names disclosed in SEC comment letter responses to infer rotations. Examining restatement announcements, they find results consistent with fresh look benefits. Litt et al. (2014) and Sharma et al. (2017) examine clients that have recently changed audit firms and assume that partners rotate only after five years.[13] Litt et al. (2014) find evidence based on discretionary accruals and going-concern opinions suggesting lower reporting quality following the assumed rotation. Sharma et al. (2017) find higher audit fees following the assumed rotation and longer reporting lags, consistent with learning effects for incoming partners and with rotations being disruptive.

Outside the U.S., studies examine partner tenure and rotation in countries such as Australia, China, Germany, Italy, and Taiwan. Rotation mandates differed across these countries in the past but have largely converged following SOX. At this point, most countries have five-year cycles,

[12] Partner rotation is not mandatory for not-for-profit entities. Audit firms generally have internal policies that rotate the partner after seven years, though not all firms have such policies.

[13] We find that pre-five year rotations are relatively frequent (see Table 1, Panel B), questioning this assumption.

though studies' sample periods often predate these changes and may cover longer tenures. Results are mixed, even within the same country and over relatively similar time periods. Some studies find results consistent with fresh look benefits after rotation and partner capture over time (e.g., Hamilton et al. 2005; Carey and Simnett 2006; Fargher, Lee, and Mande 2008; Chi et al. 2009; Firth, Rui, and Wu 2012; Gold, Lindscheid, Pott, and Watrin 2012; Lennox et al. 2014). Others find results consistent with learning and experience benefits (e.g., Chen et al. 2008; Gold et al. 2012; Azizkhani, Monroe, and Shailer 2013; Cameran et al. 2014; Lennox et al. 2014).

In contrast to prior work, we examine a large sample of U.S. engagements by six large, annually-inspected audit firms. As lead and review partner names are not disclosed in the U.S., we rely on a proprietary dataset collected by the PCAOB. SOX authorizes the PCAOB to inspect audit firms of SEC registrants. As part of the inspection process, the PCAOB collects data on audit engagements. The PCAOB obtains data from the audit firms through an annual data request and the inspection process (e.g. CAQ 2012). It uses these data in a variety of ways related to its oversight mission, including the selection of engagements for inspections. The dataset contains confidential data that were previously unavailable to academic research (e.g., partner name, partner hours, admission year to the partnership, etc.). A key advantage of the confidentiality of partner names in the U.S. is that we can study tenure and rotation effects that are largely unaffected by partner name disclosures.

3. Research design and sample description

3.1. Research design

To empirically test the audit partner tenure and rotation effects we estimate the following Ordinary Least Squares (OLS) regression model:

$$\textit{Audit Quality / Audit Economics}_{i,t} = \beta_0 + \beta_1 \times \textit{Partner Tenure}_{i,t} + \sum \beta_m \text{ Audit-specific Controls}_{i,t} + \sum \beta_n \text{ Client-specific Controls}_{i,t} + \sum \beta_k \text{ Fixed Effects}_{i,t} + \varepsilon_{i,t}. \quad (1)$$

The dependent variables are various proxies for audit quality and other variables related to the economics of audits for client *i* in fiscal year *t*. We discuss these proxies in more detail below. The primary test variable is *Partner Tenure*, a count variable reflecting the years one through five the lead partner has spent on the engagement. Thus, the coefficient estimate β_1 indicates the trend in the regression's left-hand side variable over the lead partner's tenure after controlling for all the variables included in the model. In some specifications, we replace the single *Partner Tenure* variable with a series of binary indicators, *Tenure Year 1* to *5*, separately marking the years one through five of the tenure cycle. This extension leads to the following adjusted version of the model in Eq. (1):

$$\textit{Audit Quality / Audit Economics}_{i,t} = \beta_0 + \beta_1 \times \textit{Tenure Year 1}_{i,t} + \beta_2 \times \textit{Tenure Year 2}_{i,t} + \beta_4 \times \textit{Tenure Year 4}_{i,t} + \beta_5 \times \textit{Tenure Year 5}_{i,t} + \sum \beta_m \text{ Audit-specific Controls}_{i,t} + \sum \beta_n \text{ Client-specific Controls}_{i,t} + \sum \beta_k \text{ Fixed Effects}_{i,t} + \varepsilon_{i,t}. \quad (2)$$

The indicator for *Tenure Year 3* serves as base period and, hence, the coefficients β_1 to β_5 measure the incremental effects of a particular year in the tenure cycle relative to the base period. We sometimes replace *Partner Tenure* with or add the variable *Review Partner Tenure* to the model to examine the effects over the tenure cycle of the partner reviewing the engagement.

We construct the (*Review*) *Partner Tenure* variable using the partner names and identifiers in the PCAOB database. Because this dataset comes in a non-standardized format, we apply the following protocol: (i) we match on all available names and identifiers to construct a time series of partner names, and then use this panel to identify within-client partner rotations and to count

the number of tenure years.[14] (ii) We use the information on planned, upcoming partner tenure years provided by the audit firm to fill existing gaps in the panel and to cross-check the observed tenure year count from (i).[15] For instance, if we have data on the upcoming partner in a non-populated year for client *i*, we use this information to count up or down when data is missing or disagrees in the adjacent years. (iii) We fill in missing years under the assumption that a partner completes the entire five-year cycle. This procedure allows us to extend the sample by back-filling tenure cycles early in the sample period when, for instance, we only observe the last year of an outgoing partner on the engagement.[16]

The models in Eq. (1) and (2) contain an extensive set of control variables. First, we include variables specific to the audit engagement that are primarily drawn from the PCAOB dataset. We use the *Client Risk Rating*, which audit firms assign to their clients early in the audit planning process (e.g., in April or May for large, December year-end clients). Including this variable helps us to separate audit quality and clients' reporting quality. As every audit firm has its own rating system, we normalize ratings by forming rank ordered quintiles per audit firm with higher values marking higher perceived audit risks. In the audit fee regressions, we include *Audit Hours* as a control. The variable reflects all hours performed by staff and partners on the engagement of client *i* in year *t*. However, given the endogenous nature of the supply-side variables (e.g.,

[14] Matching on reported names is inherently noisy. For *Partner Tenure*, we match on family name alone. But it is still possible that some common names within an audit firm (e.g., "Smith") match when they are different partners. Through manual inspection, we observe no cases where the tenure cycle exceeds five years due to matching family names across rotating lead partners. Moreover, we miss cross-year family name changes or different spellings identifying the same person (e.g. "Smith" in 2008 and "Smiht" in 2009). We performed a "fuzzy" match and found fewer than 10 cases with misspellings. On balance, we believe that precise matches dominate for many close family name spellings that represent different individuals (e.g. "Johns" in 2008 and "Johnson" in 2009).

[15] Audit firms do not report upcoming partner(s) for all years in our series. If there is a mismatch between "planned" partner and subsequent, observed lead partner (in about 2.6 percent of cases), we treat it as a non-mandatory or audit firm switch.

[16] Assumption (iii) will over assign five-year rotations in the early sample years (i.e., 2008 and 2009). Without this assumption, we lose 11.4 percent of the observations. However, we verify (untabulated) that the results are similar, and none of our inferences changes, when we drop back-filled observations.

Copley, Gaver, and Gaver 1995), we refrain from interpreting the coefficient estimates on audit hours in the fee regressions.

Second, we include multiple characteristics of client *i* in year *t* as controls in the model. We follow the prior literature (e.g., Minutti-Meza 2013, for audit quality; Ball, Jayaraman, and Shivakumar 2012, for audit economics) and include variables such as firm size, leverage, profitability, growth opportunities, which are drawn from Compustat. Finally, we include an extensive fixed-effects structure in the model. The specific structure is noted in the tables. Most of our models include client-, year-, and audit-firm tenure-fixed effects. The latter capture the number of consecutive years the client is with the same audit firm and hence effects related to *audit-firm tenure* (e.g., Johnson, Khurana, and Reynolds 2002; Bell et al. 2015). Throughout the analyses, we assess the statistical significance of the OLS coefficient estimates using robust standard errors clustered by client (i.e., issuer).

3.2. Proxies for audit quality and audit economics

Our proxies for audit quality comprise the following measures: (i) absolute (discretionary) accruals, (ii) actual or announced financial restatements, (iii) going concern opinions and opinions about material weaknesses, (iv) potential fraud scores, and (v) inspection findings by the PCAOB or audit firm.[17] Our first measures of audit quality are *Absolute Discretionary Accruals* and total *Absolute Accruals*. We compute discretionary accruals based on a cross-sectional Jones (1991) model, adjusted for performance matching as in Kothari, Leone, and Wasley (2005). We prefer total accruals to avoid econometric issues related to decomposition of accruals (see also Chen, Melessa, and Hribar 2017). Accruals are only indirect measures of audit quality (as they also reflect client reporting choices as well as their business processes) and have

[17] For variable details on the exact definitions and data sources see Appendix A.

a number of well-known conceptual weaknesses (e.g., Hribar and Nichols 2007; Dechow, Ge, and Schrand 2010). However, they are commonly used in the audit literature (DeFond and Zhang 2014) and hence we include these metrics in the analysis to benchmark our findings with the prior literature.

Our next set of audit quality proxies are observable outcomes of poor financial reporting or internal control weaknesses. By their very nature, these events are infrequent, but they arguably more closely related to audit quality and/or have less measurement error. We code these events as binary indicators taking on a value of '1' in case of occurrence. *Restated Financials* represent annual reports that originally received an unqualified audit opinion, but subsequently had to be restated because the client's accounting staff and/or the auditor identified a material departure from GAAP. We measure the variable in the fiscal year of the restated reports. *Announced Restatements* code the year in which restatements are announced. The latter could take place several years after the material departure from GAAP. A modified *Going Concern Opinion* in a client's annual report is another frequently used variable in audit studies. It could indicate the auditor's independence, but it could also serve as a "disclaimer," shielding the auditor from regulatory scrutiny (Aobdia 2016) and legal liabilities (Kaplan and Williams 2013). Under SOX, management is required to assess the effectiveness of its internal controls over financial reporting, and the auditor must report on management's assessment. The variable *404b Opinion with MCW* stands for cases in which the auditor finds or agrees with management's assessment of material control weaknesses (MCW). A typical example is a situation in which a client observes and corrects a material misstatement in preparing its financial statements, and the auditor notes that the client does not have proper controls to systematically "catch" such errors.

We further use two scores measuring the likelihood of a client manipulating earnings or committing fraud as proxies of audit quality. The *F-Score* from Dechow, Ge, Larson, and Sloan (2011) was developed based on the SEC's Accounting and Auditing Enforcement Releases (AAERs). The *M-Score* from Beneish (1999) also uses AAERs plus cases of earnings manipulations identified by the news media to calibrate the fraud score model. In both cases, we apply the coefficient estimates from the original papers to our sample firms to obtain a continuous measure related to the probability of fraud or misreporting.

Finally, we use confidential PCAOB data to identify cases when the specific audit engagement had deficiencies as indicated by the PCAOB or the audit firm's internal inspections. The *PCAOB Inspection Finding* variable is set to '1' when, during its inspections, the PCAOB staff finds audit evidence that is insufficient to support an engagement's opinion and mentions this deficiency in the audit firm's publicly available inspection report (so-called Part I finding; PCAOB 2004). Audit firms are also required to perform monitoring procedures over engagement quality. These procedures often include internal inspection programs during which the audit firm reviews their own engagements and is requested to report results to the PCAOB (e.g., Bell et al. 2015). We set the variable *Audit Firm Inspection Finding* to '1' when there are any findings in internal inspections (e.g., minor findings like the lack of sufficient documentation of audit work or major findings like the failure to perform certain audit procedures). Both variables are available only for client-years that were subject to either PCAOB or audit firm inspections.

Our proxies related to the economics of audits and the audit process comprise the following measures: (i) audit and non-audit fees, (ii) audit hours, (iii) review and engagement partner hours, and (iv) billing realization. The *Audit Fees* and *Non-Audit Fees* paid by client *i* in year *t* are publicly available in the proxy materials as part of the shareholders' vote to renew the

auditor's annual contract (source: Audit Analytics). They are essentially the price or charge for audit services. For all the other variables, we rely on PCAOB data. *Audit Hours* serves as proxy for audit effort or input. *Partner and Review Hours* are of special importance for our study as they measure the input of the partners, lead partner and review partner with respect to the specific engagement over the tenure cycle.[18] Finally, *Billing Realization* reflects the profitability of the engagement and is measured as the actual audit fees charged to the client divided by the "sticker price." The latter equals the total hours performed by all staff and partners multiplied by the respective billing rates.

3.3. Sample construction and description

Table 1 provides an overview of the sample by audit firm (Panel A) and year (Panel B). Our sample comprises all client-years from the six largest audit firms (henceforth "Big 6") with PCAOB data and data for the main control variables available over the 2008 to 2014 period. The PCAOB collects data from all audit firms but only the large auditors are subject to yearly inspections and provide data annually in machine-readable format. This selection procedure yields a maximum of 17,903 client-years from 3,333 individual clients. Compared to the universe in Audit Analytics, our sample covers 67 (78) percent of Big 6 clients (client-years). We lose a few observations of smaller clients for the Big 6 as input data to compute the control variables are missing. Our sample also does not include clients from other non-Big 6 auditors, which again tend to be much smaller (their average market value is $107 million compared to a sample mean of $5,880 million). Overall, our sample covers about 46 percent of the SEC registrants in the U.S. (or 85 percent in terms of aggregate market capitalization).

[18] The way the PCAOB collects *Partner Hours* has changed over time. Over the period 2008 to 2011, the variable contains all partner hours including the lead partner, review partner, and others (e.g. relationship, IT, tax, etc.). From 2012 onwards, the variable contains only the hours of the lead partner. We distinguish between these different measurements with variable subscripts.

