Professional Leave Report Cover Sheet

Name: Shu Lin

Department: Accountancy

College: Craig School of Business

Leave taken: ◉ Sabbatical ○ Difference in Pay ○ Professional Leave without Pay

Time Period: ◉ Fall 2022

○ Spring

○ Academic Year

○ Other

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**Sabbatical Report**

By Shu Lin
Department of Accountancy
Craig School of Business

## Section 1. Reporting on the Success of the Leave

I am delighted to report that I had a highly productive sabbatical leave in the fall semester of 2022. During this sabbatical, I worked closely with my co-authors to successfully revise and resubmit a research manuscript, which has since been conditionally accepted for publication in *Advances in Accounting*, a Category A journal on the Journal Quality List developed by the Australian Business School Deans' Council (ABDC). My contributions to the revision process can be found in the following documents attached to this report: (1) Response notes to the reviewer with my part highlighted in blue font, (2) Response notes to the editor with my part highlighted in blue font, and (3) Email notification of conditional acceptance from the editor.

The main goal of my sabbatical, as approved by the School Committee on Faculty and the Dean, was to create a high-quality research paper with the aim of publication in an A-level journal on the ABDC list. In the summer of 2022, I began working on the research project outlined in my sabbatical application, which investigates the change in financial reporting quality during the period of economic uncertainty caused by the COVID-19 pandemic. I predicted that firms with higher institutional ownership or a higher level of analyst following would experience an improvement in the quality of their financial reporting during times of greater economic uncertainty. This would be due to the increased incentive of sophisticated investors to obtain and exploit firm-specific information to earn a higher return during a period of heightened uncertainty. Under greater scrutiny, management would therefore be incentivized to improve financial reporting quality to meet the expectations of investors. Unfortunately, my prediction was not supported by the empirical results, and I was unable to find a significant association between my proxies for financial reporting quality and economic uncertainty. I later put this research project on hold and began a new project in collaboration with Dr. Lizhong Hao from the University of Portland.

In this project, using a propensity-score matching approach, we investigate whether Big 4 auditors provide more timely audit reports (proxy for audit efficiency) than non-Big 4 auditors after controlling for client characteristics and audit quality. As the first author of this paper, I have made significant contributions to the project, including proposing the research idea and design, conducting full data analysis, and writing the sections on research design, empirical results, additional analysis, and robustness checks. I also prepared all the result tables. We completed the preliminary draft of the paper (attached) in January 2023 and the paper has been submitted for consideration to be presented at the 32$^{nd}$ Asian-Pacific Conference on International Accounting Issues. We are revising the paper with the goal of submitting it to *AUDITING: A Journal of Practice & Theory* for consideration for publication. This journal is rated an A* on the ABDC Journal Quality List.

In my sabbatical application, I also proposed to prepare for a new course (ACCT 167). However, this proposal was not supported by the School Committee on Faculty, who stated:

"*You also proposed to "prepare a new course", ACCT 167 Advanced Accounting Problems. Based on the accountancy schedule of classes, ACCT 167 is currently being offered. The Committee on Faculty has some concerns as to what activities would be done during a sabbatical, given that course is currently being offered. Sabbatical time is not generally awarded to faculty to prepare to teach an existing course that is new to them.*"

**Section 2. Benefits to you as a faculty member**

I have achieved my sabbatical goal of writing a research paper for conference presentation, with the ultimate goal of getting it published in a peer-reviewed journal. In addition, I worked together with my co-authors to revise and resubmit a manuscript, which has since been conditionally accepted for publication in an A-rated journal on the ABDC Journal Quality List. These papers, when published, will help me maintain my Scholarly Academic (SA) status as defined by the AACSB accreditation standards.

**Section 3. Benefits to the University**

I have shared my research findings with students in my upper-division accounting classes this semester, which helped them better understand the role of auditors in today's capital markets. Students found the information interesting and helpful, and their responses were overwhelmingly positive. This has been a very rewarding experience for me, and I look forward to continuing to share my future research with students. Besides benefiting students in the classroom, faculty research is an essential component of CSB's efforts to maintain its AACSB accreditation. University will also benefit from name recognition.

**Section 4. Original Proposal**

Please see attached.

Applicant: Shu Lin, Ph.D.
Department of Accountancy
Craig School of Business

Sabbatical Request for: Fall Semester 2022

## Section 1. The Proposal

This is my first sabbatical application since I joined Fresno State in 2006. I will use this sabbatical leave, if approved, to (1) prepare a research article to submit for consideration for journal publication and (2) prepare a new course (ACCT 167 Advanced Accounting Problems) to offer in future semesters.

**Research Proposal**

1. Tentative Title

Economic uncertainty and accounting quality: Evidence from the COVID-19 pandemic

2. Motivation and Research Questions

When performing data analysis for one of my current research projects where we investigate whether the transition to remote auditing amid the COVID-19 pandemic affects audit quality, I found that accounting quality during the pandemic as measured by the absolute value of discretionary accruals improved significantly from the pre-pandemic periods. At first glance, this finding is counterintuitive as COVID-19 has posed significant challenges to financial reporting. Operational changes, remote procedures and new risks associated with the COVID-19 pandemic have weakened firms' internal control environments. Moreover, COVID-19 has caused significant operational and financial disruption, resulting in increased pressures on businesses, their supply chain, and customers. We would expect that weakened internal control combined with financial distress create opportunities for fraud, resulting in a lower accounting quality during the pandemic. If the finding of improved accounting quality during the period of pandemic is indeed robust, it would be a puzzling phenomenon and worth further investigation.

A possible explanation for this phenomenon may have to do with the impact of economic uncertainty on investors' attention to firm-specific information. Because

investors have limited attention and processing power, in equilibrium, not all investors choose to attend to the information signal and be informed (Hirshleifer, Lim, and Teoh 2011). Uninformed investors infer some firm-specific information from the equilibrium price at no cost. However, an increase in economic uncertainty caused by the COVID-19 pandemic decreases the informativeness of stock price, making it harder for uninformed investors to infer information from the equilibrium price. This increases the value of firm-specific information that informed investors can exploit to earn a higher return, resulting in greater investor incentives to obtain firm-specific information during the pandemic (Andrei, Friedman, and Ozel 2020). I predict that an increase in investors' attention to firm-specific information during the COVID-19 pandemic motivates managers and TCWG (Those Charged With Governance) to improve accounting quality, resulting in an observation of a higher accounting quality during the pandemic.

Institutional investors and financial analysts, as professionals, should be more attentive to firm-specific information. Thus, I predict that the improvement in accounting quality during the pandemic is more significant among firms with higher ownership by institutional investors especially active institutional investors and firms with a higher level of analyst following.

Although an increase in economic uncertainty may strengthen investors' incentive to obtain firm-specific information, there could also be a conflicting effect. As the economic uncertainty increases and reaches a high level, it may decrease investors' incentives to obtain firm-specific information by reducing the quality of information signals that informed investors observe. I predict that this disincentive effect likely dominates in those industries that have been hit hardest by the COVID-19 pandemic, such as airlines, leisure facilities, oil and gas drilling, restaurants, and auto parts and equipment, to name a few, resulting in a decrease in accounting quality among firms in those industries during the pandemic.

## 3. Research Design

To test for the effect of economic uncertainty on accounting quality, I will estimate the following regression model on a panel data sample consisting of pre-pandemic years of 2017 and 2018 and pandemic years of 2020 and 2021:

$$Accounting\ Quality = \beta_0 + \beta_1 COVID19 + \beta_2 Institutional\ Ownership + \beta_3 Analyst\ Following + \beta_4 Most\ Impacted\ Industries + \beta_5 COVID19 \times Institutional\ Ownership + \beta_6 COVID19 \times Analyst\ Following + \beta_7 COVID19 \times Most\ Impacted\ Industries + \gamma Controls + Year + \varepsilon$$

I expect $\beta_1$ to be positively significant if the average accounting quality improves during the COVID-19 pandemic.

I expect $\beta_5$ and $\beta_6$ to be positively significant for firms with a higher level of institutional ownership and analyst following, respectively, and $\beta_7$ to be negatively significant for firms in industries most impacted by COVID-19.

4. References

Andrei, D., H. Friedman, and N. B. Ozel. 2020. Economic uncertainty and investor attention. Available at: https://dx.doi.org/10.2139/ssrn.3128673

Hirshleifer, D., S. S. Lim, and S. H. Teoh. 2011. Limited investor attention and stock market misreactions to accounting information. *Review of Asset Pricing Studies* 1 (1): 35–73. https://doi.org/10.1093/rapstu/rar002

5. Timeline

August – October 2022

Conduct literature review and data analysis.

November – December 2022

Prepare the first draft of the paper for conference presentations.

**Teaching Proposal**

My main teaching interest is in financial accounting. I have taught the following courses since I joined Fresno State: (1) ACCT 120A Intermediate Accounting I, (2) ACCT 120B Intermediate Accounting II, (3) ACCT 146 Accounting Information Systems and Controls, (4) MSA 226 Professional Research & Accountancy Theory, and

(5) Accounting and Information Systems boot camp for MBA for executives. I plan to add a new course (ACCT 167 Advanced Accounting Problems) in the area of financial accounting to my teaching list.

I will do the following using my sabbatical time to prepare this new course:

| | |
|---|---|
| August 2022 | Identify the learning objectives for the course. A joint initiative by the American Institute of CPAs (AICPA) and National Association of State Boards of Accountancy (NASBA) is currently undergoing to transform the CPA licensure model to recognize the rapidly changing skills, competencies and technological knowledge required of CPAs. A new CPA exam is expected to launch in January 2024, adopting a new core-plus-discipline model. To help academics with this transition, the AICPA and NASBA unveiled a new CPA Evolution Model Accounting Curriculum on June 15, 2021. This model curriculum provides detailed content suggestions (learning objectives) organized by module and topic. Since one of the goals of the Accountancy Option is to prepare a student to become Certified Public Accountant, I will ensure the course cover the relevant learning objectives as suggested in the model curriculum. |
| August – September 2022 | Review and select textbook and other learning materials. I will contact the book representatives of the major publishing houses to get copies of the current editions of the most used advanced accounting textbooks and gain access to other related learning resources. |
| October – December 2022 | Prepare my lecture notes, assignments, and exams for the course. For all courses that I have taught to date, I always created my own lecture notes (i.e., PowerPoint slides) to use in class. |

## Section 2. Benefits to you as a faculty member

- The proposed research is expected to produce one working paper to submit for consideration for conference presentations and publication in a peer-reviewed journal.