Panel B of Table 1 provides a breakdown of the sample by years. It also shows the yearly numbers of within-firm partner rotations and audit-firm switches. For partner rotations, we distinguish between mandatory five-year rotations and non-mandatory rotations that fall short of the five-year cycle. The somewhat elevated numbers of five-year rotations in 2008 and 2009 likely reflect missing tenure information for the preceding years in combination with our coding choices (see footnote 9) as well as the phase-in of SOX rules. The number of non-mandatory rotations is surprisingly high, and even outpaces the mandatory rotations in 2011 and 2012. This finding contrasts with anecdotal (and survey) evidence in prior literature (e.g. Litt et al. 2014, p.67, survey 13 offices from Big 4 audit firms and receive responses indicating only one pre-5 year rotation; Laurion et al. 2017, p. 211, had discussions with partners from all Big 4 firms and find "few partner rotations in the U.S. are voluntary"). Audit firm switches are infrequent events, consistent with prior literature (e.g., Minutti-Meza 2013). We observe only 431 cases, and the numbers are particularly low during the financial crisis. Overall, our sample covers 3,852 audit partner changes.

Table 2 provides descriptive statistics for the variables used in the regression analyses (Panel A) as well as some additional information by engagement partner (Panel B). For details on the variable definitions and data sources, see Appendix A. The mean (review) partner tenure is 2.7 (2.5) years, consistent with the presence of early rotations. In 17 percent of the client-years, issuers restated their financials; they announced restatements in 6 percent of the client-years. Modified going concern opinions or 404b opinions with MCW are rare events, occurring only in 1.4 and 2.9 percent of the client-years, respectively. PCAOB inspections and internal audit firm inspections each cover about 10 percent of the client-year observations in our sample. Interestingly, both programs yield findings with relatively similar frequency, i.e., for 34 percent

and 26 percent of the inspected engagements, respectively. The distribution of audit fees and hours is highly skewed, reflecting the heterogeneity among audit clients. At the median, the lead partner spends 293 hours on the engagement over the 2012 to 2014 period. The partner hours amount to 4.5 percent of the total audit hours. These numbers are comparable to prior studies with such data (e.g., O'Keefe, Simunic, and Stein 1994; Hackenbrack and Hogan 2005; Bell, Doogar, and Solomon 2008). Based on the descriptive statistics, the review partner spends, at the median, 51 hours per engagement. Taken together, the lead partner and review partner hours come close to the median pooled *Partner Hours*$_{2008/11}$ (i.e., 293 + 51 ≈ 358). The average billing rate for audit staff and partners for the median client is approximately $517 per hour.[19] Most engagements fall into the intermediate risk category, as indicated by an interquartile range of zero for the *Client Risk Rating*.

Panel B provides additional lead partner information. On average, a partner acts as a lead partner on two public issuers and five non-issuers (e.g., not-for-profit entities or private entities). The average partner manages more than 23,000 staff hours per year, and spends about 60 percent of her time on billable client work. The average partner has 10 years of experience on the job.

4. Main analyses of audit partner tenure and rotation

4.1. Results for audit quality

We begin our audit quality analyses using performance-matched *Absolute Discretionary Accruals* as dependent variable. This proxy is probably the most widely used in prior literature (e.g., Chi, Myers, Omer, and Xie 2015; Minutti-Meza 2013; DeFond and Zhang 2014; Stice, Stice, and White 2017). Table 3, Panel A, reports coefficient estimates and (in parentheses)

[19] (*Audit Fees* / (*Billing Realization* / 100)) / *Audit Hours* = (1,350,000 / (40 / 100)) / 6,530. This billing rate will exceed the fees per hour that clients actually pay because the median realization is far below 100.

standard errors clustered by firm from regressions estimating Eq. (1). In the first column, we include a basic set of control variables plus industry- and year-fixed effects. Specifically, we include controls for firm size using log transformed market values, financial leverage, the contemporaneous and lagged return on assets, an indicator for loss firms, the operating cash flow, the book-to-market ratio, and the Altman Z-score as default risk proxy. For variable definitions, see Appendix A. Most of the control variables are significant and exhibit signs consistent with prior research (e.g., Minutti-Meza 2013, Table 3). In the least restrictive model, the coefficient on *Partner Tenure* is negative and significant at the five percent level, suggesting that discretionary accruals decrease and hence audit quality increases over the five-year tenure cycle of the lead partner.

In the second column, we make three modifications to the model. First, we control for *Client Risk Rating*. Including this proxy should help to separate reporting and audit quality. Moreover, the higher the perceived audit risk, the more effort and scrutiny an auditor is expected to apply, implying a positive relation with audit quality (negative relation with accruals). Second, we add further controls for a firm's operating activities and business process such as sales growth, the log transformed volatility of cash flows, and the lagged turnover of accounts receivables and accounts payables, which can confound the measurement of accrual quality. Moreover, we include indicators for firms undergoing a restructuring or being involved in a M&A transaction. Most of the additional controls have significant explanatory power. Third, we add audit-firm-tenure-fixed effects to the model. These three modifications to the regression specification render the coefficient on *Partner Tenure* insignificant.

In the third column, we further tighten the specification by replacing industry-fixed effects with firm-fixed effects. This change increases the explanatory power of the model from an R-

squared of 19 to 40 percent. At the same time, many of the firm-specific control variables lose statistical significance, likely due to limited variation over time. The *Partner Tenure* variable remains negative, but the magnitude gets even smaller. Next, we recognize that two-step discretionary accrual models suffer from econometric problems. We therefore follow Chen et al. (2017) and include the Jones (1991) model regressors from the first step and assess statistical significance with non-parametric, bootstrapped standard errors (clustered by firm). The results are similar to the previous model, and the *Partner Tenure* variable remains insignificant. Finally, in the fifth column, we avoid the two-step estimation of discretionary accruals altogether and use total *Absolute Accruals* as the dependent variable. Instead of performance-matching, we include fixed effects for a client firm's industry decile rank in terms of its return on assets. This last model is the tightest and arguably state-of-the-art. Here the coefficient on *Partner Tenure* is essentially zero but has tight standard errors so that even tiny accrual effects of tenure could be detected. Thus, we conclude that there is no association between partner tenure and accruals.

Panel B of Table 3 reports results for the other audit quality proxies. The models include *Client Risk Rating*, the client-specific control variables from *Market Value* through *Cash Flow Volatility*, and client (or audit firm), year, and audit firm tenure-fixed effects. In line with Laurion et al. (2017), we find a significantly negative coefficient on *Partner Tenure* for announced restatements, which can be viewed as consistent with an increase in audit quality and "fresh look" benefits after rotations. Yet, for all the other audit quality proxies (i.e., restated financials, modified going concern opinions, 404b opinions with MCW, fraud scores, and PCAOB and audit firm inspection findings), the *Partner Tenure* coefficient is small and

insignificant.[20] We report the full model estimates, as well as other robustness tests, in Section B1 of Appendix B.

In sum, our results show that for the average engagement in our sample the proxies of audit quality are unrelated to partner tenure (except for the announcement of restatements).[21] Importantly, the coefficients on the (discretionary) accruals variables are economically small and precisely estimated. Our tests could detect changes in absolute (discretionary) accruals as small as 7 (9) basis points of total assets per year of partner tenure, if they were present. Thus, our "non-result" for audit quality does not seem to be a matter of power. As we examine many different audit quality proxies, it is also unlikely to reflect measurement error. The finding of no effect on audit quality is inconsistent with many prior studies using U.S. data (e.g., Manry et al. 2008; Litt et al. 2014; Fitzgerald et al. 2015) or international samples (e.g., Chen et al. 2008; Lennox et al. 2014). One reason might be that we use a very tight model, including client, year, and audit firm tenure-fixed effects. Another plausible interpretation for our findings is that, in the U.S. with its robust reporting and audit environment, the rotation mandate is sufficient to prevent major declines in audit quality over the partner's five-year term.

4.2. Results for audit economics

Next, we explore the economics of partner tenure and rotation and examine several audit-process related proxies. We begin with log transformed *Audit Fees* as dependent variable. This

[20] In additional analyses (not tabulated), we estimate the relation between going concern opinions and tenure conditional on negative cash flows (i.e. *Cash Flow from Operations* < 0, N = 1,904) and between 404b opinions with MCW and tenure conditional on the financial statements being restated (i.e. *Restated Financials* = 1, N = 2,617). In both cases, our inferences do not change. The coefficients on *Partner Tenure* are 0.003 (*t*-statistic of 0.90) and -0.001 (*t*-statistic of -0.13), respectively.

[21] To compare our internal inspection findings to those in Bell et al. (2015), we re-estimate our main specification with an indicator for major findings only (which occurs in our audit firm inspection sample at a rate of 8.8 percent, comparable to the 7.5 percent in Bell et al. (2015), Table 1). With this modification, *Partner Tenure* has a coefficient of 0.008 with a *t*-statistic of 1.68 (p-value of 0.093). This finding could be viewed as some evidence for audit quality declines over the tenure cycle, but should be interpreted cautiously.

variable has been used as proxy for audit pricing in the literature, reflecting many characteristics such as client size, risk, complexity, or financial statement verification (e.g., Simunic 1980; Hay et al. 2006; Kealey, Lee, and Stein 2007; Ball et al. 2012; Bell et al. 2015). Table 4, Panel A, reports coefficient estimates and (in parentheses) *t*-statistics clustered by client from regressions estimating Eq. (1). In column (1), we include a basic set of control variables plus industry-, year-, and audit-firm tenure-fixed effects. The controls include everything from firm size to cash flow volatility from the audit quality model plus total absolute accruals, the current-to-total-assets ratio, the number of days between the end of the fiscal year and the signing of the audit opinion, the number of business segments, the proportion of foreign sales, and an indicator for December year-end firms. For variable definitions, see Appendix A. Most of the control variables are significant and exhibit signs consistent with prior research (e.g., Ball et al. 2012, Table 5). The coefficient on *Partner Tenure* is positive and significant at the five percent level, suggesting that audit fees increase over the five-year tenure cycle of the engagement partner.

In column (2), we add two control variables to the model. First, we add *Client Risk Rating* to account for client audit risk. Perhaps surprisingly, the coefficient is not significant, but this could reflect our extensive list of controls which also capture client risk. Second, we add the log transformed *Audit Hours* to account for the effort the auditor exerts. Because fees and hours are simultaneously determined, it is not surprising that the two variables are highly correlated. The inclusion of the audit hours sharpens the identification of the *Partner Tenure* effects (i.e., they get larger and more significant), and increases the explanatory power of the model from 77 to 91 percent. The explanatory power increases to over 97 percent when we add client-fixed effects in column (3). In column (4), we replace the continuous *Client Risk Rating* variable with an indicator for risky clients (i.e., firms with a risk rating of 4 and 5). In this specification, the

coefficient on the risk variable becomes positive and significant, suggesting that high-risk clients are charged higher fees. If we combine the insights from these regressions with column (1) in Panel C of Table 4 (in which we tabulate results from estimating Eq. 2), we find a systematic increase in audit fees over the tenure cycle of a partner following a significant drop in the initial year after rotation. This fee pattern is similar in spirit to the "low-balling" results around audit-firm switches (e.g., Hay et al. 2006), but have not been documented for partner rotation or the partner cycle. They suggest that client firms can make more credible threats to change auditors and/or mount larger fee pressures around partner rotation.

Panel B of Table 4 reports results for the other audit economics proxies. The models include all client-specific control variables and fixed effects as in column (3) of Panel A. First, we examine total *Audit Hours*, and find a steady decrease over the tenure cycle after displaying a substantially higher level in the first two years after rotation (for the latter result see column 2 in Panel C). The increase in hours in the initial years suggests that rotations are costly to audit firms and the steady decline could reflect learning and/or efforts to make engagements more profitable.

Next, we examine the two sub-periods, for which we have partner hours. In column (2), covering the years 2008 to 2011, *Partner Hours* includes all partners on the engagement. The coefficient on tenure is negative but not significant. In column (3), covering the years 2012 to 2014, the *Partner Hours* variable is limited to the lead partner, and the coefficient on *Partner Tenure* becomes highly significant. As can be seen from the relevant models in Panel C, partner effort increases substantially in the first year after the transition using both measurements, but only the lead partner's hours fall significantly in years four and five on the assignment. The drop in effort of the outgoing partner is particularly pronounced in the last year. Combined with an increase in hours by all partners on the engagement (i.e., $Partner\ Hours_{2008/11}$), this pattern is

consistent with "shadowing" by the new incoming partner. The pattern suggests that when a new partner begins a five-year cycle, she will need to spend additional time familiarizing herself with the audit procedures in place. Over time, she can reduce her effort and towards the end of the cycle a shadowing partner takes part of the workload.

The countervailing trajectories of audit fees and hours over the tenure cycle are intuitive. As a result, *Billing Realization*, which essentially is equal to fees divided by $ denominated hours, is positively related to partner tenure (Panel B, column 4). These results are similar to findings in Bedard and Johnstone (2010) for planned audit effort and planned billing realization. We find no association between partner tenure and *Non-Audit Fees* (column 5), as one would expect if these activities are strictly separated from each other within the audit firm.

Finally, we focus on the review partner and find a similar negative relation between the tenure of the review partner and her hours spent reviewing the engagement. Using *Review Partner Hours* as dependent variable in column (6) of Panel B, we show a negative and highly significant coefficient on *Review Partner Tenure*. Combined with the year-by-year results from the last column in Panel C, the patterns of both the lead and review partners are very similar. They spend more time in the initial year of the transition, but scale back their involvement substantially towards the end of the engagement. The results for the review partner hold also, when we control for the tenure cycle of the lead partner (column 7). Moreover, if we control for the tenure of the review partner in the model of the lead partner's hours in column (8), the coefficient on *Review Partner Tenure* is not significant, which is reassuring.

In sum, our analyses of the economic and audit process-related variables suggest significant partner tenure effects over the cycle and that partner rotations have significant economic

consequences. Taken together, our findings are consistent with efforts by the audit firms to minimize disruptions and audit failures around mandatory rotations.

5. Cross-sectional analyses of audit partner tenure and rotation

5.1. Competition among audit firms

If there exists fee pressure around rotations, it should be particularly prevalent in competitive environments. To test this assertion, we examine the tenure relations for audit fees and hours separately for environments with high and low competition in local audit markets. We create a binary indicator, *High Competition*, set equal to '1' in year *t* if the competition among the auditors in the city of the lead partner (measured with an audit hours-based Herfindahl index) is above the median. We then introduce this indicator as a main effect in Eq. (1) and interact it with the *Partner Tenure* variable. We report the results from estimating this specification for *Audit Fees* in column (1) and for *Audit Hours* in column (2) of Table 5.

The results show that audit fees start out substantially lower in highly competitive markets. The coefficient on *High Competition* is negative and significant. At the same time, the interaction term between *High Competition* and *Partner Tenure* is positive and significant, indicating that the lower fees in a competitive environment are at least partly recovered in the subsequent years. A plausible explanation for lower fees right after rotation is that client firms can make more credible threats to change auditors when the partner is changing. Moreover, the incoming partner may find it harder to push for fee increases. Interestingly, we do not find a similar effect for audit hours in competitive markets (see column 2), which suggests that the fee effects do reflect competition rather than client differences across local markets.

Next, we analyze the year-by-year pattern in audit fees and hours by separately estimating Eq. (2) for local markets with high and low competition and report results in columns (3) to (6) of Table 5. We only tabulate coefficients for *Tenure Year 1* and 5 as they are the most relevant. The results show that rotation-related fee effects seem to occur only in highly competitive markets. In the fee model, the coefficient on the initial tenure year is significantly negative and more than twice the magnitude in high-competition markets compared to low-competition markets. In the latter, the coefficient on the first tenure year is negative but insignificant. In the audit-hours model, the initial effort seems larger in competitive markets, but the difference is not significant across the two markets. Results for audit quality do not differ across the two partitions (not tabulated).

5.2. Partner experience and client size

To better understand the economics of partner rotation, we analyze a number of cross-sectional splits and special settings. We begin with partner experience and learning, and the distinction between more complex larger and smaller clients. In both cases, we estimate the model in Eq. (2) separately for client-years from newer versus more experienced lead partners and big versus small clients, respectively. Table 6 contains the results for these partitions using *Partner Hours* as the dependent variable.[22] We only tabulate the coefficients for the individual *Tenure Year* variables, but the model contains the full set of controls and fixed effects.

We measure a lead partner's experience by the number of years she was granted partnership at the firm, and distinguish between newer and more experienced partners by splitting the partner sample by the median. We find that newer, less experienced partners spend more hours in the

[22] We also estimate these partitions for *Audit Hours*, *Audit Fees*, and the audit quality variables. However, because these alternative dependent variables yield results very similar to the average results and do not allow for new insights, we do not report them in the table.

initial year of a rotation cycle, but experience a steeper learning curve in years four and five. Based on the actual hours the partner spends on the engagement (i.e., *Partner Hours*$_{2012/14}$), the coefficient on *Tenure Year 1* is positive and significant only in the subset of newer partners. At the same time, the coefficients on *Tenure Years 4* and *5* are significantly negative for both subsets, but larger in magnitude for newer partners. Thus, learning on the job seems particularly pronounced among newer partners.

Client complexity is likely an important consideration when managing partner rotations. We use total assets as a proxy for complexity, and split the sample by the median into larger and smaller clients. We expect that for large clients assignment decisions are made far in advance of mandatory rotation to smooth the transition and to give the new partner time to learn about the new client. Anecdotally, the process begins up to two years prior to the incoming partner's first year. We report results for both total partner hours (*Partner Hours*$_{2008/11}$) and actual hours of the lead partner (*Partner Hours*$_{2012/14}$) in the table. The results provide evidence consistent with the interpretation that large (more complex) clients have incoming partners "shadow" outgoing partners. The coefficient on *Tenure Year 5* is positive and significant in column (3), a result that is already present in Table 4, Panel C. The finding suggests that the shadowing allows the outgoing partner to spend less time on the client, plausibly relying on the incoming partner. In turn, large clients exhibit smaller post rotation increases in the workload of the lead partner, as shown by the insignificant coefficient on *Tenure Year 1* in column (5). Through the means of shadowing, the incoming partner already had time to accustom herself with the client and does not start from scratch. For smaller, less complex assignments, we find no evidence of shadowing and, hence, the incoming partner needs to exert more effort in the initial year with the new client.

5.3. Audit firm switches and audit team rotations

In this section, we examine two settings in which the "fresh look" benefits of rotations could be much stronger, namely the switch of the auditor and the joint rotation of both the engagement partner *and* the review partner. We examine these cases by creating an indicator variable marking either the initial cycle of the lead partner from the new audit firm (*Audit Firm Switch Cycle*) or the initial cycle of the team of engagement and review partners at the new client (*Audit Team Rotation Cycle*). We code the binary indicator as '1' for the duration of the entire cycle (i.e., years 1 to 5), and '0' otherwise. We then introduce the indicator as a main effect in Eq. (1) and interact it with the *Partner Tenure* variable. We report the results from estimating this specification for the proxies of audit economics in columns (1) to (4) and for audit quality in columns (5) to (8) of Table 7. We tabulate only the coefficients of the main variables of interest, but the model contains the full set of controls and fixed effects.

Switches of the audit firm are rare events, only occurring in 2.3 percent of our client-year observations. They involve a substantial initial investment on the part of the audit firm and likely exert pressure on prices, involving bids from multiple firms. Consistent with these arguments, we find in Panel A that audit fees are substantially discounted and audit hours higher in the first year under the new auditor (in line with Bell et al. 2015), not only when compared to the previous audit firm but also relative to regular partner rotations. The variable *Audit Firm Switch Cycle* is negative (positive) and significant in the audit fee (audit hours) model. However, the new auditor can make up for most of the fee discount and reduce the extra effort over the initial rotation cycle. The interaction term between *Audit Firm Switch Cycle* and *Partner Tenure* is positive (negative) for audit fees (audit hours), indicating a steeper increase (decrease) over the initial tenure cycle. The partner hours are not affected by the audit firm switch.

We find a higher likelihood of the new auditor issuing an opinion on material control weaknesses and the PCAOB reporting an inspection finding in the first year after the switch. The *Audit Firm Switch Cycle* variable is positive and significant in the respective models in column (7) and (8). Unfamiliarity with the new client by the incoming auditor and the new audit procedures not being fully in place are likely explanations for this finding. We do not find significant results for the other audit quality proxies (except for a significantly negative coefficient on *Partner Tenure* for announced restatements, which was already present in Table 3). The restatement evidence is consistent with some limited fresh-look benefits after switching the audit firm.

In Panel B of Table 7, we find similar audit fee and hour effects after an audit team rotation, but, as one would expect, the magnitudes of the *Audit Team Rotation Cycle* variable in columns (1) and (2) are much smaller compared to the audit firm switch. The higher initial effort of the entire partner team (but not necessarily the lead partner) also shows up in the analyses of partner hours in columns (3) and (4). On the audit quality side, we find a higher likelihood of the client announcing a financial statement restatement in the first year of the new audit team (on top of the general effect occurring around partner rotation). Similarly, the likelihood of the newly rotated audit team issuing an opinion on material control weaknesses in the initial year is higher. These effects provide evidence of some limited fresh-look benefits. We do not find any other quality effects around the rotation of the audit team.

5.4. Non-mandatory rotations of engagement partners

Finally, we consider within-firm lead partner switches before the end of the five-year mandatory limit (hereafter "non-mandatory rotations").[23] There are several potential reasons why a lead partner is rotated early. First, the client could pressure the audit firm to rotate the partner to improve the relationship. These non-mandatory rotations might follow in circumstances in which the lead partner attempts or even successfully forces the client to change poor accounting practices. Examples preceding our sample period include Arthur Andersen's removal of Carl Bass from Enron (Greising 2002) or KPMG's removal of Ronald Safran from Xerox (Andrejczak 2003).[24] In this case, we expect to observe higher audit quality (or lower financial reporting quality) prior to rotation and reduced audit quality (or continued low financial reporting quality) following rotation. Second, the client might identify the need for a more experienced or technically competent audit partner and request a rotation. Third, the audit firm could determine that the lead partner's audit is low quality and rotate without request from the client. In the latter two cases, we expect to observe lower audit quality prior to the rotation and higher audit quality thereafter. There are of course other reasons why a lead partner rotates prior to the five-year limit. The partner may depart for personal reasons (e.g., planned retirement, health issues, or relocation). The audit firm could also reallocate partners to better meet its goals (e.g., long-term career planning of partners or designate specialists to a particular industry or client). Because it is unclear why these cases of explainable or planned non-mandatory rotations would accompany systematic audit quality changes (e.g., Chen and Wang 2016), we look at them separately in the analyses below.

[23] Non-mandatory rotations occur with stable frequency over the first four years of the tenure cycle. In our sample, we count 346, 380, 340, and 401 switches in tenure years one, two, three, and four, respectively.

[24] Despite being ousted by Xerox for challenging aggressive revenue recognition practices, Safran settled an AAER with the SEC for his role as lead partner for Xerox in 1998 and 1999 (SEC 2003).

We examine non-mandatory rotations by creating separate indicator variables marking the last year of the outgoing partner who leaves before completing a five-year cycle (*Year before Non-Mandatory Rotation*) as well as the first year of the new incoming partner (*Year after Non-Mandatory Rotation*). We then introduce these indicators in Eq. (2) aside of the individual year-by-year tenure cycle variables. For benchmarking purposes, we also include an indicator marking the final year before an audit firm switch (*Year before Audit Firm Switch*) in the model. This variable helps us to compare the non-mandatory rotations to a more disruptive break in the client-auditor relationship. We report the results from estimating this specification for the economic proxies in columns (1) to (4) and for audit quality in columns (5) to (8) in Panel A of Table 8. We tabulate only the coefficients of the main variables of interest, but the model contains the full set of controls and fixed effects.

The coefficient estimates on the *Year before Non-Mandatory Rotation* (*Year after Non-Mandatory Rotation*) variables represent the incremental effects on the outcome variables in those years over and above the respective tenure year. We find no results for audit fees around non-mandatory rotations. The audit hours (overall partner hours) spent on the engagement in the last year of the outgoing partner (first year under the incoming partner) are slightly elevated, though the incremental effect is only statistically significant in one case. This extra effort could reflect the unexpected nature of the switch, which might require special attention from higher-level partners to accompany the transition. In terms of audit quality, we find that the client is more likely to restate or announce a restatement of its financials. We also see that the likelihood of a PCAOB inspection finding is substantially higher in the year before a non-mandatory rotation, but the effect is not statistically significant. The respective coefficient is larger in magnitude than the restatement coefficients, so the insignificance likely reflects lack of power.

Interestingly, we do not see higher likelihoods for the audit quality variables in the first year of the incoming partner.

We next separately examine the effects for explainable or planned non-mandatory rotations and unexplained non-mandatory rotations. To do so, we create a separate indicator variable for each group (as highlighted by the subscript *expl* and *unexpl*) and use them to replace the *Year before Non-Mandatory Rotation* variable in the model. We identify explainable transitions using several common-sense patterns in the data, indicating such reasons as partner retirements, promotions, dislocations, and temporary leaves. Panel B of Table 8 reports the results. We do not observe meaningful differences in the proxies for audit economics, except that the lead partner experiences a larger decline in hours on the engagement for explainable versus unexplained non-mandatory rotations. The effects in the year leading up to these planned rotations are similar in magnitude to the reductions in lead partner hours in tenure year 5 before a mandatory rotation (see Table 4, Panel C). However, we do observe that unexplained non-mandatory rotations are associated with clients that are more likely to restate or announce a restatement and have elevated levels of PCAOB inspection findings. All three coefficients are significant in the year before an unexplained rotation, but none of the coefficients is significant for planned transitions of the audit partner. The findings are consistent with low audit quality and/or financial reporting quality, at least in parts, playing a role in ousting the incumbent partners prior to the end of their five-year term.

We find similar results when we distinguish between different PCAOB inspection findings in Panel C of Table 8. Column (1) repeats the analysis with Part I findings, which are published in the audit firm's inspection report. In column (2), we find that findings contributing to an audit firm's Part II deficiencies (which are not made public and describe issues with the audit firm's

overall system of quality control) also show elevated levels before unexplained non-mandatory rotations.[25] In column (3), we combine the Part I and II findings and use the (log transformed) count as the dependent variable. The results indicate that a 1% increase in the number of findings is associated with an 18% increase in the likelihood of an unexplained non-mandatory rotation. No such effect is present for planned transitions. Finally, in columns (4) and (5), we distinguish between severe inspection findings (e.g., when the audit work fails to support the financial statement and internal controls opinions or the PCAOB discovers a likely departure from GAAP) and the remaining inspection findings.[26] The only place where we measure a very strong positive association is for severe inspection findings before unexplained non-mandatory rotations. This evidence suggests that the PCAOB inspection process can lead to disruptions in the client-auditor relationship following a negative quality event.

6. Conclusion

This paper provides the first partner tenure and rotation analysis for a large cross-section of U.S. publicly listed firms over an extended period. We analyze the effects on audit quality over the mandatory five-year partner tenure cycle as well as other economic tradeoffs related to partner tenure and rotation. We find no evidence for audit quality declines over the tenure cycle and little support for significant fresh-look benefits after rotations. Thus, at least on average, mandatory rotation appears to be short enough and/or the U.S. audit environment robust enough that there are no major declines in audit quality from partner capture over the tenure cycle.