- I will be able to teach a new course, and during the preparation for the new course, I will explore new teaching methods and improve my teaching skills.

## Section 3. Benefits to the University

- Faculty research is an important part of CSB's efforts to maintain its AACSB accreditation. University will also benefit from name recognition.
- The quality of the research can translate to the quality of teaching and learning in the classroom. I will share the knowledge gained through the new research with my students.
- Having faculty who are ready to teach more subjects will make the scheduling of classes more easily for the department.

FRESNO STATE

Shu Lin <shulin@mail.fresnostate.edu>

# Fwd: Decision on submission to Advances in Accounting

1 message

**Harry Xia** <hxiacsu@gmail.com> Tue, Dec 27, 2022 at 11:22 AM
To: Shu Lin <shulin@mail.fresnostate.edu>

Hi Shu,

Glad to have the opportunity to get together again after the pandemic started almost three years ago! Good to catch up with you and the family!

Dr. Li also sent us good news. I suggest that we use the copy editor recommended by Dennis and use our future PRJA fund to cover the cost if you agree.

Enjoy the rest of the holiday season!

Regards,

Harry

---------- Forwarded message ---------
From: **Shuo Li** <lis4@wwu.edu>
Date: Tue, Dec 27, 2022 at 11:07 AM
Subject: Fwd: Decision on submission to Advances in Accounting
To: Harry Xia <hxiacsu@gmail.com>

Great news!!!

Begin forwarded message:

> **From:** Advances in Accounting <em@editorialmanager.com>
> **Date:** Dec 27, 2022 at 10:07 AM
> **To:** Shuo Li <lis4@wwu.edu>
> **Subject: Decision on submission to Advances in Accounting**
>
> ELSEVIER
>
> Manuscript Number: ADIAC-D-21-00092R2
>
> The effect of audit committee financial expertise on earnings management tactics in the post-SOX era
>
> Dear Dr Li,
>
> Thank you for submitting your manuscript to Advances in Accounting.
>
> After reviewing your revised manuscript and your response-to-reviewer document, I have decided not to return your manuscript to the reviewer. Your paper is now conditionally accepted for publication.
>
> I would like to process your paper through at least two more rounds. First, I would like you to hire a professional copyeditor to improve the quality of the writing. This is the only request for this next round. A copy editor who has done excellent work for authors of earlier papers published in Advances in Accounting is Corrine Kidd. Corrine's address

is corinthiakidd@gmail.com. An alternative address for her is corrinekidd@gmail.com. You are not required to use this copy editor, but if you hire someone else and the quality is not adequate, I will ask you to do it again.

After your manuscript has been professional edited, please resubmit through Editorial Manager, and at the same time, please send me (to dcaplan@albany.edu) the Word file of your manuscript. I will use Track Changes to offer my own editorial suggestions. I anticipate that I will have extensive suggestions, because I have arrived at the conclusion that most of the reviewer's concerns on the last round arise due to how your characterize the literature and your contribution to it, and not the actual research design or results.

Please resubmit your revised manuscript by Mar 27, 2023. To submit your revised manuscript, please log in as an author at https://www.editorialmanager.com/adiac/, and navigate to the "Submissions Needing Revision" folder under the Author Main Menu.

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Advances in Accounting values your contribution and I look forward to receiving your revised manuscript.

Best regards,

Dennis

Dennis Caplan
Immediate Past Editor
Advances in Accounting

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**Main concerns/suggestions**

1. *I have stated this before, but I am not sure what we learn from Table 3 or Table 4 Panel A that isn't documented in the literature. I unpack this further below.*
2. *The motivation for requiring ACFE is to enhance financial reporting quality. The relation between ACFE and MBE is therefore unclear to me. There is an indirect relation mentioned in that ACFE may limit earnings management and therefore be negatively associated with MBE, but I am not sure what the relation is or what we learn from Table 3?*

We consider JUSTMBE as a composite measure of earnings management, which reflects/combines the net result of different earnings management tactics used by managers. The SEC's (19991, 20092) statements and actions indicate that meeting-just beating analysts' forecasts is considered by the SEC to be a factor in evaluating the quality of financial reporting. The SEC (1999) noted that "among the considerations that may well render material a quantitatively small misstatement of a financial statement item" is "whether the misstatement hides a failure to meet analysts' consensus expectations."

Jensen (2005) posits "solution to the agency problem of overvalued equity [caused by earnings management indicated by JUSTMBE] was the corporate governance system." He also defines corporate governance as the internal control system headed by the board of directors, where ACFE plays a critical role.

In Table 3, we model JUSTMBE as a direct function of ACFE and its three components. In this round of review, we performed another literature review round and identified a prior study (Rickling, 2014) that directly relates MBE to ACFE. She used a very small hand-collected sample (n = 139) and regressed an indicator variable representing firms that repeatedly meeting-beating analyst forecasts on various audit committee characteristics including ACFE. She found the coefficient on ACFE to be negative and significant at the 10% level. However, when she replaced ACFE with AFE in a sensitivity analysis, she found AFE to be insignificant. In our results, we examined all three components of ACFE and found AFE and FFE to be significantly negative. We believe this is new evidence that has not been presented in prior studies.

   a. *I think that limiting the analysis to firms that Just meet or beat is theoretically sound. I do not think that the fact that firms still just meet/beat or that earnings management still occurs (according to surveys) is a puzzle that warrants examination.*
      i. *This comment still remains in this draft, and I refer to your response to Reviewer 1's point 1 on page 1 of the response memo. The authors provide three aspects in which there are 'inconsistent findings." Yet, none of the three is actually motivation for a research study. The fact that earnings management to MBE exists and that managers use different types of EM to*

[1] SEC, 1999, *SEC Staff Accounting Bulletin No. 99: Materiality*. Washington, D.C., Government Printing Office.
[2] SEC, 2009, *SEC Charges General Electric with Accounting Fraud*, Available at: http://www.sec.gov/news/press/2009/2009-178.htm.

*meet earnings is not novel. The fact remains that there is a continued stream of research that can be summed up as "AFE on the Audit committee is associated with higher earnings quality." It doesn't matter the measure of earnings/audit quality or the time period, a plethora of research has documented this.*

We agree that it is not a puzzle that firms still just meet/beat or that earnings management still occurs. However, following Fields et al. (2001)'s argument that examining only one earnings management technique at a time cannot explain the overall effect of earnings management activities, we believe the possible shift (or trade-off) among earnings management tactics for MBE due to the impact of ACFE and its components is still worth investigating. There are many factors that contribute to the quality of earnings. Although it has been well documented that ACFE or AFE on the audit committee is associated with higher earnings quality due to their constraint effect on discretional accruals, our finding of a positive association between ACFE (as well as its components of AFE and SFE) and the use of non-GAAP exclusions, for example, is new and inconsistent with prior evidence (e.g., Seetharaman et al., 2013).

b. *In the same response, and in the abstract, the authors state "To the best of our knowledge, this is the first study to thoroughly investigate not only overall ACFE but also the variation in accounting and non-accounting expertise and their effect on three key earnings management tactics, namely, discretionary accruals, real activities management, and non-GAAP financial disclosures." Is this true? Every study I have read in this area has parsed the audit committee along these lines. In fact, the more interesting studies that have been published in the past 7-10 years have more finely parsed these categories into more granular categories (legal expertise, Big 4 partners, etc.). I think these finer categories, personal traits are the areas that are still possible to publish interesting research in this area.*

We believe our study is the first one that examines the impact of ACFE (and its three components) on three major earnings management tactics in one research setting, and we provide some new evidence regarding the relationship between ACFE (and its component of SFE) and the use of real earnings management and non-GAAP exclusions to MBE. Thank you for pointing out a more interesting direction for future research.

c. *This is a minor point but a suggestion nonetheless. Like R1 on page 3 of the manuscript, I have concerns about the time period. 2016 is now 7 years old data, which really hampers the authors ability to make a contribution. I agree with your point about Covid, but I think there needs to be some distinct reason for limiting the sample. In this case, 2019 would seem to be the logical cut off due to Covid. I am not sure that the Tax Cuts and Jobs Act would affect this relation.*

Again, thank you for pointing this out. Due to some objective reasons, the current span of data is a limitation of this study.

3. *Table 4 Panel A gets into a more theoretically sound test, where the authors test the relation between AEM and ACFE for MBE firms, which are the only firms in which AEM would be expected. I would further strengthen this by looking at Just meet or beat firms, actually. I know that in the robustness checks, there are some tests for earnings surprises, but it seems to me that the 'suspicious' firms would be those firms that just meet or beat, not firms with an earnings surprise.*
    a. *Ultimately, what do we learn from Table 4 Panel A that we did not already know from prior research? AFE is associated with higher quality financial reporting is pretty well established in the literature, as the authors note. *This comment I reiterate, even in the Just meet/beat firms**

    We agree. It has been well established in the literature that ACFE can effectively curb the accrual-based earnings management activities. We consider Table 4 Panel A as a replication of prior findings in our setting. However, there are still new findings such as the relation between FFE & SFE and AEM. Furthermore, it helps form our expectations about how ACFE may affect real earnings management and the use of non-GAAP exclusions, with which this study provides new evidence to the literature.

4. *Table 4 Panel B tests the relation between ACFE and REM. Similar to my first point above, I am not convinced of the theoretical or practical relation between ACFE and REM, because REM is not a financial reporting decision. Are AC members concerned about REM? I think, at best, the investigation here could be looking at the shift to REM if AEM is constrained, similar to the Zang (2012) and Fan et al. (2010) papers. If this is the case, then the results seem counterintuitive, right? It seems that AFE would be associated with higher levels of REM because AEM is constrained?*
    a. *I am not sure the authors understood my point here. My question was whether AC members are concerned with REM. Are they charged with questioning abnormal production, advertising expense, RD, etc? I don't think they are, so what is the theoretical link? If the link is that it is a tradeoff, I think the paper should be reworked. The authors mention Zang 2012, there are others that perform stronger tests of trade-offs. I think these are the types of changes and theoretical build up that was needed to carve out incremental contribution. Something like "there is an unintended consequence of AFE on the audit committee" would be a nice addition to the well established AC literature.*

    Thank you for pointing out the need for a theoretical link to support our findings of the negative relation between ACFE, particularly SFE, and firms' use of real activities manipulation. Prior studies argue and find that institutional investor play a monitoring role in reducing real activities manipulation. For example, Bushee (1998) finds that firms are less likely to cut R&D expenditure to avoid a decline in earnings when institutional ownership is high. Roychowdhury (2006) finds a negative relation between institutional ownership and real activities manipulation to avoid losses. Zang

(2012) finds a negative relationship between institutional ownership and her proxy for REM, which is the sum of abnormal production costs and abnormal discretionary expenditures. Their argument is that, because institutional investors are more sophisticated and informed, they understand the real negative economic consequences of real activities manipulation for firms' long-term value, and as a result, they are likely to put in more effort to monitor and curtail real activities manipulation.

The same argument applies to ACFE, especially SFEs who are CEOs, Presidents, and managing directors etc., and are the same as or even more sophisticated than institutional investors. Badertscher (2011) argues that REM is more costly than Accruals Management from a cash flow perspective because of its adverse impact on optimal business operations and its potential to destroy long-term firm value. SFEs' unique backgrounds and experiences would make them more sensitive to the costly consequences of REM. Consistent with resource dependence theory, Olson (1998) posits that ''the best qualified audit committee members will often be those who have practical management experience, and industry knowledge, as opposed to those with a financial or accounting background.''

If ACFE, particularly SFE, monitoring effect dominates the substitution effect between AEM and REM, we expect a negative association between SFE and REM, which is indeed what we find in terms of REM by cutting SGA or overproducing inventory. We have included this argument in our paper.

5. *I think that the more interesting part of the paper lies in the Expectations management and non-GAAP earnings tests. I think that these areas could be beefed up for form the direct link between AC and analysts and non-GAAP earnings which may be an unexplored niche in the AC area.*
    a. *Obviously, the authors had to make changes to appease many parties. I personally hate that this was the test that didn't make the cut because it was an area that had potential to make a contribution.*

    Having conducted another round of literature review, we chose to follow the existing literature (Badertscher, 2011; Myers et al., 2007) to focus on three alternative earnings management choices (1) within-GAAP Accruals Management, (2) Real Transactions Management, and (3) Non-GAAP earnings management. While examining the degree and duration of overvaluation, Badertscher (2011) finds that managers engage in accruals management in the early stages of overvaluation before moving to real transactions management, in order to sustain their overvalued equity. He also concludes that the longer a firm is overvalued, the more likely it is to engage in one of the most egregious forms of earnings management, non-GAAP earnings management. We wanted to concentrate on ACFE's effect on such alternative earnings management mechanisms and possible switch or trade-off among them in this study.

Another consideration was that expectations management was a different way of earnings management compared to the other three involving direct manipulation of accounting records.

Nevertheless, we agree that expectations management and non-GAAP earnings tests are an unexplored niche in this area, which could be the direction of our future research.

6. *Throughout the paper, the authors use phrases like "Although prior literature has documented relatively consistent evidence on ACFE to mitigate accrual-based earnings management, evidence on ACFE's impacts on the other two earnings management tactics (i.e., real activities management and non-GAAP exclusions) are either limited or inconclusive." Page 16 bottom paragraph. However, the prior paragraphs don't really provide inconclusive evidence. Seetharaman et al. (2013) shows a decline in non-GAAP earnings exclusions following the appointment of AFE. The rest of the paragraph describes studies about firms' overall use of non-GAAP, but says nothing about AFE. Perhaps the literature is limited because this has been documented?*

To clarify our statement, through the literature review, we find that evidence on ACFE's impact on real activities management is mixed and on non-GAAP exclusions is limited. For the latter, we only find one paper, Seetharaman et al. (2013). Although Seetharaman et al. (2013) finds a negative relationship between ACFE and non-GAAP exclusions, their data set covers from 1998 to 2005 (only two years after the requirement of ACFE) and their tests are not conducted in the setting of JUSTMBE, and we found a different result using the JUSTMBE setting. This we believe provides an incremental contribution to the literature.

7. *I expressed concerns about the use of REM in a previous point, and I appreciate the response to my previous comment about the use of residuals. These measures appear to me to be very crude proxies for REM. I would consider using established measures of REM if you continue to go down that path, and acknowledge limitations, or use all of the variables in one model as a sensitivity. I think that "REM is decreasing in the percentage of SFE" provides more direct evidence.*

We acknowledge that the REM measures we use may be noisy proxies for REM. However, they are widely used in the literature (Bartov & Cohen, 2009; Gunny, 2010; Roychowdhury, 2006; Zang, 2012), and most recently, Cheung and Adelopo (2022). We will keep searching for the specific established REM measures per your suggestion for our future research. Thank you.

# 21-00092R1
# The Effect of Audit Committee Financial Expertise on Earnings Management Tactics in the Post-SOX Era

## Editor's Comments

**Abstract:**

1. Third sentence, beginning "to the best of our knowledge": Please rewrite this sentence to be more precise about what you do that hasn't been done before. Of the various combinations of AFE and its subcomponents, on the one hand, and the three types of earnings management, on the other hand, which if any are the combinations that you are the first to examine?
   We have changed this sentence to "*Our study investigates the effects of overall ACFE and its subcomponents on three key earnings management tactics, namely, discretionary accruals, real activities management, and non-GAAP financial disclosures in one research setting.*"

2. There is no need to say "to the best of our knowledge." Also, please remove the word "thoroughly" here and throughout the manuscript when used in this context, because it is a matter of judgment.
   Done. Please refer to the revised sentence mentioned above.

3. In the fourth sentence, please remove "more importantly." If it is more important, you should discuss it first. Also, what does the "both" refer to? If it is AEM and REM, then you shouldn't say "including". Please rewrite this sentence to clearly state what you mean.
   Done. We have changed this sentence to "We posit that *two upward earnings manipulations, accrual-based and real activities management*, are significantly mitigated by ACFE, through a complementary effect of its subcomponents of accounting and supervisory expertise."

4. The 3rd through 6th sentences of the Abstract appear to summarize your main results. For my own benefit, can you tell me if each of these statements represent an original incremental contribution to the literature.
   We believe our results through the unique research method (summarized in the 3rd sentence) with the data set and research model represent an incremental contribution to the literature. The 4th and 5th sentences provide new evidence for an ongoing debate with mixed conclusions. The 6th sentence is our finding of a popular alternative tactic as an incremental contribution to the literature.

5. I like the last sentence.
   Thank you for your comment. We also think the last sentence highlights the value of our research and hope it would generate a positive impact.

**Introduction:**

6. First paragraph. This paragraph would flow better if you make the connection between ACFE and earnings management before you talk about your sample focusing on small beaters.
   Done. We moved this paragraph after the original second paragraph.

7. Page 3, last paragraph. I do not agree that the surveys reveal a "puzzling situation," and apparently, neither does the reviewer. Please change this sentence to refer to "views of management revealed by the above surveys". Similarly, on p. 5, please remove the assertion of a puzzle between the research and the surveys.
   Done.

8. Page 3, last paragraph, regarding the statement "In this study, we attempt to fill this gap by thoroughly focusing on three …": No need to say "attempt"; you can just say "we fill this gap …". Also, please eliminate the word "thoroughly" from the characterization of your study.
   Done.

9. Page 4, Item #1: Please change "through the post-SOX period" to "in the X years following the enactment of SOX". Although I don't share the reviewer's concern about the age of your data to the same extent as the reviewer, this change is proposed to acknowledge that your data cannot provide insight about the last six years.
   Done.

10. Page 4, Item #4: When you say "more likely," please indicate more likely than what.
    We have changed this sentence to "we also find that firms with *a greater presence* of both AFE and NAFE (particularly SFE) on the audit committee are more likely to use non-GAAP exclusions to JUSTMBE."

11. Page 5, top of page: This statement of your contribution should be more specific. Eliminate the word "thoroughly," and instead, indicate precisely what you do that hasn't been done before. This could relate to how your regression model differs from prior research, or it could relate to your sample. Also, in the next sentence that begins with "We find that …" are you the first paper to find this?
    We have changed this sentence to "our findings make two important contributions to the literature. First, *our research examines the effects of overall ACFE and its components on three alternative earnings management tactics to JUSTMBE in one research setting*. We provide new evidence that the SEC's requirement of ACFE significantly reduces the likelihood of JUSTMBE by mitigating upward accrual-based and real activities manipulation. *Notably, in contrast with existing literature, we find that, even after the implementation of Regulation G and under the greater presence of ACFE, managers increasingly use their discretion in defining non-GAAP earnings to JUSTMBE and to eventually affect the capital market*. The shift in the mix of earnings management tactics toward manipulating non-GAAP earnings helps explain the different views between prior literature and practitioners' survey results. It shows that managers, facing more limited

discretion within GAAP, turn to non-GAAP disclosures, shaded from the formal oversight of audit committees and external auditors, as an effective substitute for other earnings management tools under scrutiny in a stricter regulatory environment after SOX. Second, we examine ACFE composition expertise groups and provide new empirical evidence on the effectiveness of overall ACFE and its components, among which AFE proved to be the most operative in mitigating earnings management. Furthermore, *we find preliminary evidence to support the resource dependency theory, highlighting the complementary effect between AFE and NAFE, particularly SFE, in improving GAAP financial reporting quality and mitigating real activities management.*"

12. Paragraph that spans pp. 5-6. This paragraph would benefit from a major rewrite to tone it down. Please eliminate "substantial" in the first sentence. Please don't tell regulators and financial statement users what they need to pay closer attention to, unless you have some indication of the attention they are already paying it. Unless you test how the market reacts to the non-GAAP earnings releases, your paper does not support a need for additional regulatory intervention. I think you could remove this entire paragraph.
We have changed this paragraph to "Our findings add empirical evidence with implications for regulators to consider more rigorous intervention and regulation on non-GAAP disclosures and to refine the requirement of audit committee financial experts with an emphasis on the complement of accounting and non-accounting financial expertise to effectively mitigate earnings manipulation."

13. Minor changes:

    a. In the 2nd paragraph on p. 2 please change "… even find no evidence to suggest that ..." to "… find no evidence that …
    b. On page 3, first paragraph, change "… offer different perspectives from the practitioners" to "… offer perspectives from practitioners …" Also, in that paragraph, eliminate the words "top of" in the sentence that begins with "However".
    c. Page 3, last paragraph, change "such purpose" to "this purpose"
    d. Page 4, in #3 eliminate the word "trendy", and in #4 eliminate "Nevertheless"
    e. Page 5, eliminate the word "proof." Statistical findings do not prove anything.

Done.

**Section 2**

14. On p. 6, where you first reference AFE , NAFE, SFE and FFE, please spell them out and use (AFE), (NAFE), etc. after the full name. You can then use the abbreviations through the remainder of the section.
Thank you for pointing this out. We first reference AFE, NAFE, SFE and FFE after the full name in the second paragraph in Section 1, and then use the abbreviations through the remainder of the manuscript.