[25] The coefficient is not significant at conventional levels with a *p*-value of 0.267. However, it is significantly larger than the same coefficient for explained non-mandatory rotations in a one-sided test. Due to the pervasive nature of quality control problems at the audit firm level, any one audit cannot independently be a Part II finding. Instead, individual findings contribute to an audit firm's quality control deficiencies.

[26] In practice, the PCAOB does not distinguish the severity of an inspection finding; the publicly observable output of the inspection work is binary. Either the audit firm failed to perform sufficient audit work to support an opinion and, hence, has a Part I finding or not. We classify these findings as severe when both opinions are not supported by the audit work or there are other, likely GAAP departures.

Nevertheless, partner rotations have significant economic consequences. We show that there are fee pressures around partner rotations but that audit firms can make up for both the fee pressures and the extra audit hours after rotation in subsequent years, however, without compromising audit quality. We also document that these systematic fee increases and audit hour decreases over the partner cycle differ by competitiveness of the local audit market, partner experience, and client size. The partner hour results are consistent with learning and "shadowing." We further provide evidence of systematic audit hour patterns over the tenure cycle for review partners.

Generally speaking, our findings are consistent with efforts by the audit firms to minimize disruptions and audit failures around mandatory rotations. When we analyze special circumstances, such as audit firm switches and audit team rotations, we find that they are more disruptive than mandatory rotations, and more likely to exhibit audit quality effects. We also examine early, non-mandatory partner rotations and show that they are more likely after an issuer restates the fiscal year audited by the respective partner, a restatement is announced, and a PCAOB inspection finds some deficiencies. The results are particularly pronounced for severe inspection findings and suggest that, for at least some lead partners, low quality audits can give rise to early termination of an assignment. The fact that we do not find any quality effects before an explainable or planned non-mandatory rotation lends further credence to this interpretation.

Our analysis also provides a wealth of novel descriptive evidence on the economic tradeoffs for U.S. audit firms. For instance, non-mandatory rotations are more frequent than previously thought. Lead partners manage very few SEC audits concurrently, in contrast to international settings such as Taiwan. In that sense, our evidence serves as an important baseline for future research on the role the disclosure of engagement partner names starting in 2017.

In closing, several caveats are in order. First, our analysis relies on associations and does not provide causal effects. Audit firms purposefully assign lead and review partners to particular engagements, which create selection and matching issues. Second, our finding that there are no major declines in audit quality over the average partner cycle needs to be interpreted carefully. While it provides an important baseline for a controversial policy issue, it does not imply that a five-year cycle is optimal or that mandatory rotations are justified. It is possible that a longer rotation term would yield similar results. Thus, the relation between partner tenure and audit quality beyond the five-year period remains an open question for the U.S. audit environment. Finally, lead partners may manage many non-SEC audits, which are not observable even with the new partner name disclosures, "gap" years in public data should be interpreted cautiously.

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TABLE 1

Sample Composition and Description by Audit Firm and Year

Panel A: Number of Observations and Client Characteristics by Audit Firm

	Full Sample							Audit Analytics Universe				
	BDO	Deloitte	EY	GT	KPMG	PwC	Total Big 6	Total Big 6	Coverage (%)	Other Auditors	Total All Auditors	Coverage (%)
Clients	183	651	1,017	278	713	739	3,333	4,947	67.4%	2,661	7,295	45.7%
Client-Years	680	3,257	5,246	1,236	3,681	3,803	17,903	23,092	77.5%	9,434	32,526	55.0%
Market Value ($ million)	608	6,516	5,966	586	5,093	8,642	5,880	4,105		107	2,946	
Total Fees ($ thousand)	854	4,075	3,060	796	2,748	4,695	3,289	2,903		249	2,138	

Panel B: Number of Observations and Engagement Partner Rotations/Audit Firm Switches by Year

Fiscal Year	Within-Firm Partner Rotations				Audit Firm Switches		Total Changes		Total Observations
	5-year	%	< 5-year	%	No.	%	No.	%	
2008	481	20%	177	7%	25	1%	683	28%	2,423
2009	401	15%	235	9%	20	1%	656	25%	2,657
2010	319	12%	286	11%	37	1%	642	24%	2,685
2011	273	10%	281	11%	64	2%	618	24%	2,625
2012	259	10%	288	11%	93	4%	640	25%	2,599
2013	365	14%	200	8%	97	4%	662	26%	2,566
2014	287	12%	n.a.	n.a.	95	4%	382	16%	2,348
Total	2,385	13%	1,467	8%	431	2%	4,283	24%	17,903

Table 1 provides descriptive information on the sample. Panel A gives detail by audit firm and compares the sample totals to the Audit Analytics Universe. The full sample comprises up to 17,903 client-year observations with PCAOB data and available (main) control variables used in the regression analyses. The Big 6 audit firms are BDO USA, Deloitte & Touche (Deloitte), Ernst & Young (EY), Grant Thornton (GT), KPMG, and PricewaterhouseCoopers (PwC). The Audit Analytics universe comprises firms with U.S. signing auditors and positive assets, market capitalization, and revenues. We indicate the number of unique clients, client-years, mean client market value, and mean client total fees (audit and non-audit) in the panel. Market value and fee data are from Audit Analytics. Coverage is the percentage of sample firms out of the Audit Analytics universe. Panel B provides detail on within-audit firm rotations and across-audit firm switches, and the number of client-year observations per fiscal year. We code "5-year" rotations as years when the outgoing partner is in her fifth year of tenure (mandatory rotation), and "< 5-year" rotations as years when the outgoing partner is in her first through fourth year of tenure (non-mandatory rotation). We do not observe the number of "< 5-year" rotations in 2014 because of lack of 2015 data. We identify audit firm switches based on the opinion data in Audit Analytics. The table also indicates the number of total changes (rotations plus switches) and the proportion of changes out of the yearly total observations.

TABLE 2
Descriptive Statistics

Panel A: Main Variables Used in the Regression Analyses

	N	Mean	Std. dev.	P25	Median	P75
Variables of interest:						
Partner Tenure (years)	17,903	2.671	1.397	1	2	4
Review Partner Tenure (years)	17,748	2.523	1.361	1	2	4
Audit quality variables:						
Abs. Discretionary Accruals (% of total assets)	14,691	0.072	0.079	0.021	0.047	0.093
Absolute Accruals (% of total assets)	15,323	0.089	0.092	0.034	0.063	0.110
Restated Financials (indicator)	17,903	0.172	0.377	0	0	0
Announced Restatements (indicator)	17,896	0.059	0.236	0	0	0
Going Concern Opinion (indicator)	17,903	0.014	0.115	0	0	0
404b Opinion with MCW (indicator)	16,663	0.029	0.167	0	0	0
F-Score (Dechow et al.)	17,902	1.011	0.702	0.457	0.779	1.47
M-Score (Beneish)	16,215	-2.617	0.869	-2.937	-2.643	-2.38
PCAOB Inspection Finding (indicator)	1,558	0.342	0.475	0	0	1
Audit Firm Inspection Finding (indicator)	1,805	0.261	0.440	0	0	1
Audit-specific variables:						
Audit Fees ($ thousand)	17,850	2,888	4,677	734	1,350	2,892
Non-Audit Fees ($ thousand)	17,850	401	1,056	8	86	329
Audit Hours (hours)	17,834	10,880	13,166	3,719	6,530	12,384
Partner Hours$_{2008/14}$ (hours)	17,826	559	805	196	325	583
Partner Hours$_{2008/11}$	10,333	696	1009	205	358	712
Partner Hours$_{2012/14}$	7,493	371	271	183	293	471
Review Partner Hours (hours)	17,757	67	53	34	51	81
Billing Realization (percentage)	17,836	47	22	31	40	60
Client Risk Rating (score)	17,903	3.036	0.598	3	3	3
Competition Index (%)	17,902	0.355	0.202	0.244	0.273	0.358
Audit Firm Switch (indicator)	17,903	0.023	0.149	0	0	0
Audit Firm Switch Cycle (indicator)	17,843	0.072	0.258	0	0	0
Audit Team Rotation Cycle (indicator)	17,748	0.264	0.441	0	0	1
Year before Non-Mandatory Rotation (indicator)	17,903	0.082	0.274	0	0	0
Year after Non-Mandatory Rotation (indicator)	17,903	0.082	0.274	0	0	0

Panel B: Information by Audit Engagement Partner

	N	Mean	Std. dev.	P25	Median	P75
Engagement Partner Clients (number)						
observed (per client-year)	17,249	2.0	1.0	1	2	2
observed (per partner-year)	11,153	1.5	0.8	1	1	2
reported (per partner-year)	8,552	2.1	1.4	1	2	3
non-issuer clients (per partner-year)	8,073	5.0	6.4	1	3	7
Review Partner Clients (number)						
reported (per partner-year)	8,465	1.7	1.9	0	1	3
non-issuer clients (per partner-year)	8,380	3.1	4.2	0	2	4
Audit Hours Managed (hours)	10,912	23,446	13,487	14,936	20,880	28,930
Partner Utilization (percentage)	10,935	62.0	17.8	51.5	62.6	73.0
Partner Entry Year (calendar year)	11,150	2001	6	1997	2002	2005
Partner Experience (years)	17,246	10.2	5.9	6	9	14

(Continued)

TABLE 2—*Continued*

Table 2 presents descriptive statistics for the main variables used in the regression analyses (Panel A) as well as the audit engagement partners in our sample (Panel B). The sample comprises up to 17,903 client-year observations with PCAOB data and control variable data. For variable definitions in Panel A see the descriptions in Appendix A. In Panel B, we list the following variables: The number of observed *Engagement Partner Clients* is a count of issuers with opinions signed by the same audit partner. We provide this statistic for our client-year panel as well as on a partner-by-partner basis (i.e., by partner-year). All other variables are taken from what the audit firms report to the PCAOB. *Review Partner Clients* is a count of clients whose audit engagement the partner reviews. Issuer clients are entities required to file with the U.S. Securities and Exchange Commission (SEC), including subsidiaries or benefit plans that report separately. Non-issuer clients are entities that are not required to file with the SEC (e.g., not-for-profit entities or for-profit entities below SEC reporting thresholds). *Audit Hours Managed* are total staff hours under the supervision of the audit engagement partner. *Partner Utilization* measures the time spent on billable client work relative to the available time (i.e., standardized number of hours per week depending on the time of year). For instance, the available time could be 60 (40) hours per week during busy season (other periods) and, thus, a utilization of 60% indicates that the partner performs 36 (24) hours of billable work on average. *Partner Entry Year* is the calendar year the employee becomes an audit partner for the firm, either through internal promotion or external hiring. We compute *Partner Experience* as the current calendar year minus the year the partner was granted partnership at the firm.

TABLE 3

Engagement Partner Tenure and Audit Quality

Panel A: Absolute (Discretionary) Accruals as Proxy for Audit Quality

	(1)	(2)	(3)	(4)	(5)
Dependent Variables:		*Absolute Discretionary Accruals*			*Abs. Accruals*
Audit-specific Variables:					
Partner Tenure	**-0.095****	**-0.053**	**-0.045**	**-0.047**	**-0.000**
	(0.044)	**(0.045)**	**(0.047)**	**(0.039)**	**(0.036)**
Client Risk Rating	–	-0.186*	-0.195	-0.205	-0.243**
		(0.105)	(0.146)	(0.147)	(0.116)
Client-specific Variables:					
Ln(*Market Value*)	-0.325***	-0.693***	0.044	0.065	-0.404*
	(0.051)	(0.096)	(0.236)	(0.266)	(0.208)
Leverage	-2.989***	-3.166***	0.387	1.033	0.893
	(0.471)	(0.480)	(1.046)	(1.062)	(0.918)
Return on Assets	-7.853***	-8.329***	-9.360***	-9.410***	-61.431***
	(1.560)	(1.601)	(1.835)	(1.897)	(2.775)
Return on Assets$_{t-1}$	-3.591***	-2.211**	-1.422	-0.918	-1.960**
	(0.894)	(0.918)	(1.022)	(0.923)	(0.947)
Loss Firm	0.941***	0.642***	0.387	0.430	0.354
	(0.234)	(0.243)	(0.299)	(0.323)	(0.345)
Cash Flow from Operations	1.658	1.440	0.780	1.002	47.993***
	(1.722)	(1.766)	(2.395)	(1.956)	(2.288)
Book-to-Market	-0.759***	-0.868***	0.111	0.144	-0.124
	(0.140)	(0.158)	(0.191)	(0.219)	(0.161)
Altman Z-Score	-0.240***	-0.211***	0.419**	0.498***	0.496***
	(0.074)	(0.072)	(0.182)	(0.164)	(0.166)
Sales Growth	–	1.086***	0.551	0.554	0.537
		(0.319)	(0.382)	(0.504)	(0.459)
Ln(*Cash Flow Volatility*)	–	0.583***	0.487***	0.527***	0.275**
		(0.094)	(0.146)	(0.139)	(0.113)
Receivables Turnover$_{t-1}$	–	0.018***	0.021*	0.019*	0.000
		(0.006)	(0.013)	(0.011)	(0.009)
Payables Turnover$_{t-1}$	–	0.012*	0.005	0.005	0.021
		(0.007)	(0.016)	(0.015)	(0.019)
Restructuring Firm	–	3.366***	3.358***	3.366***	3.435***
		(0.506)	(0.548)	(0.485)	(0.481)
M&A Firm	–	-0.411***	-0.060	-0.029	0.015
		(0.138)	(0.170)	(0.140)	(0.124)
Jones Model Regressors	–	–	–	Yes	Yes
Fixed Effects:					
Industry (I)/*Client* (C) and *Year* (Y)	I, Y	I, Y	C, Y	C, Y	C, Y
Audit Firm Tenure Year (AT)	–	AT	AT	AT	AT
Industry-Performance Decile (ID)	–	–	–	–	ID
R-squared	0.187	0.196	0.401	0.404	0.787
Observations	13,660	13,386	13,187	13,187	13,785