15. Page 9, first line: Can you please reword the phrase "combination of FFE from NAFE only"? I think this wording is unclear.

We have changed this sentence to "Dhaliwal et al. (2010) argue that the most positive effect of AFE is achieved *together with only FFE from NAFE*, whereas SFE has no incremental impact on the committee's effectiveness."

16. Section 2.2, first two sentences: Please spell out MBE and JUSTMBE the first time they appear in this section, and put the abbreviations in parenthesis.
    Thank you for pointing this out. We first reference MBE and JUSTMBE after the full name in the second paragraph and third paragraph respectively in Section 1, and then use the abbreviations through the remainder of the manuscript.

17. Page 10, first paragraph: In terms of the tactics used by managers to avoid negative earnings surprises, I suggest you add the tactic of guiding analysts to adjust their forecasts prior to the earnings announcement.
    Done.

18. Page 10, last paragraph: Because I do not believe there is inconsistency between the academic research and the survey responses from CFOs, I suggest the following wording change: Change "… 400 executives to deliver a different message from practitioners. They find" to "… 400 executives and find …"
    Done.

19. Page 10, last paragraph: The paragraph starts out talking about JUSTMBE and then pivots to discussing MBE. The transition should be more explicit.
    We have re-written this paragraph to focus on JUSTMBE which is more consistent with the theme of this paper.

20. Page 11, first full paragraph: This paragraph would benefit from a major rewrite. I see no contradiction between the academic literature and the survey from practitioners. The fact that CFOs still view meeting earnings as important is not inconsistent with less earnings management occurring after the implementation of SOX. If you want to motivate your research due to a contradiction between the empirical research and the practitioner surveys, you will have to set forth a more careful argument of the precise nature of the contradiction. Assuming you are willing to drop the first sentence of this paragraph, then starting with the second sentence, are you saying that you are including a more complete set of JUSTMBE than all prior research? If so, can you add a sentence indicating why looking at all three in a single study is important. Regarding the third sentence, starting with "Our primary purpose …", you are not the first study to do this, are you? I think perhaps this sentence should be the first sentence of the paragraph, followed by what is now the second sentence along with an explanation of why it is important to look at all three earnings management tactics in a single study.
    We have re-written Section 2.2 to address your concerns and highlight the reason for us to examine all three tactics in a single study.

21. Page 11, first full paragraph: Please eliminate the word "thorough" from the last sentence.
    Done.

22. Page 12, first full sentence: You haven't talked about real earnings management in Section 2 yet (not much, if at all). I suggest you start a new paragraph, start the paragraph with a reference to REM, and then include the sentence beginning "However, Graham et al …"
Done.

23. Page 12, first paragraph of 2.2.2: Please keep these four references but also add two or three much more recent papers that use the same three measures of REM, to support the fact that you are using state-of-the-art measures in this aspect of your research design. Please also reference these more recent papers in the first paragraph of Section 3.3.2.
We have added two papers in the first paragraph of 2.2.2. and 3.3.2 (Cheung & Adelopo, 2022; Susanto & Pradipta, 2020) and three recent papers (after 2019) in the second paragraph.

24. Page 12, second paragraph of 2.2.2: Sun, Lan, and Liu (2014) seems less relevant than the other papers in this paragraph. The reference to it is perhaps a distraction. I suggest deleting the sentence.
Done.

25. Page 12, second paragraph of 2.2.2: I am in agreement with the reviewer's comment 4a. This paragraph provides weak support for a relation between AFE and REM. Carcello et al. (2006) finds an association for discretionary expenditures, but the other papers either find only weak evidence or an insignificant relation. As I mention above, Sun et al. (2014) is not directly relevant. Therefore, it would be helpful for you to add the theoretical link between AFE and REM to help motivate your research question related to this point. Although how you draw this link is entirely your decision, it seems that elsewhere in the paper, you suggest a substitution effect, where REM replaces accruals earnings management when AEM becomes more difficult to implement.
We have revised Section 2.2.2 based on our response to the reviewer's comment 4a.:

Thank you for pointing out the need for a theoretical link to support our findings of the negative relation between ACFE, particularly SFE, and firms' use of real activities manipulation. Prior studies argue and find that institutional investor play a monitoring role in reducing real activities manipulation. For example, Bushee (1998) finds that firms are less likely to cut R&D expenditure to avoid a decline in earnings when institutional ownership is high. Roychowdhury (2006) finds a negative relation between institutional ownership and real activities manipulation to avoid losses. Zang (2012) finds a negative relationship between institutional ownership and her proxy for REM, which is the sum of abnormal production costs overproduction and abnormal discretionary expenditures. Their argument is that, because institutional investors are more sophisticated and informed, they understand the real negative economic consequences of real activities manipulation for firms' long-term value, and as a result, they are likely to put in more effort to monitor and curtail real activities manipulation.

The same argument applies to ACFE, especially SFEs who are CEOs, Presidents, and managing directors etc., and are the same as or even more sophisticated than institutional investors. Consistent with resource dependence theory, Olson (1998) posits that ‘‘the best qualified audit committee members will often be those who have practical management experience, and industry knowledge, as opposed to those with a financial or accounting background.” Badertscher (2011) argues that REM is more costly than Accruals Management from a cash flow perspective because of its adverse impact on optimal business operations and its potential to destroy long-term firm value. SFEs’ unique backgrounds and experiences would make them more sensitive to the costly consequences of REM.

If ACFE, particularly SFE, monitoring effect dominates the substitution effect between AEM and REM, we expect a negative association between SFE and REM, which is indeed what we find in terms of REM by cutting SGA or overproducing inventory. We have included this argument in our paper.

26. Page 14, last paragraph: please verify, but I believe Reg G was adopted in January of 2003, and became effective in March.
Thank you for pointing it out. We changed it to January 2003.

27. Page 16, first sentence of Section 2.3: This sentence is confusing because of the phrase “either limited or inconclusive”. Which one is it? Is it limited for one of the two tactics and inconclusive for the other? If so, be more precise. As far as I can tell, the only paper you cite that addresses REM in the context of AFE is Seetharaman et al (2013). Is this correct, and if so, are you saying that research on this topic is limited. Please ensure that there are no additional papers published more recently that you haven’t cited.
We have changed this sentence to “evidence on ACFE’s impacts on the other two earnings management tactics is *either inconclusive for real activities management or limited for non-GAAP exclusions*.” So far, we have only found one paper addresses non-GAAP in the context of ACFE, which is Seetharaman et al. (2013).

28. Page 17: I suggest you shorten the research question as follows: “How does ACFE and its component parts of AFE, SFE, and FFE impact the following three just-meet-or-beat earnings tactics: accrual-based earnings management, real activities management, and non-GAAP disclosures with unexpected exclusions?”
Done. Thank you for your suggestion.

29. Minor changes:

    a. Page 6, change the second sentence to read “… prevent the misconduct that led to well-known accounting scandals such as Enron (Healy & Palepu, 2003), …”
    b. Page 7, first sentence: eliminate “extant” and replace “, which can most” with “to”. In the next sentence, change “which” to “that” and eliminate “desirable”
    c. Page 8, last paragraph: eliminate “A series of”.
    d. Page 9, line 4, eliminate “even”
    e. Page 9, last paragraph on Section 2.1, eliminate “extant” and “thorough”.

f. Page 9, last sentence of Section 2.1. Consider adding "still" to say "is still a meaningful research question"
g. Page 11, first full paragraph: eliminate "extant" prior to literature.
h. Page 11, first sentence of Section 2.2.1: Start this sentence as follows: "Hassabelnaby et al. (2007) indicates that as a response to …, there is a …"
i. Page 12, line 4: Change "… preferences for the mix between taking " to "… preferences between accounting-related …"
j. Page 16, 2nd-to-last line, change "Facing a more strict regulation environment …" to "Facing a stricter regulatory environment …"

Done.

**Section 3**

30. Section 3.1, first paragraph: You can delete the first sentence and also "because the empirical models we use … in these industries"
Done.

31. Page 19, first line: More likely than what?
We have changed this sentence to "*Compared to other MBE instances, an outcome of JUSTMBE is more likely to have been driven by the use of an earnings management tactic.*"

32. Regarding your response to Reviewer 2, comment 3, please include all three auditor characteristic control variables in your model: audit fees, nonaudit fees, and industry audit specialists. Please discuss them in Section 3.2.
Following Reviewer 2 and your suggestion, we included all three auditor characteristic control variables in the model and rerun all analyses. Including these three variables reduced our sample size from 99,389 to 90,873. We have updated all tables, affected model designs, and discussion of results in the paper.

33. Minor changes:

    a. Page 18, last few words before Section 3.2: change "with 3,932 individual firms" to "consisting of 3,932 unique firms"
    Done

**Section 4**

34. I am confused by your response to the Discussant's comment #2. The discussant is comparing JUSTMBE firm-quarters and non-JUSTMBE firm-quarters both post SOX. Your explanation seems to discuss the impact of SOX, but does not seem to address the Discussant's question. In any case, please include a discussion of this comparison requested by the Discussant in Section 4.1.
It is puzzling to observe that these accrual and real earnings management indicators have a lower mean value for *JUSTMBE* firm-quarters than for non-*JUSTMBE* firm-quarters. One possible explanation as suggested by our regression results is that firms switched

from accrual and real earnings management to the use of non-GAAP exclusion to just meet or beat earnings forecasts in the post-SOX period. Another possible explanation is that these measures are noisy proxies for earnings management. For example, prior studies have shown that for firms with extreme earnings levels, estimated discretionary accruals are more likely to be misspecified (Dechow, Sloan, & Sweeney, 1995). Therefore, in this study, we use these earnings management measures in conjunction with *JUSTMBE* to better identify firms that engage in earnings management activities.

35. Page 27, paragraph beginning with "Finally, we find that …": In the last sentence of this paragraph, you indicate that the JUSTMBE firm-quarters have significantly higher non-GAAP earnings exclusions than the non-JUSTMBE firm-quarters. This wording is troubling, because discretionary accruals is also statistically significantly different between the JUSTMBE and non-JUSTMBE firm-quarters, and two of the three REM measures are statistically significantly different. Please reword this paragraph to incorporate the results of the statistical tests that you present in the table for all three earnings management techniques.
    Done

36. Page 28 and Table 2: Please add to your discussion of Table 2 the intuition you provide the Discussant in response to his comment #3.
    Done

37. Page 29, last sentence. When you say you "shed more light on the positive effect of AFE and FFE on the improvement of financial reporting quality," can you please be more specific on what the literature had already found with respect to AFE and FFE and precisely what you add to it.
    Dhailwal et al. (2010) tests the impact of the mix of accounting and nonaccounting expertise on accruals quality and finds that the most positive impact on accruals quality is achieved when firms possess a combination of both AFE and FFE in their audit committee. We find both AFE and FFE are negatively associated with JUSTMBE. This finding provides additional evidence in supporting their argument that non-accounting experts on audit committees can enhance the monitoring ability of audit committees and, as a result, lead to higher financial reporting quality.