(Continued)

TABLE 3—*Continued*

Panel B: Alternative Financial Reporting Proxies for Audit Quality

Dependent Variables:	(1) *Restated Financials*	(2) *Announced Restate-ments*	(3) *Going Concern Opinion*	(4) *404b Opinion with MCW*	(5) *F-Score (Dechow et al.)*	(6) *M-Score (Beneish)*	(7) *PCAOB Inspection Finding*	(8) *Audit Firm Inspection Finding*
Audit-specific Variables:								
Partner Tenure	**-0.002**	**-0.005*** **	**0.000**	**-0.000**	**-0.001**	**-0.001**	**0.005**	**0.003**
	(-0.93)	**(-3.52)**	**(0.46)**	**(-0.37)**	**(-0.36)**	**(-0.35)**	**(0.56)**	**(0.39)**
Client Risk Rating	-0.005	-0.008	0.002	-0.007*	0.000	-0.007	0.016	0.005
	(-0.70)	(-1.52)	(0.84)	(-1.94)	(0.00)	(-0.59)	(0.80)	(0.36)
Client-specific Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects:								
Client (C)/*Audit Firm* (A), Year (Y), and *Audit Firm Tenure Year* (AT)	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	A, Y, AT	A, Y, AT
R-squared	0.502	0.221	0.533	0.291	0.688	0.541	0.099	0.153
Observations	17,653	17,646	17,653	16,435	17,653	15,984	1,557	1,801

The table reports analyses of the relation between engagement partner tenure and audit quality. We measure audit quality for client *i* in year *t* as performance matched *Absolute Discretionary Accruals* or *Absolute Accruals* in Panel A, and using various alternative assessments of a client's reporting process in Panel B (e.g., whether the auditor issues a modified *Going Concern* opinion, or the propensity to commit reporting fraud using the *F-Score*, etc.). In Panel A, we exclude financial firms (1-digit SIC industry="6") from the analysis. Our variable of interest, *Partner Tenure*, reflects the number of consecutive years that the audit partner manages the engagement, and ranges from 1 to 5. For all variable definitions see Appendix A. Depending on the specification, we include (but do not report) the Jones (1991) model regressors (i.e., the inverse of total assets, sales revenue growth, and PP&E over total assets) as well as fixed effects for a client's 2-digit SIC industry (I), individual clients (C), audit firms (A), fiscal years (Y), the number of consecutive years the client is with the same audit firm (*Audit Firm Tenure Year,* AT), or a client's industry decile rank based on its return on assets (*Industry-Performance Decile,* ID). In Panel B, we include all the client-specific control variables from *Market Value* through *Cash Flow Volatility* in the model, but do not report the coefficients. We use the natural log of the raw values and lag the variables by one year if indicated. For ease of interpretation, we multiply the absolute (discretionary) accruals variables by 100. The table reports ordinary least squares (OLS) coefficient estimates and (in parentheses) robust standard errors clustered by firm (or bootstrapped standard errors with firm clusters in Model 4) in Panel A, and *t*-statistics based on robust standard errors clustered by firm in Panel B. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed).

TABLE 4

Engagement Partner Tenure and Audit Economics

Panel A: Audit Fees as Proxy for Audit Economics

	(1)	(2)	(3)	(4)
Dependent Variable:	Ln(*Audit Fees*)			
Audit-specific Variables:				
Partner Tenure	**0.006****	**0.009*****	**0.005*****	**0.006*****
	(2.54)	**(5.78)**	**(5.59)**	**(5.65)**
Client Risk Rating	–	0.004	0.000	–
		(0.67)	(0.10)	
High Client Risk	–	–	–	0.016**
				(2.33)
Ln(*Audit Hours*)	–	0.778***	0.395***	0.394***
		(50.96)	(19.73)	(19.68)
Client-specific Variables:				
Ln(*Market Value*)	0.293***	0.129***	0.077***	0.077***
	(29.68)	(19.68)	(11.81)	(11.89)
Leverage	0.569***	0.218***	0.247***	0.246***
	(11.35)	(7.98)	(8.59)	(8.57)
Return on Assets	-0.330***	-0.133***	-0.122***	-0.122***
	(-4.47)	(-2.99)	(-3.56)	(-3.58)
Return on Assets$_{t-1}$	-0.147***	-0.060**	0.004	0.007
	(-3.46)	(-2.46)	(0.20)	(0.35)
Loss Firm	0.128***	0.042***	0.019***	0.018***
	(7.51)	(4.22)	(3.00)	(2.95)
Cash Flow from Operations	0.136*	-0.021	-0.081**	-0.081**
	(1.76)	(-0.42)	(-2.38)	(-2.37)
Book-to-Market	0.143***	0.068***	0.044***	0.045***
	(10.07)	(7.42)	(6.04)	(6.10)
Altman Z-Score	-0.007	-0.005	0.005	0.005
	(-1.17)	(-1.38)	(1.40)	(1.41)
Sales Growth	-0.129***	-0.045***	0.014**	0.015**
	(-8.41)	(-4.73)	(2.01)	(2.07)
Ln(*Cash Flow Volatility*)	0.234***	0.071***	0.025***	0.025***
	(25.84)	(11.57)	(6.56)	(6.50)
Absolute Accruals	-0.428***	-0.126***	0.055	0.056*
	(-5.34)	(-2.61)	(1.64)	(1.65)
Current-to-Total Assets	0.003	0.052*	-0.216***	-0.216***
	(0.05)	(1.79)	(-6.30)	(-6.29)
Reporting Lag	0.004***	0.002***	0.003***	0.003***
	(7.23)	(5.05)	(7.32)	(7.31)
# Business Segments	0.061***	0.018***	0.020***	0.020***
	(11.15)	(5.36)	(4.98)	(4.98)
Foreign Sales	0.687***	0.263***	0.151***	0.150***
	(16.94)	(10.01)	(3.64)	(3.61)
December Firm	0.038*	0.000	–	–
	(1.79)	(0.00)		
Fixed Effects:				
Industry (I)/*Client* (C), *Year* (Y), and *Audit Firm Tenure Year* (AT)	I, Y, AT	I, Y, AT	C, Y, AT	C, Y, AT
R-squared	0.773	0.911	0.978	0.978
Observations	17,795	17,728	17,506	17,506

(Continued)

TABLE 4—*Continued*

Panel B: Audit Hours, (Review) Partner Hours, and Other Proxies for Audit Economics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variables:	Ln(*Audit Hours*)	Ln(*Partner Hours*$_{2008/11}$)	Ln(*Partner Hours*$_{2012/14}$)	*Billing Realization*	Ln(*Non-Audit Fees*)	Ln(*Review Partner Hours*)	Ln(*Review Partner Hours*)	Ln(*Partner Hours*$_{2008/14}$)
Audit-specific Variables:								
Partner Tenure	**-0.006*** **	**-0.004**	**-0.042*** **	**0.414*** **	**0.005**	–	**-0.005***	**-0.016*** **
	(-4.34)	**(-1.35)**	**(-11.13)**	**(9.58)**	**(0.78)**		**(-1.94)**	**(-6.59)**
Review Partner Tenure	–	–	–	–	–	**-0.026*** **	**-0.026*** **	**-0.001**
						(-9.10)	**(-9.12)**	**(-0.25)**
Client Risk Rating	0.032***	0.003	0.003	-0.316*	-0.006	0.042***	0.042***	0.021**
	(5.59)	(0.30)	(0.19)	(-1.73)	(-0.24)	(4.55)	(4.51)	(2.32)
Ln(*Audit Hours*)	–	–	–	-8.345***	0.262***	–	–	–
				(-10.55)	(5.12)			
Client-specific Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT
R-squared	0.944	0.915	0.887	0.906	0.761	0.696	0.696	0.836
Observations	17,556	10,146	7,132	17,549	14,296	17,353	17,353	17,405

(Continued)

TABLE 4—*Continued*

Panel C: Year-by-Year Analysis of Audit Fees and Audit (Partner) Hours

	(1)	(2)	(3)	(4)	(5)
	Engagement Partner				Review Partner
Dependent Variable:	Ln(*Audit Fees*)	Ln(*Audit Hours*)	Ln(*Partner Hours*$_{2008/11}$)	Ln(*Partner Hours*$_{2012/14}$)	Ln(*Review Partner Hours*)
Tenure Year Indicators:					
Tenure Year 1	-0.014***	0.022***	0.034***	0.028**	0.043***
	(-3.37)	(4.01)	(3.01)	(2.23)	(4.57)
Tenure Year 2	-0.004	0.009**	0.006	0.014	0.016*
	(-1.04)	(2.04)	(0.58)	(1.28)	(1.95)
Tenure Year 3 (baseline)	–	–	–	–	–
Tenure Year 4	0.008	-0.006	0.000	-0.047***	-0.013
	(1.91)	(-1.05)	(0.03)	(-4.17)	(-1.41)
Tenure Year 5	0.007	0.003	0.025*	-0.168***	-0.080***
	(1.51)	(0.54)	(1.90)	(-11.03)	(-6.15)
Audit- and Client-specific Variables	Yes	Yes	Yes	Yes	Yes
Fixed Effects	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT
R-squared	0.978	0.944	0.916	0.888	0.696
Observations	17,506	17,556	10,146	7,132	17,353

The table reports analyses of the relation between engagement (review) partner tenure and several measures of audit economics such as audit prices, hours, and profitability. We proxy for the economics of the auditing process for client *i* in year *t* using *Audit Fees* in Panel A, and various measures of *Audit Hours* that the (review) partner spends on the engagement, *Non-Audit Fees*, or *Billing Realization* in Panel B. In Panel C, we report year-by-year analyses of the evolution of audit price and hours over the partner tenure cycle. Our variable of interest, (*Review*) *Partner Tenure*, reflects the number of consecutive years that the audit partner manages the engagement (spends reviewing the audit engagement), and ranges from 1 to 5. In Panel C, we use five separate indicators marking the years 1 through 5 of the tenure cycle instead. *Tenure Year 3* serves as base period and lacks a coefficient estimate. For all variable definitions see Appendix A. Depending on the specification, we include (but do not report) fixed effects for a client's 2-digit SIC industry (I), individual clients (C), fiscal years (Y), and the number of consecutive years the client is with the same audit firm (*Audit Firm Tenure Year,* AT). In Panels B and C, we include the respective audit-specific variables and all the client-specific control variables from *Market Value* through *Foreign Sales* in the model (see Panel A), but do not report the coefficients. We use the natural log of the raw values and lag the variables by one year if indicated. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on robust standard errors clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed).

TABLE 5

Audit Economics and Competition Among Audit Firms

Dependent Variables:	(1) Ln(*Audit Fees*)	(2) Ln(*Audit Hours*)	(3) Ln(*Audit Fees*) High Competition	(4) Ln(*Audit Fees*) Low Competition	(5) Ln(*Audit Hours*) High Competition	(6) Ln(*Audit Hours*) Low Competition
Audit Tenure Variables:						
High Competition	-0.020**	0.000	–	–	–	–
	(-2.17)	(0.02)				
High Competition × *Partner Tenure*	0.006***	-0.002	–	–	–	–
	(2.99)	(-0.85)				
Partner Tenure	0.003*	-0.005**	–	–	–	–
	(1.92)	(-2.40)				
Tenure Year 1	–	–	-0.016***	-0.006	0.028***	0.017**
			(-2.69)	(-1.07)	(3.70)	(2.14)
Tenure Year 2, 3 (baseline), *and 4*	–	–	Yes	Yes	Yes	Yes
Tenure Year 5	–	–	0.009	0.004	0.002	0.001
			(1.42)	(0.56)	(0.22)	(0.13)
Audit- and Client-specific Variables	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT
R-squared	0.978	0.944	0.979	0.979	0.947	0.949
Observations	17,505	17,555	8,472	8,680	8,492	8,709

The table reports analyses of the partner tenure relation conditional on the level of competition among audit firms in the city of the signing partner's office. We use *Audit Fees* and *Audit Hours* as the dependent variables. *High Competition* is a binary indicator equal to '1' in year *t* if the competition in the signing city is below the variable median of the *Competition Index*, and '0' otherwise. We interact the *High Competition* variable with *Partner Tenure* in models (1) and (2), and run the analyses separately for high versus low competition with the individual partner tenure cycle indicators in models (3) to (6). For all variable definitions see Appendix A. We include (but do not report) fixed effects for individual clients (C), fiscal years (Y), and the number of consecutive years the client is with the same audit firm (*Audit Firm Tenure Year,* AT). We include the respective audit-specific variables and all the client-specific control variables from *Market Value* through *Foreign Sales* from Table 4 in the model (as well as *Tenure Year 2* and *4* in the sub-sample analyses), but do not report the coefficients. We use the natural log of the raw values if indicated. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on robust standard errors clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed).