38. Minor changes

    a. Page 28, first line: Change "whose share increased" to "increasing"
       Done
    b. Page 29, the sentence beginning "In sum": please eliminate "to demonstrate" and change "would decrease" to "decreases".
       Done
    c. Page 29, second-to-last sentence: Please consider rewording as follows: "Our findings are consistent with prior research, supporting ACFE's role in curtailing earnings management."
       Done

d. Page 30, second sentence: Please consider rewording as follows: "Therefore, … we examine the probable impact on the mix of …tactics which results from ACFE …" In the next sentence, please eliminate "To explore the possible explanation" and start the sentence with "We."
Done

**Section 5**

39. Please include in Section 5 the results of the tests that you ran in response to the Discussant's comment #4. There is no need to tabulate these tests.
Done.

**Conclusion**

40. Second sentence in Section 6: Please eliminate the word "thoroughly" and "the importance of"
Done.

41. Page 35, first full paragraph, regarding the sentence "We find that upward earnings manipulation, including accrual-based and real activities management is significantly mitigated by increasing ACFE, especially AFE and SFE, in the post-SOX era". For my own benefit, please explain to me which findings in this sentence replicate earlier research and which findings represent an original contribution.
We have changed this sentence to "We *provide new evidence* that upward earnings manipulation, including accrual-based and real activities management, is significantly mitigated by increasing ACFE, especially AFE and SFE, in the post-SOX era."

42. Page 35, first full paragraph: Please eliminate the word "comprehensively".
Done.

43. Please consider eliminating the last sentence in the first full paragraph on p. 35.
Done.

44. Page 35, last paragraph: Please eliminate the words "extensively" and "comprehensively".
Done.

45. Minor changes:

    a. Page 35, last paragraph: Please consider changing the first part of the first sentence as follows: "Based on our results, we believe future research could study how …"

Done.

**Appendix**

46. Please remember to add the auditor characteristic variables to the appendix.
    Done.

**References**

47. In April of this year, *Journal of Corporate Accounting & Finance* published "Audit committee financial expertise, accrual, and real earnings management," by Kwok Yip Cheung and Ismail Adelopo. Please include this paper in your literature review and add it to the References Section.
    Done. Thank you for providing us with this new research paper.

48. Please search for other recently-published papers that might be relevant to your study.
    Done. We have added around ten new references.

49. Some of your references to published papers do not indicate the journal where the paper was published. Qin (2007) is an example. If the paper has been published, the entry in the References Section should indicate the journal where it was published, not SSRN.
    Done.

**Tables**

50. Consistent with the conference discussant's recommendation for Table 4, please add a column with predicted signs for the coefficients. Please do this for Table 4 as recommended by the discussant, and it seems to me you should also do it for Table 3. As you suggested, please indicate +/- where there is no clear prediction. Where there is a clear prediction, please state that prediction in your discussion of the variables in Sections 3.2.1 and 3.2.2, citing appropriate research where appropriate. I acknowledge that this will add some length to this section of the paper, but I am not worried about the length of the paper.
    We have added to both Tables 3 and 4 a column with predicted signs for the coefficients, except for Panel B of Table 4: Real earnings management, and provided appropriate justification. We state in the paper why we don't provide predicted signs for the coefficients reported in Panel B of Table 4 as follows: "It is unclear from the existing literature whether ACFE can effectively restrict REM. Drawing on the arguments and empirical evidence for the relationship between institutional ownership and REM (Zang, 2012), we expect ACFE, especially SFE, may decrease REM activities. However, some prior studies find a positive association between ACFE and REM, highlighting the substitution effect between accrual-based and real earnings management. Given the mixed evidence to date (see, for example, Carcello et al., 2006; Bilal et al., 2018; Susanto and Pradipta, 2020; Cheung & Adelopo, 2022), we are not predicting the relationships between ACFE and the various proxies that we use for REM. The relationships between control variables and the REM proxies are also not predicted following prior studies (e.g., Carcello et al., 2006; Cheung & Adelopo, 2022)."

**Miscellaneous**

51. As a stylistic choice, I prefer references to prior papers to refer to the paper, not the authors. Therefore, regardless of how many authors are on the paper, please use the singular pronoun. For example, "Carcello et al. (2006) finds", not "Carcello et al. (2006) find …"
    Done.

52. Regarding the reviewer's comment #5, can you please tell me why you dropped this test from the earlier paper that was submitted in 2020?

    Having conducted another round of literature review during the revision, we chose to follow the existing literature (Badertscher, 2011; Myers et al., 2007) to focus on three alternative earnings management choices (1) within-GAAP Accruals Management, (2) Real Transactions Management, and (3) Non-GAAP earnings management. While examining the degree and duration of overvaluation, Badertscher (2011) finds that managers engage in accruals management in the early stages of overvaluation before moving to real transactions management, in order to sustain their overvalued equity. He also concludes that the longer a firm is overvalued, the more likely it is to engage in one of the most egregious forms of earnings management, non-GAAP earnings management. We wanted to concentrate on ACFE's effect on such alternative earnings management mechanisms and possible switch or trade-off in this study.

    Another consideration was that expectations management was a different way of earnings management compared to the other three involving direct manipulation of accounting records.

    Nevertheless, we agree that expectations management and non-GAAP earnings tests are an unexplored niche in this area, which could be the direction of our future research.

53. Regarding the reviewer's comment #7, can you please tell me what established measures of REM the reviewer is referring to?

    We acknowledge that the REM measures we use may be noisy proxies for REM. However, they are widely used in the literature (Bartov & Cohen, 2009; Gunny, 2010; Roychowdhury, 2006; Zang, 2012), and most recently, Cheung and Adelopo (2022). We don't know other "established measures of REM" the reviewer referred to and will keep searching for the specific established REM measures per his suggestion for our future research.

# Do Big 4 Auditors Provide More Timely Audit Report after Controlling for Client Characteristics and Audit Quality?

**ABSTRACT:** This study examines whether Big 4 auditors provide audit more efficiently and in a more timely manner than non-Big 4 auditors. We use audit report lags (audit timeliness) jointly with audit fees (audit input) as proxies for audit efficiency and use a propensity-score matching (PSM) approach to construct a pseudo random sample in which each non-Big 4 client is matched with a similar Big 4 client based on their characteristics and audit quality in order to control for potential endogeneity related to self-selection bias in this setting. Our findings indicate that non-Big 4 auditors are positively and significantly associated with shorter audit delay and lower fee premiums than Big 4 auditors. Our findings do not support the notion that Big 4 auditors conduct audit more efficiently than non-Big 4 auditors.

**Keywords:** Audit efficiency; timeliness; audit quality; Big 4 versus non-Big 4 auditors; propensity-score matching

## 1. Introduction

Prior studies in auditing literature indicate that Big 4 auditors provide higher-quality audits than non-Big 4 auditors (e.g. Palmrose 1988; Becker et al. 1998; Khurana and Raman 2004; Behn et al. 2008). In this line of research, DeAngelo (1981) provides a theoretical ground positing that larger audit firms with a greater number of clients have less incentives to 'cheat' in order to retain any one client. Similarly, Dopuch and Simunic (1980) argue that larger accounting firms are less likely to compromise their independence because they have greater reputations to protect. Furthermore, Reynolds and Francis (2000) argue, from audit firm office-level, that an office with a larger client base have greater independence from any one specific client and therefore have stronger incentives to protect their reputation.

Recent studies further argue that Big 4 auditors are superior to non-Big 4 auditors in providing higher-quality audit due to better training and more resources. For example, Francis and Yu (2009) document that larger audit firms have more collective experience in auditing public companies. Lawrence et al. (2011) and Eshleman and Guo (2014) argue that Big 4 firms have more resources to invest in robust employee training programs and standardized audit methodologies, resulting in better trained auditors.

Besides audit quality, regulators, filing entities, auditors, market participants and academic researchers are also interested in the efficiency and timeliness of auditors completing an audit engagement (Krishnan and Yang 2009; Abbott et al. 2012; Bronson et al. 2011; Lambert et al. 2013). Whether Big 4 auditors are superior to non-Big 4 auditors in completing audit on timely matter is still an empirical question.

However, there is potential endogeneity problem with early auditing research. Public firms select their auditors and auditors tend to accept firms as their clients that are less risky with

higher earnings quality (Eshleman and Guo 2014). Public firms select their auditors and auditor self-select their clients that are less risky with higher earnings quality. Without control for endogeneity problem, it is not clear from early studies that Big 4 auditors have higher quality audit (Eshleman and Guo 2014). For example, Boone et al. (2010) find evidence that suggests Big 4 auditors and Mid-tier auditors exhibit similar audit quality after controlling for endogeneity inherent in client selection. Eshleman and Guo (2014) use propensity -score matching model to match non-Big 4 clients with Big 4 clients to control for the endogenous choice of auditor, they find evidence suggesting that Big 4 auditors do perform higher quality audits.

In this study, we explore whether Big 4 auditors are associated with higher audit efficiency and lower audit fees than non-Big 4 auditors. We posit that Big 4 auditors would work more efficiently and complete each audit engagements on more timely matter than auditors non-Big 4 firms since Big 4 auditors are better trained with more experience in auditing public clients. We use audit report lags (audit timeliness) jointly with audit fees as a proxy for audit efficiency. We construct our sample by using a propensity-score matching (PSM) approach to create a pseudo random sample in which each Big 4 client is matched with a non-Big 4 client on the basis of their characteristics and audit quality. We believe that this approach can effectively mitigate the effect of endogeneity issue related to self-selection bias.

Our empirical results indicate that, inconsistent with our prediction, non-Big 4 auditors are positively and significantly associated with shorter audit delay than Big 4 auditors. Our finding does not support the notion that Big 4 auditors conduct audit more efficiently than non-Big 4 auditors. However, this shorter audit lags may be due to non-Big 4 auditors expending more resources in order to provide a more timely audit rather than an indicator of higher audit

efficiency. Therefore, we conduct an additional analysis and use audit fees to proxy for audit input to examine whether our finding is driven by non-Big 4 (Big 4) auditors devote more (less) resource to their more (less) important client. Our results indicate that there is no significant difference in fee premium paid by non-Big 4 clients. Our findings do not support the argument that the shorter audit lags for non-Big 4 clients are due to higher audit input by non-Big 4 auditors.

The evidence presented in this paper should be of interest to public firms' management, audit committees, investors, and regulators. Management and audit committees would like to know whether the Big 4 auditors actually provide higher quality audit and complete their audit more efficiently on a timely matter.

## 2. Literature review hypotheses development

### 2.1. Big 4 vs. non-Big 4 auditors

One important early theory in audit literature is that larger auditors with a greater number of clients have less incentives to compromise their independence to retain any one client (DeAngelo 1981). Prior empirical studies provided evidence consistent with DeAngelo's theory and suggest that Big 4 auditors provide higher-quality audits than non-Big 4 auditors (Palmrose 1988; Becker et al. 1998; Francis and Krishnan 1999; Khurana and Raman 2004; Behn et al. 2008; Lennox and Pittman 2010). For example, Francis and Krishman (1999) find that Big 4 auditors are more conservative when issuing audit report. Dopuch and Simunic (1980) and Caramanis and Lennox (2008) find that Big 4 auditors are more likely to protect their reputation and avoid litigation costs by expanding audit scopes. Cao et al. (2016) investigate the effects of auditors' characteristics on the reporting quality of delayed filings. They find that Big 4 auditors are better able to mitigate the adverse effect of filing delays on financial reporting quality.

Prior literature further argue that Big 4 audit firms have more resources, provide more robust employee training programs, and more standardized audit methodologies (Lawrence et al. 2011; Eshleman and Guo 2014). For example, Francis and Yu (2009) find evidence that large audit firms provide higher-quality audit since large audit firms have more collective experience in auditing public companies.

**2.2. Audit delay and audit efficiency**

Besides audit quality, the timeliness of auditors completing an audit has been a primary concern of regulators, filing entities, auditors, market participants and academic researchers (Krishnan and Yang 2009; Abbott et al. 2012; Bronson et al. 2011; Lambert et al. 2013). The Public Company Accounting Oversight Board (PCAOB), since its inception, has issued multiple auditing standards that require increased scope of audit and auditor reporting requirements (Bronson et al. 2011). Therefore, it becomes increasingly important to study for factors associated with the timeliness of audit and audit efficiency (Abbott et al. 2012).

Despite the increasing concerns of regulators and market participants towards the timeliness of audit, empirical research has concentrated on audit quality and audit effectiveness, with little attention on audit efficiency from the academic. Even from the limited research on audit efficiency, the results are mixed (Knechel and Sharma 2012). Prior studies mainly use audit delay to measure the timeliness of audit, where audit delay refers to the number of calendar days from fiscal year-end to the audit report date. One stream of literature examines determinants of audit delay and prior studies indicate that audit delay is negatively related to client size and ownership concentration and positively associated with auditor changes, extraordinary items, net loss, modified audit opinions, etc. (Ashton et al. 1987; Ashton et al. 1989; New ton and Ashton 1989; Bamber et al. 1993; Kinney and McDaniel 1993; Ettredge et al. 2006).

For example, Knechel and Sharma (2012) examine the efficiency and effectiveness of auditors from the effect of auditors providing non-audit services, where efficiency refers to the timeliness and cost of the audit process, i.e., conducting audit more quickly or with fewer resources, effectiveness refers to the quality of the auditor's conduct of the engagement. They find that higher non-audit service fees are associated with shorter audit report lags, a potential indicator of audit efficiency, prior to the passage of SOX. Whitworth and Lambert (2014) extend the audit delay literature by exploring the impact of office-level attributes of Big 4 firms on audit delay. They find that office-specific industry expertise is negatively associated with audit delay and provide support for the importance of office-specific characteristics on audit and financial reporting outcomes.

Early research on audit delay has been focused on audit firm characteristics and the primary firm attribute is auditor size. Prior studies argue that larger audit firms have incentives to compete audits in a timely fashion and these studies have documented a negative association between larger audit firms and audit delay (Whitworth and Lambert 2014). For example, Ashton et al. (1989) examines the determinants of audit delay using Canadian data from 1977 to 1982, and a set of eight explanatory variables: company size, industry classification, month of year-end, audit firm, sign of net income, extraordinary items, contingencies, and type of audit opinion; where, the variable auditor was classified into Canadian "Big Nine" and all other auditors. They predict that larger audit firms to complete audits on a more timely basis because of their experience in auditing public companies than small audit firms. Their regression results indicate that Big Nine auditors are consistently associated with shorter audit delays than are smaller auditing firms. Therefore, we predict that Big 4 auditors are more likely to be associated with timely audit report and shorter audit delay. We state our hypothesis as follows:

**Hypothesis:** Big 4 auditors have a shorter audit delay than non-Big 4 auditors.

## 3. Research Design

We follow Eshleman and Guo (2014) and Lawrence et al. (2011) and use a propensity-score matching (PSM) approach to create a pseudo random sample in which each non-Big 4 client is matched with a similar Big 4 client based on their characteristics and audit quality. The primary advantage of this approach is in mitigating the effect of endogeneity related to self-selection bias. We aim to generate a sample of similar audit efforts between matched Big 4 and non-Big 4 clients by controlling for differences in client characteristics and audit quality between the two auditor groups. This allows us to use audit report lags (audit timeliness) jointly with audit fees (audit input) to proxy for audit efficiency. To apply the PSM approach, we first model the probability of selecting a Big 4 auditor using the following logit regression (firm and year subscripts omitted):

$$BIG4 = \beta_0 + \beta_1 LNASSETS + \beta_2 ATURN + \beta_3 CURR + \beta_4 LEVERAGE + \beta_5 ROA + \beta_6 ADA + \beta_7 RMM + Industry\ and\ Year\ Fixed\ Effects + \varepsilon_{i.t} \quad (1)$$

See Table 1 for variable definitions. Following Lawrence et al. (2011), we include five client characteristics (size, ROA, current ratio, leverage, and asset turnover). We proxy for firm size using the log of total assets (*LNASSETS*) and use return on assets (*ROA*) to measure firm profitability as Big 4 clients, when compared to non-Big 4 clients, are significantly larger and more profitable. The client's risk of financial distress is captured by including the current ratio (*CURR*) and firm leverage (*LEVERAGE*) in the model. Prior evidence also suggests Big 4 clients have lower asset turnover (*ATURN*) (Eshleman and Guo 2014).

We include two proxies to control for audit quality: absolute discretionary accruals (*ADA*) and post-audit risk of material misstatement (*RMM*). We estimate discretionary accruals using the performance-adjusted cross-sectional modified-Jones model and then compute the absolute value of discretionary accruals (*ADA*) (Kothari, Leone, and Wasley 2005). To estimate misstatement risk, we augment the logit model used in Lobo and Zhao (2013) to predict the probability of the restatement of the current year's financial report (see also Burns and Kedia 2006; Erickson et al. 2006; Efendi et al. 2007; Lennox and Pittman 2010). The dependent variable of the model is an indicator variable, which equals one if the financial report for the current year is subsequently restated, and zero otherwise.[1] We use the predicted probability of misstatement (*RMM*) as our proxy for post-audit misstatement risk. We present the performance-adjusted modified-Jones model and the misstatement risk model in Appendix.

After obtaining the fitted values from estimating Equation (1), we follow Lawrence et al. (2011) to match one Big 4 client to one non-Big 4 client with the closest fitted value in the same year and same industry (based on two-digit SIC code) without replacement and retain matches that are within a caliper width of 0.03.

To test our hypothesis, we estimate the following regression model for audit report lag on the matched sample (firm and year subscripts omitted):

$$\begin{aligned} LNARLAG = {} & \rho_0 + \rho_1 BIG4 + \rho_2 ADA + \rho_3 AOPIN + \rho_4 ATURN + \rho_5 AUDCHG \\ & + \rho_6 BM + \rho_7 BUSYFYE + \rho_8 CFO + \rho_9 CFOVOLATILITY \\ & + \rho_{10} CURR + \rho_{11} EXITEMS + \rho_{12} F10K\_60 + \rho_{13} F10k\_75 \\ & + \rho_{14} FINANCE + \rho_{15} FOREIGN + \rho_{16} GOING\ CONCERN \end{aligned} \quad (2)$$

[1] We only include restatements that involve misstatements resulting from GAAP violations as indicated by Audit Analytics.

$$+\rho_{17}INVAR + \rho_{18}LATE + \rho_{19}LEVERAGE + \rho_{20}LITIGATION$$

$$+\rho_{21}LNAGE + \rho_{22}LNASSETS + \rho_{23}LNAFEE$$

$$+\rho_{24}LNSEGMENT + \rho_{25}LOSS + \rho_{26}MA + \rho_{27}MOD\_ALTMAN\ Z$$

$$+\rho_{28}MW + \rho_{29}RESTATE + \rho_{30}RETURN + \rho_{31}RMM + \rho_{32}ROA$$

$$+\rho_{33}SALESGROWTH + \rho_{34}SALESVOLATILITY + \rho_{35}SOX404B$$

$$+\rho_{36}SOX404B\_1ST\_FILING + \rho_{37}SOX404B\_1ST\_YEAR$$

$$+\rho_{38}SPITEMS + \rho_{39}TENURE\_S$$

$$+Industry\ and\ Year\ Fixed\ Effects + \varepsilon$$

Table 1 presents variable definitions. The dependent variable (*LNARLAG*) is the natural logarithm of audit report lag, where audit report lag is the number of days between the fiscal year-end date and the initial audit report date.[2] We use audit report lag to proxy for audit efficiency, i.e., whether an audit could be conducted more quickly with the same (or fewer) resources and still achieve the same (or even higher) audit quality (Knechel and Sharma 2012). If Big 4 auditors would complete audits on a more timely basis due to higher audit efficiency, then we expect to observe a negative coefficient on *BIG4* controlling for the audit effort.

We first include a set of control variables (presented in parentheses and italics) that capture the innate firm characteristics (e.g., size, age, complexity, volatility), financing and operational risks, and risk of misreporting, which likely affect audit timeliness by affecting the pre-audited financial reporting quality and, therefore, the extent of audit work required. Prior research finds that smaller (*LNASSETS*, *ATURN*) and younger (*LNAGE*) firms and firms with high growth

[2] Consistent with prior research (e.g., Ashton, Graul, and Newton 1989; Knechel and Sharma 2012), we transform audit report lag variable using the natural logarithm function to meet the normal distribution assumption required by OLS.