TABLE 6

Audit Economics and Partner Experience/Client Size

Dependent Variables:	(1)	(2)	(3)	(4)	(5)	(6)
	Ln(*Partner Hours*$_{2012/14}$)		Ln(*Partner Hours*$_{2008/11}$)		Ln(*Partner Hours*$_{2012/14}$)	
	Newer Partners	Experienced Partners	Big Clients	Small Clients	Big Clients	Small Clients
Tenure Year Indicators:						
Tenure Year 1	0.051**	0.002	0.037**	0.032**	-0.001	0.055***
	(2.50)	(0.12)	(2.35)	(1.91)	(-0.04)	(2.90)
Tenure Year 2	0.023	0.006	0.004	0.010	0.015	0.017
	(1.39)	(0.35)	(0.28)	(0.65)	(0.99)	(1.07)
Tenure Year 3 (baseline)	–	–	–	–	–	–
Tenure Year 4	-0.083***	-0.028*	0.009	-0.022	-0.028*	-0.079***
	(-4.49)	(-1.76)	(0.58)	(-1.28)	(-1.89)	(-4.41)
Tenure Year 5	-0.200***	-0.138***	0.038**	0.005	-0.172***	-0.171***
	(-7.60)	(-6.16)	(2.05)	(0.25)	(-8.70)	(-6.88)
Audit- and Client-specific Variables	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT
R-squared	0.892	0.922	0.910	0.835	0.874	0.840
Observations	3,304	2,968	5,053	4,916	3,591	3,374

The table reports analyses of the partner tenure relation conditional on partner experience and client size. We use *Partner Hours* as the dependent variable. Our variables of interest are the individual partner tenure cycle indicators (*Tenure Year 3* serves as base period). For all variable definitions see Appendix A. We run the partner hour regressions separately for (i) newer versus experienced audit engagement partners based on the years since they were granted partnership (*Partner Experience*), and (ii) big versus small audit clients based on total assets. In both cases, we split the sample by the variable median. We include (but do not report) fixed effects for individual clients (C), fiscal years (Y), and the number of consecutive years the client is with the same audit firm (*Audit Firm Tenure Year,* AT). We include the respective audit-specific variables and all the client-specific control variables from *Market Value* through *Foreign Sales* from Table 4 in the model, but do not report the coefficients. We use the natural log of the raw values if indicated. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on robust standard errors clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed).

TABLE 7

Audit Economics and Quality Around Audit Firm Switches and Audit Team Rotations

Panel A: Audit Firm Switches

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Proxies for Audit Economics				Proxies for Audit Quality			
Dependent Variables:	Ln(*Audit Fees*)	Ln(*Audit Hours*)	Ln(*Partner Hours*$_{2008/11}$)	Ln(*Partner Hours*$_{2012/14}$)	*Restated Financials*	*Announced Restate-ments*	*404b Opinion with MCW*	*PCAOB Inspection Finding*
Audit Tenure Variables:								
Audit Firm Switch Cycle	-0.187***	0.103***	-0.072	0.045	-0.036	0.000	0.047**	0.200***
	(-7.98)	(3.15)	(-0.91)	(0.77)	(-1.05)	(0.01)	(2.11)	(2.74)
Audit Firm Switch Cycle × PT	0.028***	-0.016*	0.013	-0.021	0.003	-0.003	-0.009	-0.056*
	(4.47)	(-1.87)	(0.69)	(-1.31)	(0.31)	(-0.41)	(-1.43)	(1.92)
Partner Tenure (PT)	0.005***	-0.006***	-0.004	-0.041***	-0.001	-0.004***	-0.000	0.013
	(5.02)	(-4.63)	(-1.53)	(-10.74)	(-0.32)	(-3.06)	(-0.18)	(1.42)
Audit- and Client-specific Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	C, Y	C, Y	C, Y	C, Y	C, Y	C, Y	C, Y	A, Y
R-squared	0.978	0.943	0.915	0.886	0.501	0.218	0.285	0.086
Observations	17,507	17,557	10,148	7,129	17,597	17,590	16,384	1,551

Panel B: Audit Team Rotations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Proxies for Audit Economics				Proxies for Audit Quality			
Dependent Variables:	Ln(*Audit Fees*)	Ln(*Audit Hours*)	Ln(*Partner Hours*$_{2008/11}$)	Ln(*Partner Hours*$_{2012/14}$)	*Restated Financials*	*Announced Restate-ments*	*404b Opinion with MCW*	*PCAOB Inspection Finding*
Audit Tenure Variables:								
Audit Team Rotation Cycle	-0.016*	0.018	0.040*	-0.010	0.022	0.026**	0.018**	0.013
	(-1.90)	(1.47)	(1.79)	(-0.29)	(1.58)	(2.44)	(2.35)	(0.22)
Audit Team Rotation Cycle × PT	0.004	-0.006	-0.013*	0.012	-0.005	-0.005	-0.007***	0.004
	(1.59)	(-1.64)	(-1.90)	(1.20)	(-1.12)	(-1.12)	(-2.79)	(0.16)
Partner Tenure (PT)	0.005***	-0.005***	0.000	-0.044***	0.000	-0.003**	0.001	0.004
	(4.16)	(-3.02)	(0.08)	(-10.66)	(0.05)	(-2.17)	(1.01)	(0.44)
Audit- and Client-specific Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	A, Y, AT
R-squared	0.978	0.944	0.916	0.887	0.504	0.220	0.293	0.099
Observations	17,362	17,411	10,018	7,108	17,504	17,497	16,307	1,537

(Continued)

TABLE 7—*Continued*

The table reports analyses of the partner tenure relation conditional on the audit firm switching or the audit team (i.e., both engagement partner and review partner) rotating. We use various proxies of audit economics and quality as the dependent variables. In Panel A (Panel B), *Audit Firm Switch Cycle* (*Audit Team Rotation Cycle*) is a binary indicator equal to '1' over the entire initial partner rotation cycle under the new audit firm (when both the engagement and review partner rotate to a new client). We interact the *Audit Firm Switch Cycle* (*Audit Team Rotation Cycle*) variable with *Partner Tenure* (*PT*) in the respective models. For all variable definitions see Appendix A. We include (but do not report) fixed effects for individual clients (C), audit firms (A), fiscal years (Y), and the number of consecutive years the client is with the same audit firm (*Audit Firm Tenure Year,* AT). We include the respective audit-specific variables and all the client-specific control variables from *Market Value* through *Foreign Sales* (*Cash Flow Volatility*) from Table 4 (Table 3) in the audit economics (quality) models, but do not report the coefficients. We use the natural log of the raw values if indicated. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on robust standard errors clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed).

TABLE 8

Audit Economics and Quality Around Non-Mandatory Rotations of Engagement Partners (< 5-Year)

Panel A: Average (Incremental) Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Proxies for Audit Economics				Proxies for Audit Quality			
Dependent Variables:	Ln(*Audit Fees*)	Ln(*Audit Hours*)	Ln(*Partner Hours*$_{2008/11}$)	Ln(*Partner Hours*$_{2012/14}$)	*Restated Financials*	*Announced Restate-ments*	*404b Opinion with MCW*	*PCAOB Inspection Finding*
Audit Tenure Variables:								
Year before Non-Mandatory Rotation	0.001	0.011	0.025	-0.089***	0.025**	0.015*	0.009	0.051
	(0.08)	(1.26)	(1.49)	(-3.29)	(2.29)	(1.93)	(1.46)	(1.13)
Year after Non-Mandatory Rotation	-0.006	0.029***	0.026	0.009	0.008	0.006	0.003	0.000
	(-0.88)	(3.05)	(1.20)	(0.41)	(0.72)	(0.65)	(0.42)	(0.01)
Year before Audit Firm Switch	0.018	0.082***	0.170***	0.050	0.043**	0.045***	0.068***	0.088
	(1.18)	(4.35)	(3.60)	(1.54)	(2.09)	(2.64)	(3.77)	(1.06)
Tenure Year 1	-0.012***	0.015***	0.030**	0.014	0.007	0.014**	0.013***	-0.037
	(-2.79)	(2.61)	(2.49)	(1.00)	(0.90)	(2.30)	(3.13)	(-0.93)
Tenure Year 2, 3 (baseline), *4 and 5*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Audit- and Client-specific Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	A, Y, AT
R-squared	0.978	0.945	0.916	0.890	0.502	0.222	0.295	0.104
Observations	17,517	17,567	10,147	7,145	17,660	17,653	16,441	1,560

Panel B: Distinction between Explainable and Unexplained Non-Mandatory Rotations

Audit Tenure Variables:								
Year before Non-Mandatory Rotation$_{expl}$	0.001	0.025*	0.010	-0.116***	0.021	0.007	0.013	-0.067
	(0.09)	(1.83)	(0.34)	(-3.22)	(1.14)	(0.46)	(1.28)	(-0.80)
Year before Non-Mandatory Rotation$_{unexpl}$	0.000	0.006	0.030	-0.076**	0.026**	0.018**	0.007	0.092*
	(0.05)	(0.62)	(1.61)	(-2.22)	(2.18)	(2.09)	(1.04)	(1.80)
Other Audit Tenure Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Audit- and Client-specific Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT	A, Y, AT
R-squared	0.978	0.945	0.916	0.890	0.502	0.222	0.295	0.105
Observations	17,517	17,567	10,147	7,145	17,660	17,653	16,441	1,560

(Continued)

TABLE 8—*Continued*

Panel C: Different PCAOB Inspection Outcomes for Explainable and Unexplained Non-Mandatory Rotations

Dependent Variables:	(1) *Part I Finding* (*PCAOB Inspection Finding*)	(2) *Part II Finding*	(3) Ln(1 + # *Part I Findings* + # *Part II Findings*)	(4) *Severe Inspection Finding*	(5) *Non-Severe Inspection Finding*
Audit Tenure Variables:					
Year before Non-Mandatory Rotation$_{expl}$	-0.067	-0.105	-0.071	0.003	-0.083
	(-0.80)	(-1.19)	(-0.40)	(0.04)	(-1.09)
Year before Non-Mandatory Rotation$_{unexpl}$	0.092*	0.057	0.179*	0.139***	-0.060
	(1.80)	(1.11)	(1.71)	(2.82)	(-1.28)
Other Audit Tenure Variables	Yes	Yes	Yes	Yes	Yes
Audit- and Client-specific Variables	Yes	Yes	Yes	Yes	Yes
Fixed Effects	A, Y, AT	A, Y, AT	A, Y, AT	A, Y, AT	A, Y, AT
R-squared	0.105	0.078	0.089	0.084	0.091
Observations	1,560	1,560	1,560	1,560	1,560

The table reports analyses of the partner tenure relation surrounding non-mandatory rotations of the engagement partner within the same audit firm. We use various proxies of audit economics and quality as the dependent variables. *Year before Non-Mandatory Rotation* (*Year after Non-Mandatory Rotation*) is a binary indicator equal to '1' marking the final year on the engagement before the partner leaves (first year after the partner has left) short of the regular 5-year rotation cycle (i.e., during years one through four of her tenure). *Year before Audit Firm Switch* marks the final year on the engagement before the client hires a new audit firm. *Tenure Year 1* represents the first year of each partner tenure cycle (i.e., the *Year after Non-Mandatory Rotation* variable measures the incremental effect for the new partner in the first year). In Panels B and C, we partition the *Year before Non-Mandatory Rotation* indicator into *Explainable* (*expl*) and *Unexplained* (*unexpl*) rotations. *Explainable* rotations include retirements, promotions, office switches, and temporary leaves. In Panel C, we distinguish between different types of inspection findings. We classify an inspection finding as *Severe* if the PCAOB inspection determines that the financial statement and internal control opinions are not supported or the client has a likely departure from GAAP. See footnote 26. For all variable definitions see Appendix A. We include (but do not report) the individual *Tenure Year 2* to *5* indicators as well as fixed effects for individual clients (C), audit firms (A), fiscal years (Y), and the number of consecutive years the client is with the same audit firm (*Audit Firm Tenure Year,* AT). We include the respective audit-specific variables and all the client-specific control variables from *Market Value* through *Foreign Sales* (*Cash Flow Volatility*) from Table 4 (Table 3) in the audit economics (quality) models, but do not report the coefficients. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on robust standard errors clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed).

APPENDIX A
Variable Definitions

Panel A: Variables of Interest

Variable Name	Definition
Partner Tenure (years)	The ordered variable reflects the number of consecutive years that the audit partner manages the engagement, and ranges from 1 to 5. We determine a partner's tenure cycle based on (i) the disclosed tenure information from the audit firm, and (ii) the observed partner history in the data following a switch in engagements. If information is missing, we assume a partner rotation after year 5. Data source: proprietary data submitted to the PCAOB.
Review Partner Tenure (years)	Measured the same way as *Partner Tenure*, but with regard to the partner that reviews the audit engagement. Data source: proprietary data submitted to the PCAOB.
Tenure Year 1 through *Tenure Year 5* (indicator)	A set of five indicator variables marking the years 1 through 5 of the tenure cycle that the (review) partner manages (spends reviewing) the audit engagement. That is, the indicator is set equal to '1' in the respective year of the tenure cycle based on the variables *Partner Tenure* or *Review Partner Tenure*.

Panel B: Audit Quality Variables

Variable Name	Definition
Absolute Discretionary Accruals (% of assets)	The variable is equal to the absolute value of performance matched discretionary accruals following Kothari et al. (2005). For the performance matching, we subtract from the abnormal accruals of firm *i* in year *t* the value of the firm in the same 2-digit SIC industry with the closest return on assets (ROA). *Abnormal Accruals* are equal to actual accruals minus estimated accruals: *Abnormal Accruals* = (Net Income – Cash Flows from Operations)/Total Assets$_{t-1}$ – [α + β_1 × 1 / Total Assets$_{t-1}$ + β_2 × (Revenue – Revenue$_{t-1}$) / Total Assets$_{t-1}$ + β_3 × Gross Property, Plant, and Equipment / Total Assets$_{t-1}$]. We estimate the regression coefficients across all firms in year *t* and a 2-digit SIC industry following Jones (1991). We also refer to these variables as *Jones Model Regressors* in the tables. Data source: Compustat.
Absolute Accruals (% of assets)	The variable is equal to the absolute value of (Net Income – Cash Flows from Operations) / ((Total Assets$_t$ + Total Assets$_{t-1}$) / 2) of firm *i* in year *t*. Data source: Compustat.
Restated Financials (indicator)	We set the binary indicator equal to '1' in year *t* if subsequently the client's audited annual financial statements (10-K) for fiscal year *t* are restated, and '0' otherwise. We exclude quarterly restatements (except for the fourth quarter) when coding this variable. Data source: Audit Analytics.
Announced Restatements (indicator)	We set the binary indicator equal to '1' in year *t* if a restatement of prior (*t*-1, *t*-2, *t*-3, etc.) audited annual financial statements is announced between the filing of the prior year's 10-K$_{t-1}$ and the filing of the current year's 10-K$_t$, and '0' otherwise. Thus, compared to the previous variable, this definition results in a subsequent fiscal year being coded as '1'. Data source: Audit Analytics.
Going Concern Opinion (indicator)	We set the binary indicator equal to '1' in year *t* if there is a modified auditor opinion expressing uncertainty about the client's ability to continue as a going concern in the annual financial statements for fiscal year *t*, and '0' otherwise. Data source: Audit Analytics.
404b Opinion with MCW (indicator)	We set the binary indicator equal to '1' in year *t* if the auditor finds or agrees with the client's assertion that internal controls over financial reporting exhibit some material control weaknesses (MCW), or qualifies or disclaims the client's internal control opinion for fiscal year *t*, and '0' otherwise. MCW is defined by PCAOB auditing standard 2201 (pre-codified AS5). Data source: Audit Analytics.