(*BTM*, *SALESGROWTH*), poor performance (*LOSS*, *ROA*, *RETURN*), financial distress (*CURR*, *LEVERAGE*, *MOD_ALTMAN Z*), new debt or equity (*FINANCE*), more complex operations (*FOREIGN*, *INVAR*, *LNSEGMENT*), organizational change (*MA*), high underlying volatility and uncertainty (*CFOVOLATILITY*, *SALESVOLATILITY*), low operating cash flows (*CFO*), occurrence of special items or extraordinary items (*EXITEMS*, *SPITEMS*), or operating in industries with greater litigation risk (*LITIGATION*) have a higher likelihood of financial misreporting or failure (see e.g., Cahan, Jeter, and Naiker 2011; Feng, Li, and McVay 2009; Ashbaugh-Skaife, Collins, and Kinney 2007; Hribar and Nichols 2007; McVay 2006; DeFond, Raghunandan, and Subramanyam 2002; Dechow, Sloan, and Sweeney 1995; Beattie et al. 1994; DeFond and Jiambalvo 1994). Relating these factors to audit report lag, Bamber, Bamber, and Schoderbek (1993) find that audit report lag is shorter for larger clients but longer for clients that have more lines of business, report extraordinary items, incur a net loss, or have higher bankruptcy risk. Knechel and Sharma (2012) show that better financial performance is associated with shorter audit report lags, while higher liquidity risk or debt levels are associated with longer audit report lags. Lu, Wu, and Yu (2017) find that M&A-related pressure leads auditors to increase their assessed level of audit risk, which results in a longer audit delay.

Our next set of control variables is related to specific events found in prior studies to be associated with audit delays. Ashton, Willingham, and Elliott (1987) find that audit report lags are longer for companies receiving qualified audit opinions (*AOPIN*). Schwartz and Soo (1996) find that audit report lags are longer (shorter) for companies that switch auditors (*AUDCHG*) later (early) in the fiscal year. We include a variable of going-concern (*GOING CONCERN*) because prior studies find a positive association between audit lags and having a going-concern opinion (Raghunandan and Rama 1995; Carcello, Hermanson, and Huss 1995). Ettredge, Li, and

Sum (2006) find that companies reporting material weaknesses (*MW*) in internal control over financial reporting experience longer audit delays. They also document a significant increase in audit delay associated with the fulfillment of the SOX Section 404 in 2004 (*SOX404B_1ST_YEAR*), which requires the assessment of internal control effectiveness by both management and the external auditors. We also control for whether the current year is the first year that the company is subject to SOX Section 404(b) (*SOX404B_1ST_FILING*). Following Blankley, Hurtt, and MacGregor 2014), we include a variable representing current restatements (*RESTATE*) because the auditor faces a significant amount of additional audit work in the year of a restatement announcement.[3] We also include an indicator variable *(LATE*) identifying firms that filed Form 10-K after the statutory due date as delays in financial report filings often reflect issues related to period-end accounting and audit processes (Cao, Chen, and Higgs 2016).

We control for four additional variables reflecting auditor's workload pressure and time constraints. We control for if the company has a fiscal year-end in December or January (*BUSYFYE*). We also include two variables capturing if the company is an accelerated filer or a large accelerated filer and, therefore, has a filing deadline of 75 days (*F10K_75*) or 60 days (*F10K_60*), respectively (Blankley et al. 2014; Whitworth and Lambert 2014) as shorter filing deadlines reduce the auditors' ability to extend the audit (Lambert, Jones, and Brazel 2014). We also control for the requirement of auditors to attest to management's assessment of the internal controls under SOX Section 404(b) (*SOX404B*) as this added reporting requirement may increase the time required complete the audit.

[3] Blankley et al. (2014) also control for prior restatements in either of the two years before the current year's audit report. Since the coefficient on this variable is insignificant in their audit lag model, we do not include it as a control.

GAO (2003) notes that it takes auditors at least two to three years to become adequately acquainted with a client's operations. We also control for auditor tenure (*TENURE_S)* as Lee, Mande, and Son (2006) find that audit lags decline as auditor tenure lengthens. We include audit fees (*LNAFEE*) to proxy for the overall input of audit effort after controlling for audit quality with the same two measures (*ADA* and *RMM*) that we include in the auditor choice model (Equation (1)). Finally, we include controls for year and industry fixed effects.

### 2.1. Data, Sample Selection, and Descriptive Statistics

We collect the following data from Audit Analytics database: audit report dates, audit fees, restatements of financial statements, SOX Section 302 reports, SOX Section 404 reports, audit opinions including going concern opinions, auditor changes, notifications of late filings, and indicators of accelerated filers and large accelerated filers. Other financial and audit data are collected from Compustat. The initial sample consists of 26,188 companies for which audit report dates and audit fee data are available over the period 2000 to 2018 inclusive. Our sample period begins in 2000 because audit fee data are available starting from 2000 and our analyses require data on audit fees. It ends in 2018 because our calculation of post-audit risk of material misstatement (*RMM*) requires future restatement data. Our search for subsequent restatement announcements pertaining to 2018 financial reports ends in 2020, as prior research indicates an average lag of two years between the end of the misstatement period and the restatement announcement (Cheffers et al. 2010). After merging with Compustat and deleting observations with missing values, we have 69,430 firm-year observations from 8,628 firms as our sample to perform propensity-score matching regression. We use Equation (1) to calculate the propensity scores and match one Big 4 client to one non-Big 4 client with the closest propensity scores in the same year and same industry without replacement and retain matches that are within a caliper

distance of 0.03. This leaves us with a propensity-score matched sample of 16,196 firm years (from 4,638 firms), which are evenly represented by Big 4 clients (8,098) and non-Big 4 clients (8,098).

Table 2 reports descriptive statistics for both the full and propensity-score matched samples of Big 4 and non-Big 4 clients. Panel A presents the descriptive statistics for the full sample. There are 69,430 firm-year observations in the full sample in which 50,251 and 19,179 are Big 4 and non-Big 4 clients, respectively. Following Eshleman and Guo (2014), for continuous variables, we performance a parametric t-test of the difference in means, and a non-parametric Kolmogorov-Smirnov (KS) test of the difference in distributions between Big 4 and non-Big 4 clients. Differences in means for indicator variables are tested using Chi-square tests. In the full sample, the mean (median) audit lag (*ARLAG*), the key variable of interest, is significantly shorter for the Big 4 clients than non-Big 4 clients (65.063 (59) vs. 81.023 (75)) with a difference of 16 (16) days.[4] Big 4 clients have significantly more assets (*LNASSETS*) than non-Big 4 clients, and a significantly larger portion of Big 4 clients are large accelerated filers (*F10K_60*) or accelerated filers (*F10K_75*) compared with non-Big 4 clients (38.1% vs. 8.3% and 26.4% vs. 18.2%, respectively). On average, Big 4 clients tend to be more profitable (*LOSS*, *ROA*) and have less underlying uncertainty (*CFOVOLATILITY*, *SALEVOLATILITY*) and lower bankruptcy risk (*GOING CONCERN*, *MOD_ALTMAN Z*). The risk of misstatement (*MW*, *RESTATE*) also tends to be lower for Big 4 clients than non-Big 4 clients. In our full sample, 4.9% of Big 4 clients report an auditor change (*AUDCHG*) compared to 15.4% for non-Big 4 clients, and, not surprisingly, the percentage of current auditors with a tenure of two years or less (*TENURE_S*) is significantly higher for non-Big 4 clients than Big 4 clients (24.0% vs. 11.1%). Turning to our

[4] Our mean audit lag is consistent with prior research. For example, Whitworth and Lambert (2014) report a mean audit lag of 65.4 days for clients of Big 4 auditors.

two measures of audit quality, Big 4 clients have significantly less discretionary accruals (*ADA*). Surprisingly, the mean (median) predicted probability of future misstatement (*RMM*) is significantly higher for Big 4 clients than for non-Big 4 clients (11.4% (9.7%) vs. 8.9% (7.0%)). However, this is consistent with the evidence presented by Eshleman and Guo (2014) who find that Big 4 clients have a higher frequency of subsequent restatements than non-Big 4 clients.

Panel B of Table 2 reports the descriptive statistics for the propensity-score matched sample. It is important to note that none of the control variables (*ADA*, *ATURN*, *CURR*, *LEVERAGE*, *LNASSETS*, *RMM*, *ROA*) that we include in the auditor choice model have means that are significantly different at the 10 percent level between the Big 4 and non-Big 4 groups, and three have distributions that are insignificantly different at the 5 percent level (*ADA*, *LNASSETS*, *RMM*), suggesting a balanced sample of two client types resulted from the propensity-score matching model. Of the 30 remaining control variables, 23 have means that are significantly different at the 5 percent level between the two client types. However, most of these variables have a difference of smaller magnitude than the same variable in the full sample. Turning to our variable of interest, we do not find the difference in mean audit lag (*ARLAG*) to be significant between the Big 4 and non-Big 4 client groups (74.312 vs. 75.160, $p = 0.185$, highlighting the importance of controlling for client characteristics and audit quality.

## 4. Empirical Results

Table 3 reports the results of estimating the regressions of audit report lags (*LNARLAG*) on the *BIG4* indicator variable and control variables (Equation (2)). Columns 4 and 5 report results when using the full sample, and Columns 6 and 7 report results when using the propensity-score matched sample. Most control variable coefficients are significant and have directional effects

consistent with those documented in the prior audit lag literature (Blankley et al. 2014; Whitworth and Lambert 2014; Knechel and Sharma 2012; Ettredge et al. 2006, Lee, Mande, and Son 2006).

Our model controls for audit effort by including variables capturing client's innate characteristics and audit quality (proxied by post-audit financial reporting quality). The full sample results show that the coefficient on *BIG4* (0.021) is positive and significant at the 1 percent level, suggesting a shorter audit delay for non-Big 4 auditors than Big 4 auditors after controlling for the extent of audit work. This finding does not support the notion that Big 4 auditors conduct audit more efficiently than non-Big 4 auditors. We estimate the same model using the propensity-score matched sample, which better control for the endogenous choice of auditor. The coefficient on *BIG4* (0.019) is positive and significant at the 5 percent level, which confirms our finding from the full sample. This implies that when conducting audit of clients of similar characteristics, non-Big 4 auditors could be more efficient than Big 4 auditor.

## 5. Additional Analysis

In this study, we use audit report lags to proxy for audit efficiency. Using a propensity-score matched sample, we find that audit lags are shorter for non-Big 4 auditors after controlling for client characteristics and audit quality. However, one could argue that shorter audit lags may be due to non-Big 4 auditors expending more resources in order to provide a more timely audit report rather than be an indicator of their higher audit efficiency. This is possible, as audit firms are likely to prioritize their more important clients. Whitworth and Lambert (2014) find that client importance is associated with longer audit lags except for the most important clients. They argue that auditors are more conservative for their more important clients and will devote more time to ensuring the accuracy of the financial statements resulting in higher levels of audit delay.

But on the other hand, the most important clients likely have more input into the timing of the audit and be prioritized and staffed with the most competent personnel leading to more efficient auditing and shorter audit delays.

In the group of Big 4 clients, the average firm size of clients in the matched sample is significantly smaller than that of the remaining Big 4 clients (mean total assets (mm): 430 vs. 7,559, $p = 0.000$). In contrast, in the group of non-Big 4 clients, clients in the matched sample are, on average, significantly larger than those outside the matched sample (mean total assets (mm): 425 vs. 57, $p = 0.000$). We use audit fees to proxy for audit input, and if our finding is driven by non-Big 4 (Big 4) auditors devoting more (less) audit resource to their more (less) important clients, then we expect non-Big 4 (Big 4) clients in the matched sample to pay a higher (lower) fee premium compared to those outside the matched sample. In addition, we do not expect the fee premium for Big 4 clients in the matched sample to be higher than the fee premium for non-Big 4 clients in the matched sample. To test these conjectures, we estimate the following audit fee model, controlling for the same risk and effort proxies used in our audit lag model (firm and year subscripts omitted).

$$\begin{aligned} LNAFEE = {} & \sigma_0 + \sigma_1 BIG4 + \sigma_2 MATCHED + \sigma_3 BIG4 \times MATCHED + \sigma_4 ADA \\ & + \sigma_5 AOPIN + \sigma_6 ATURN + \sigma_7 AUDCHG + \sigma_8 BM + \sigma_9 BUSYFYE \\ & + \sigma_{10} CFO + \sigma_{11} CFOVOLATILITY + \sigma_{12} CURR + \sigma_{13} EXITEMS \\ & + \sigma_{13} F10K\_60 + \sigma_{14} F10k\_75 + \sigma_{15} FINANCE + \sigma_{16} FOREIGN \\ & + \sigma_{17} GOING\ CONCERN + \sigma_{18} INVAR + \sigma_{19} LATE \\ & + \sigma_{20} LEVERAGE + \sigma_{21} LITIGATION + \sigma_{22} LNAGE \end{aligned} \quad (3)$$

$$+\sigma_{23}LNASSETS + \sigma_{24}LNAFEE + \sigma_{25}LNSEGMENT + \sigma_{26}LOSS$$

$$+\sigma_{27}MA + \sigma_{28}MOD\_ALTMAN\ Z + \sigma_{29}MW + \sigma_{30}RESTATE$$

$$+\sigma_{31}RETURN + \sigma_{32}RMM + \sigma_{33}ROA + \sigma_{34}SALESGROWTH$$

$$+\sigma_{35}SALESVOLATILITY + \sigma_{36}SOX404B$$

$$+\sigma_{37}SOX404B\_1ST\_FILING + \sigma_{38}SOX404B\_1ST\_YEAR$$

$$+\sigma_{39}SPITEMS+\sigma_{40}TENURE\_S$$

$$+Industry\ and\ Year\ Fixed\ Effects + \varepsilon$$

Where, *MATCHED* = 1 if the firm is in the propensity-score matched sample, and 0 otherwise. Definitions of other variables are provided in Table 1.

Table 4 reports the results of the audit fee model (Equation (3)). First, we find a positive and significant coefficient on *MATCHED* + *BIG4 X MATCHED* (0.067, p<0.01) indicating that Big 4 clients in the matched sample pay a higher fee premium than Big 4 clients outside the matched sample. Second, the coefficient on *MATCHED* (-0.003) is negative and insignificant, indicating that there is no significant difference in fee premiums paid by non-Big 4 clients in and outside the matched sample. Finally, the coefficient on *BIG4 X MATCHED* (0.070, p<0.01) is positive and significant at the 1 percent level, indicating that Big 4 clients pay a significantly higher fee premium than non-Big 4 clients in the matched sample after removing fee premium paid by the Big 4 clients outside the matched sample. These findings are inconsistent with the argument that the short audit lags for the non-Big 4 clients are due to higher audit input by non-Big 4 auditors in order to provide a more timely audit report.

Overall, the results in Tables 3 and 4 do not support the argument of higher audit efficiency of Big 4 auditors than non-Big 4 auditors.

## 6. Robustness Check

We perform a number of robustness tests. First, Glover, Hansen and Seidel (2022) provide evidence that audit report dates, previously coincided with the substantial completion of audit fieldwork, have shifted to coincide with the timing of the public issuance of clients' financial statements as a result of regulatory and audit practice changes, making audit report date a less effective proxy for auditor efficiency. This issue becomes more acute for samples with a substantial portion of post-June 2009 observations. To address this issue, we perform a robustness check by including in our sample only years before 2009. The results of the audit lag regression are reported in Table 5. Given more variance and less noise in audit report dates before 2009, we obtain even more significant results. The coefficients on *BIG4* are 0.055 and 0.035 for the full sample and the matched sample, respectively, and are both significant at the 1 percent level.

In our second robustness test, we exclude firm-years with any of the following situations: having an auditor change, receiving a modified opinion or a going concern opinion, having a late filing of Form 10-K, reporting internal control weaknesses, or disclosing a restatement of financial reports in the current year. This reduces our sample size to 54,209. We then redo the propensity-score matching and create a matched sample of 11,190 observations. The untabulated results of the audit lag regression show that the coefficients on *BIG4* are 0.018 ($p$ = 0.018) and 0.026 ($p$ = 0.005) for the full sample and the matched sample, respectively.

Finally, our results are robust to imposing different caliper width (e.g., 0.02, 0.05, or 0.1) when forming the propensity-score matched sample.

## 7. Conclusion

This study examines whether Big 4 auditors provide more efficient audit and on a timely matter than non-Big 4 auditors. We use audit report lags (audit timeliness) jointly with audit fees (audit input) as proxies for audit efficiency. In order to control for potential endogeneity related to self-selection bias inherent in this auditor-client setting, we use a propensity-score matching (PSM) approach to construct a pseudo random sample in which each non-Big 4 client is matched with a similar Big 4 client based on their characteristics and audit quality. Inconsistent with our hypothesis, our findings indicate that non-Big 4 auditors are positively and significantly associated with shorter audit delay and lower fee premiums than Big 4 auditors. Our finding does not support the notion that Big 4 auditors conduct audit more efficiently than non-Big 4 auditors.

It is interesting to see from our results that Big 4 auditor are associated with longer audit lag, indicating less audit efficiency. One possible interpretation is that Big 4 auditors are more conservative and have more lose in case of audit failure; consequently, they would expand their audit scopes and spend more hours on their audits to protect their reputation and avoid litigation costs, thus charge higher audit fees to their clients.

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Table 1: Variable Definitions

| | | |
|---|---|---|
| *BIG4* | = | 1 if the firm has a Big 4 auditor, and 0 otherwise. For years before 2002, the Big 4 is actually the Big 5 as it includes Arthur Anderson. |
| *LNARLAG* | = | Natural logarithm of audit report lag (*ARLAG*), where audit report lag is the number of days between the fiscal year-end date and the initial audit report date. |

Control Variables (in alphabetical order)

| | | |
|---|---|---|
| *ADA* | = | Absolute value of discretionary accruals, estimated using the performance-adjusted cross-sectional modified-Jones model (Kothari et al., 2005). |
| *AOPIN* | = | 1 if auditor's opinion modified for other than going concern, and 0 otherwise. |
| *ATURN* | = | Asset turnover computed as annual sales divided by the average total assets. |
| *AUDCHG* | = | 1 if the firm's auditor changes from the prior year, and 0 otherwise. |
| *BM* | = | Book-to-market computed as book value of common equity divided by the market value of common equity. |
| *BUSYFYE* | = | 1 if the firm's fiscal year-end is in either December or January, and 0 otherwise. |
| *CFO* | = | Operating cash flows divided by lagged total assets. |
| *CFOVOLATILITY* | = | The standard deviation of cash flow from operations divided by lagged total assets, calculated over the prior three fiscal years. |
| *CURR* | = | Current assets divided by current liabilities. |
| *EXITEMS* | = | 1 if the firm reports an extraordinary item, and 0 otherwise. |
| *F10K_60* | = | 1 if the firm is a large, accelerated filer that is required to file its annual report within 60 days of the fiscal year-end, and 0 otherwise. |
| *F10K_75* | = | 1 if the firm is an accelerated filer that is required to file its annual report within 75 days of the fiscal year-end. |
| *FINANCE* | = | 1 if long-term debt increases by at least 20 percent and/or the number of common stock outstanding increases by at least 10 percent after accounting for stock splits and stock dividends, and 0 otherwise. |
| *FOREIGN* | = | 1 if the firm has foreign operations as indicated by foreign currency adjustments to income, and 0 otherwise. |
| *GOING CONCERN* | = | 1 if the firm receives a going concern modified audit opinion, 0 otherwise. |
| *INVAR* | = | Inventory plus accounts receivable divided by total assets. |
| *LATE* | = | 1 if the firm filed Form 10-K after the statutory due date, and 0 otherwise. |
| *LEVERAGE* | = | Total debt divided by total assets. |
| *LITIGATION* | = | 1 if SIC code is 2833-2836, 3570-3577, 3600-3674, 5200-5961, 7370-7374, and 0 otherwise. |
| *LNAGE* | = | Natural logarithm of the number of years for which total assets is reported in Compustat since 1985. |
| *LNASSETS* | = | Natural logarithm of total assets. |
| *LNAFEE* | = | Natural logarithm of total audit fees. |
| *LNSEGMENT* | = | Natural logarithm of the sum of the number of business and geographic segments reported by the Compustat Segments file. |
| *LOSS* | = | 1 if net income is negative, and 0 otherwise. |
| *MA* | = | 1 if firm engaged in an acquisition or merger, and 0 otherwise. |
| *MOD_ALTMAN Z* | = | Modified Altman's Z-score to measure financial risk, following Shumway (2001), as: 