Variable Name	Definition
F-Score (Dechow et al.)	Following Dechow, Ge, Larson, and Sloan (2011), Table 7, Panel A, we compute the client's risk of committing reporting fraud in fiscal year *t* as: $[e^{(\text{Predicted Value})} / (1 + e^{(\text{Predicted Value})})] \times 1 / 0.0037,$ where we derive the *Predicted Value* from a logit model equal to: -7.893 + 0.790 × (Accruals / Average Total Assets) + 2.518 × (Receivable Changes / Average Total Assets) + 1.191 × (Inventory Changes / Average Total Assets) + 1.979 × (Soft Assets / Total Assets) + 0.171 × Cash Sales Growth + (-0.932) × Return on Asset Changes + 1.029 × Stock or Debt Issue Indicator. Higher values indicate higher probabilities of misstatements. Data source: Compustat.
M-Score (Beneish)	Following Beneish (1999), Table 3, Panel A, we compute the client's probability of earnings manipulation in fiscal year *t* as: -4.480 + 0.920 × Receivable Growth + 0.528 × Inverse Growth Margin Growth + 0.404 × Soft Asset Growth + 0.892 × Revenue Growth + 0.115 × Inverse Depreciation Rate Growth + (-0.172) × SG&A Expense Growth + (-0.327) × Leverage Growth + 4.679 × (Accruals / Average Total Assets). Higher values indicate higher probabilities of earnings manipulation. Data source: Compustat.
PCAOB Inspection Finding also called: *Part I Finding* (indicator)	We set the binary indicator equal to '1' in year *t* if the PCAOB inspections of clients' audits of fiscal year *t* resulted in any Part 1 findings (i.e. disclosed anonymously in the audit firm's publicly available inspection report), and '0' otherwise. The PCAOB inspection will include a Part 1 finding when the work performed by the auditor does not support the opinion. This variable is only coded for client-years that were subject to PCAOB inspections. In some analyses, we are also using the log of the number of Part I findings (plus 1) as dependent variable. Data source: proprietary data generated by the PCAOB.
Part II Finding (indicator)	We set the binary indicator equal to '1' in year *t* if the PCAOB inspections of clients' audits of fiscal year *t* resulted in any findings that contributed to the content of an audit firm's Part II report (i.e., describing deficiencies of the audit firm's overall system of quality control), and '0' otherwise. This variable is only coded for client-years that were subject to PCAOB inspections. In some analyses, we are also using the log of the number of Part II findings (plus 1) as dependent variable. Data source: proprietary data generated by the PCAOB.
Severe (Non-Severe) Inspection Finding (indicator)	See footnote 26. We set the *Severe Inspection Finding* binary indicator to '1' in year *t* if the PCAOB concludes from the inspection that (i) both financial statements and internal controls opinions were unsupported by the audit work *or* (ii) the client firm had likely GAAP deficiencies that could result in material misstatements in years not inspected by the PCAOB. The *Non-Severe Inspection Finding* indicator equals '1' for any other inspection finding. This variable is only coded for client-years that were subject to PCAOB inspections. Data source: proprietary data generated by the PCAOB.
Audit Firm Inspection Finding (indicator)	We set the binary indicator equal to '1' in year *t* if an audit firm's internal inspections resulted in some type of finding, and '0' otherwise. Audit firms review audits internally and report the results, that is, no finding, minor finding(s) (e.g., add additional documentation), and major finding(s) (e.g., failed to perform sufficient audit work) to the PCAOB. This variable is only coded for client-years that were subject to audit firms' internal inspections. Data source: proprietary data submitted to the PCAOB.

Panel C: Audit-specific Variables

Variable Name	Definition
Audit Fees ($ thousand)	Total fees for auditing (*MATCHFY_SUM_AUDFEES*) and audit related activities (*MATCHFY_SUM_AUDREL_FEES*) paid by client *i* in year *t*. Data source: Audit Analytics.
Non-Audit Fees ($ thousand)	We interpret non-audit fees as total fees (*MATCHFY_SUM_TOTAL*) minus those for auditing and audit related activities (see *Audit Fees* above) paid by client *i* in year *t*. Data source: Audit Analytics.
Audit Hours (hours)	Total number of auditing hours, including both staff and partner hours, performed for client *i* in year *t*. Data source: proprietary data submitted to the PCAOB.
Partner Hours$_{2008/14}$ *Partner Hours*$_{2008/11}$ *Partner Hours*$_{2012/14}$ (hours)	Total hours the engagement partner performed for client *i* in year *t*. The measurement of this variable changed over the sample period. From 2008 to 2011, the measure reflects all partner hours performed for the client (i.e., engagement partner, review partner, IT partner, tax partner, specialist partner, etc.). From 2012 to 2014, the measure reflects only the engagement partner hours performed for the client. In certain analyses, we use the pooled measure while in others we analyze the sub-periods separately (as indicated by the subscript). Data source: proprietary data submitted to the PCAOB.
Review Partner Hours (hours)	Total hours the review partner performed reviewing the engagement partner's work for client *i* in year *t*. Data source: proprietary data submitted to the PCAOB.
Billing Realization (percentage)	Audit fees divided by the "sticker price" of the audit performed for client *i* in year *t*. The sticker price of an audit is the sum of the billing rate for all staff (including the partner) multiplied by the total hours that all staff (including the partner) spent on the engagement. For instance, a *Billing Realization* of 40 indicates that with a staff (partner) bill rate of $300 ($800) per hour, the final, negotiated audit fee results in the audit firm receiving an average of $120 ($320) per actual staff (partner) hour. Data source: proprietary data submitted to the PCAOB.
Client Risk Rating (score)	The variable is the normalized version of the risk rating that the audit firms assign to client *i* in year *t*, and ranges from 1 to 5. Each audit firm has its own rating system. To make risk ratings comparable, we normalize them by dividing them into rank ordered quintiles per audit firm. Higher values indicate higher perceived audit risks. Data source: proprietary data submitted to the PCAOB.
High Client Risk (indicator)	We set the binary indicator equal to '1' in year *t* if the *Client Risk Rating* variable equals 4 or 5, and '0' otherwise.
Partner Experience (years)	We compute a partner's experience in year *t* as the calendar year *t* minus the year she was granted partnership at the firm. Data source: the year of partnership is proprietary data submitted to the PCAOB.
Competition Index (%)	We compute the Herfindahl index (i.e., sum of squared market shares) using the *Audit Hours* performed by an individual audit firm in year *t* as percent of the total *Audit Hours* performed by all audit firms in a signing city (i.e., the location of the signing partner's office) in year *t* as our proxy of market share. Higher values indicate less market competition in a city. Data source: proprietary data submitted to the PCAOB.
Audit Firm Switch *Audit Firm Switch Cycle* (indicator)	We set the binary indicator equal to '1' in year *t* if the signing audit firm changes in year *t*+1, and '0' otherwise. For *Audit Firm Switch Cycle* we code the entire initial partner cycle (i.e., years *t*+1 up to *t*+5) as '1' following an *Audit Firm Switch*. Data source: the audit firm identifier (AUDITOR_FKEY) in Audit Analytics and proprietary data submitted to the PCAOB.
Audit Team Rotation Cycle (indicator)	We set the binary indicator equal to '1' over the entire partner cycle (i.e., years *t*+1 up to *t*+5) if both the engagement partner and the engagement review partner have moved together to client *i* in year *t*+1 and stay on the same engagement (i.e. *Partner Tenure* equals *Review Partner Tenure* up to year *t*+5), and '0' otherwise. Data source: proprietary data submitted to the PCAOB.

Variable Name	Definition
Year before Non-Mandatory Rotation *Year before Non-Mandatory Rotation*$_{expl}$ *Year before Non-Mandatory Rotation*$_{unexpl}$ (indicator)	We set the binary indicator equal to '1' in year *t* marking the final year on the engagement before the partner leaves short of the regular 5-year rotation cycle (i.e., during years one through four of her tenure), and '0' otherwise. In some analyses, we partition this variable into two groups: years before explainable non-mandatory rotations (as indicated by the subscript *expl*) and unexplained non-mandatory rotations (*unexpl*). We identify explainable rotations as years in which the partner either (i) drops from the dataset after more than 10 years, (ii) has a title change to a higher position or leadership role, (iii) switches location to a different office, (iv) leaves, but rotates back after one or two years, or (v) fills in for one or two years for another partner who subsequently rotates back. Data source: proprietary data submitted to the PCAOB.
Year after Non-Mandatory Rotation (indicator)	We set the binary indicator equal to '1' in year *t* marking the first year on the engagement after the previous partner has left short of the regular 5-year rotation cycle (i.e., during years one through four of her tenure), and '0' otherwise. This variable identifies a subset of *Tenure Year 1* = 1 observations. Data source: proprietary data submitted to the PCAOB.
Year before Audit Firm Switch (indicator)	We set the binary indicator equal to '1' in year *t* if the client firm switches its audit firm in the next year. Data source: Audit Analytics.

Panel D: Client-specific Variables[*]

Variable Name	Definition
Market Value ($ million)	Share price at fiscal year-end *t* (PRCC_F) multiplied by the number of total shares outstanding (CSHO).
Leverage (ratio)	Total Long Term Debt (DLC + DLTT) / ((Total Assets (AT) + Total Assets$_{t-1}$) / 2).
Return on Assets (ratio)	Income before Extraordinary Items (IB) / ((Total Assets (AT) + Total Assets$_{t-1}$) / 2).
Loss Firm (indicator)	We set the binary indicator equal to '1' in year *t* if Income before Extraordinary Items (IB) is negative, and '0' otherwise.
Cash Flow from Operations (ratio)	Cash Flows from Operations (OANCF) / ((Total Assets (AT) + Total Assets$_{t-1}$) / 2).
Book-to-Market (ratio)	Total Common Equity (CEQ) / *Market Value*.
Altman Z-Score	Following Altman (1968) and Altman and Hotchkiss (2005, p. 246), we compute the client's risk of bankruptcy in fiscal year *t* as: 0.717 × (Working Capital / Total Assets) + 0.874 × (Retained Earnings / Total Assets) + 3.107 × (Operating Income / Total Assets) + 0.420 × (Total Common Equity / Total Liabilities) + 0.998 × (Revenue / Total Assets), with Working Capital = (ACT – LCT), Total Assets = AT, Retained Earnings = RE, Operating Income = OIADP, Total Common Equity = CEQ, Total Liabilities = LT, and Revenue = REVT. Higher values indicate higher risk of bankruptcy.
Sales Growth (%)	(Revenue (REVT) – Revenue$_{t-1}$) / Revenue$_{t-1}$.
Cash Flow Volatility ($ million)	Standard deviation of Cash Flows from Operations (OANCF) over the four years *t* to *t*-3. We require at least three years of data for the computation of this variable.
Receivables Turnover (ratio)	Revenue (REVT) / ((Total Receivables (RECT) + Total Receivables$_{t-1}$) / 2).
Payables Turnover (ratio)	Cost of Goods Sold (COGS) / ((Total Payables (AP) + Total Payables$_{t-1}$) / 2).
Restructuring Firm (indicator)	We set the binary indicator equal to '1' in year *t* if Discontinued Operations (DO) or Restructuring Expense (RCP) is non-zero, and '0' otherwise.
M&A Firm (indicator)	We set the binary indicator equal to '1' in year *t* if Acquisition Cash Flows (AQC) is positive, and '0' otherwise.
Current-to-Total Assets (ratio)	Current Assets (ACT) / Total Assets (AT).

Variable Name	Definition
Reporting Lag (days)	Number of days between the end of the fiscal year *t* of client *i* and the date the audit firm signs the audit opinion. Data source: Audit Analytics.
# Business Segments (number)	Number of operating business segments as reported in the segment database. We count the number of unique segment identifiers (SID) if the segment type is equal to business segments (STYPE = "BUSSEG"). We assume a value of one if data is missing.
Foreign Sales (%)	Foreign Sales / Total Sales (REVT). We determine Foreign Sales as the sum of SALES if the segment type is geographic (STYPE = "GEOSEG") and the geographic segment type is nondomestic (GEOTP = "3"). We assume a value of zero if data is missing.
December Firm (indicator)	We set the binary indicator equal to '1' in year *t* if client *i*'s fiscal year ends in December (FYR="12"), and '0' otherwise.

[*] All price and accounting data are from Compustat (we indicate Compustat variable names in parentheses). We measure the data at the end of fiscal year *t* of client *i*, if not indicated otherwise.

APPENDIX B
Additional Analyses

This appendix provides descriptive information and supplemental robustness analyses. In Section 1, we report the full models from Table 4, Panel B, in which we examine the economics of partner tenure using audit process variables. As many of the dependent variables have not been available for a broad sample of U.S. audits, we provide a short discussion of the associations we observe for these outcomes with the control variables. In Section 2, we report descriptive statistics on rotations after a cooling-off period. These statistics provide robustness checks on our classification of mandatory and non-mandatory rotations in the main analyses.

B1. Tabulation of full model for audit economics proxies (Table 4, Panel B)

To conserve space, we only report the main variables of interest in Table 4, Panel B, of the study. Because many of these audit process variables are not widely available for a sample of U.S. listed firms, we repeat these analyses but tabulate the full set of controls for select models in Table B1. The specifications include client, year, and audit-firm tenure-fixed effects, and we assess the statistical significance of the OLS coefficient estimates using robust standard errors clustered by client.

In Panel A, we report results for *Audit Hours*, total *Partner Hours*$_{2008/11}$, actual lead *Partner Hours*$_{2012/14}$, and *Review Partner Hours* as dependent variables. Aside from the audit-specific variables already reported in Table 4, Panel B, we list the coefficient estimates for all the client-specific controls (see Appendix A for definitions). Many variables are significant and exhibit the expected sign. Larger firms with more risk (as shown, e.g., by higher leverage ratios, the incurrence of a loss, or higher cash flow volatility), higher complexity (i.e., more business segments), a larger asset base (higher book-to-market ratios), higher realized sales growth, and more absolute accruals require additional (review partner) hours to complete the audit. More

profitable firms (return on assets) with higher cash flows from operations and more current assets to total assets require fewer (review partner) hours to complete the audit. The positive relation for a client's reporting lag is likely endogenous (i.e., when auditors need more time, the opinion signing is delayed). The lagged *Return on Assets*, *Altman Z-Score,* and *Foreign Sales* variables are not related to audit (partner) hours. We further note that the *Client Risk Rating* variable is positively related to audit hours and review partner hours, consistent with clients that were perceived as higher risk by the audit firm requiring more time. The magnitude of this coefficient is largely attenuated when we move from a specification with industry fixed effects (not tabulated) to client fixed effects, indicating that a portion of the client risk rating is likely persistent. The risk rating variable is only positively related to partner hours when we include industry (instead of client) fixed effects (not tabulated).

In Panel B, we focus on *Billing Realization*, that is, the relation between actual audit fees and the "sticker price" for the services provided. Importantly, the fee regressions combined with the audit hour results (or a fee regression controlling for audit hours) does not necessarily yield the same inferences as the analysis of billing realization. It is plausible that audit firms take actions to maintain consistent audit profitability amid changing hours and fees over the tenure cycle. For instance, an audit firm could substitute lower ranked audit staff into client service when that client negotiates lower audit fees. Similarly, audit firms could reallocate work away from senior managers and managers (i.e. higher ranks) to seniors and associates (i.e. lower ranks) when a client requires additional audit hours. In those cases, one could observe lower fees and/or higher hours, but no changes in audit profitability. As the results in Panel B show, most of the client-specific control variables are insignificant in a specification including client fixed effects. Only the coefficients on size, book-to-market, current-to-total assets, and the number of business

segments significantly load. At the same time, the explanatory power of the model is high with an R-squared of 91 percent (up from 15 percent in a model with only industry fixed effects; not tabulated). Audit firms have much lower billing realization on risky clients, as measured by the *Client Risk Rating* variable. In column (2), we report a model with the year fixed effects interacted with fixed effects for each audit firm. Audit firms use different bill rates, that is, different denominators, by year. Due to this unobservable, mechanical variation, we want to make sure that our results are robust to controls that remove the impact of the yearly changes in *Billing Realization*. The effect of *Partner Tenure* on billing realization is only slightly attenuated by the inclusion of the additional fixed effects.

B2. Descriptive statistics on non-mandatory rotations of engagement partners

In this section, we discuss in more detail rotation practices that audit firms use to reduce the disruption for the client by rotating partners back to the same client or alternating assignments between lead and review partners. First, technically, an audit firm can return a partner to the same client after a five-year cool off period (17 C.F.R. § 210.2-01(c)(6) and SEC 33-8183). Our data series covers seven years. Thus, we can only observe such instances if a partner audits the client in 2008, departs in 2009, and returns to the same client for the 2014 audit. We find 46 such cases out of the 658 within-firm (mandatory and non-mandatory) rotations in 2008 (see Table 1, Panel B). This rate of 7 percent seems low if there were substantial benefits to relationship continuity from partner returns.

Second, an audit firm might rotate a partner off after fewer than five years to avoid the five-year cool off period.[1] We observe 22 cases in which a partner returns to the same client with

[1] The rule, 17 C.F.R. § 210.2-01(c)(6), states, "An accountant is not independent of an audit client when any audit partner within the five consecutive year period following the performance of services [for five consecutive years as lead or concurring partner] performs for that audit client the services of a lead […] or concurring partner."

a cool-off period of less than five years. In 16 cases, the cool-off period was one year; however, the audit firms appear to count these off years "as if" the partner remained on the client for tenure limit purposes.[2] As an example, in one case the lead partner rotates off after three years, is replaced by the review partner for a single year, and then returns to the engagement as lead partner for another year or two. Overall, the incidence of such cases is relatively sparse, implying that the number of non-mandatory rotations in Tables 1 and 8 are unlikely to be inflated by abbreviated tenure cycles to avoid the five-year cool off period.

Finally, an audit firm could use a review partner assignment to prepare a partner for the lead position or, the other way around, the audit firm might rotate a lead partner into a review partner position to monitor and support the new incoming lead partner. Years in either position account towards the combined five-year limit.[3] Potential other reasons for these role reversals include client incentives to ensure consistency or temporal unavailability of the lead partner (e.g., due to maternity/paternity leave, sickness, sabbatical, or career development) that requires the audit firm to ask the review partner to substitute during the absence. These types of role switches could affect our analyses in two ways. First, the switches could add noise to how we measure non-mandatory rotations. A partner who switches roles ends up with a shorter than five-year tenure as lead or review partner. If we are unable to observe the reversal of roles, we will classify the switch as non-mandatory rotation. Additionally, the years spent in the new role will also be less than five but likely mark the end of the term limit and, hence, a mandatory rotation. We try

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Simply, if a partner is lead or review for five years, the cool off must last five years. If a partner is lead or review for less than five years, she has to cool off for at least one year and then can return to the client as lead or review.

[2] For instance, we observe *no* cases in which the sum of the years before the cool off, the year of the cool off, and the years after the cool off on the same client exceeds the limit of five years.

[3] The rule, 17 C.F.R. § 210.2-01(c)(6), states, "An accountant is not independent of an audit client when any audit partner […] performs the services of a lead […] ***or*** concurring partner […] for more than five consecutive years" (***emphasis*** added).

to carefully account for these facts when we construct our variables.[4] Second, the switching of roles, if unrecognized, could lead us to classify the audit team as new while effectively the same audit team stays in place. We count 164 lead partners who at *any* time over our sample period also serve as review partners on 159 clients. The typical sequence is to start out as review partner before assuming a lead role (i.e., in 157 of the 164 cases). The 164 partners give rise to 596 client-year observations in which the partner serves either as lead or review partner *at the same client*. In 45 cases (225 client-years), the consecutive time spent as review or lead partner reaches the five-year limit.[5]

[4] When coding the variables *Year before Non-Mandatory Rotation* and *Year after Non-Mandatory Rotation*, we set them equal to '0' whenever we observe the exiting partner's five-year cycle in both the lead and review roles or if the partner began as review partner in 2008 or earlier. For coding *Audit Team Rotation Cycle*, we set this variable to '0' over the full cycle whenever we observe that the partners switch roles from the prior year.

[5] Due to the short time series, we are unable to determine in all cases if a partner serving both as lead and review partner completes her five years. Out of the 64 partners who switch roles and for whom we can observe the entire tenure cycle (i.e., partners beginning in 2009 or 2010), only 29, or 45 percent, complete the five-year cycle. We exclude partners beginning in 2008 from this count because we are often unable to determine how long they have served a client prior to that year.

TABLE B1

Tabulation of Full Models for Other Proxies for Audit Economics (Table 4, Panel B)

Panel A: Audit Hours and (Review) Partner Hours

Dependent Variables:	(1) Ln(*Audit Hours*)	(2) Ln(*Partner Hours*$_{2008/11}$)	(3) Ln(*Partner Hours*$_{2012/14}$)	(4) Ln(*Review Partner Hours*)
Audit-specific Variables:				
Partner Tenure	**-0.006*** **	**-0.004**	**-0.042*** **	–
	(-4.34)	**(-1.35)**	**(-11.13)**	
Review Partner Tenure	–	–	–	**-0.026*** **
				(-9.10)
Client Risk Rating	0.032***	0.003	0.003	0.042***
	(5.59)	(0.30)	(0.19)	(4.55)
Client-specific Variables:				
Ln(*Market Value*)	0.081***	0.046***	0.093***	0.056***
	(9.28)	(3.37)	(5.19)	(4.54)
Leverage	0.269***	0.246***	0.311***	0.172***
	(7.44)	(3.73)	(4.67)	(3.06)
Return on Assets	-0.112***	-0.051	-0.115	-0.159**
	(-2.74)	(-0.64)	(-1.30)	(-2.44)
Return on Assets$_{t-1}$	-0.023	0.003	0.002	-0.031
	(-0.91)	(0.06)	(0.03)	(-0.75)
Loss Firm	0.033***	0.024	0.014	0.019
	(3.99)	(1.63)	(0.74)	(1.43)
Cash Flow from Operations	-0.069	-0.096	-0.134	-0.112
	(-1.59)	(-1.24)	(-1.53)	(-1.57)
Book-to-Market	0.035***	0.019	0.077***	0.022*
	(2.95)	(1.23)	(3.44)	(1.68)
Altman Z-Score	0.003	0.005	0.004	0.003
	(0.66)	(0.72)	(0.50)	(0.36)
Sales Growth	0.026**	0.040**	0.014	0.008
	(2.50)	(2.19)	(0.74)	(0.66)
Ln(*Cash Flow Volatility*)	0.041***	0.022**	-0.016	0.012
	(7.35)	(2.24)	(-1.46)	(1.41)
Absolute Accruals	0.081*	0.155**	0.048	0.047
	(1.91)	(2.02)	(0.53)	(0.68)
Current-to-Total Assets	-0.384***	-0.290***	-0.346***	-0.255***
	(-9.07)	(-3.90)	(-3.68)	(-3.78)
Reporting Lag	0.005***	0.005***	0.007***	0.005***
	(8.87)	(6.27)	(7.30)	(7.21)
# Business Segments	0.029***	0.008	0.006	0.014*
	(4.50)	(0.57)	(0.57)	(1.89)
Foreign Sales	0.058	0.015	0.172	0.080
	(0.93)	(0.16)	(1.41)	(1.02)
Fixed Effects:				
Client (C), *Year* (Y), and *Audit Firm Tenure Year* (AT)	C, Y, AT	C, Y, AT	C, Y, AT	C, Y, AT
R-squared	0.944	0.915	0.887	0.696
Observations	17,556	10,146	7,132	17,353

(Continued)

TABLE B1—*Continued*

Panel B: Billing Realization

	(1)	(2)
Dependent Variable:	*Billing Realization*	
Audit-specific Variables:		
Partner Tenure	**0.414*****	**0.386*****
	(9.58)	**(9.92)**
Client Risk Rating	-0.316*	-0.377**
	(-1.73)	(-2.43)
Ln(*Audit Hours*)	-8.345***	-5.722***
	(-10.55)	(-8.08)
Client-specific Variables:		
Ln(*Market Value*)	1.229***	1.152***
	(5.22)	(5.88)
Leverage	1.725	1.909**
	(1.59)	(2.21)
Return on Assets	-1.343	-2.052**
	(-1.13)	(-2.02)
Return on Assets$_{t-1}$	-1.002	-1.067
	(-1.32)	(-1.55)
Loss Firm	0.425	0.084
	(1.62)	(0.39)
Cash Flow from Operations	0.881	1.504
	(0.70)	(1.41)
Book-to-Market	0.643**	0.420*
	(2.26)	(1.65)
Altman Z-Score	0.100	0.155
	(0.80)	(1.41)
Sales Growth	-0.306	-0.491**
	(-1.33)	(-2.38)
Ln(*Cash Flow Volatility*)	0.166	0.050
	(1.12)	(0.39)
Absolute Accruals	-0.339	-0.395
	(-0.28)	(-0.35)
Current-to-Total Assets	-2.918**	-1.756*
	(-2.29)	(-1.72)
Reporting Lag	0.018	0.034***
	(1.19)	(3.09)
# Business Segments	0.503***	0.338***
	(3.69)	(3.09)
Foreign Sales	-0.393	-1.250
	(-0.26)	(-0.96)
Fixed Effects:		
Client (C), *Year* (Y), *Audit Firm* (AF), and *Audit Firm Tenure Year* (AT)	C, Y, AT	C, Y × AF, AT
R-squared	0.906	0.930
Observations	17,549	17,549

(Continued)

TABLE B1—*Continued*

The table reports analyses of the relation between engagement (review) partner tenure and several measures of audit economics such as audit hours and profitability. We proxy for the economics of the auditing process for client *i* in year *t* using *Audit Hours*, *Partner Hours*, or *Review Partner Hours* in Panel A and *Billing Realization* in Panel B. Our variable of interest, (*Review*) *Partner Tenure*, reflects the number of consecutive years that the audit partner manages the engagement (spends reviewing the audit engagement), and ranges from 1 to 5. For all variable definitions see Appendix A. We include (but do not report) fixed effects for individual clients (C), fiscal years (Y), and the number of consecutive years the client is with the same audit firm (*Audit Firm Tenure Year,* AT). In model (2) of Panel B, we further interact the year fixed effects with fixed effects for each audit firm (AF). We use the natural log of the raw values and lag the variables by one year if indicated. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on robust standard errors clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed).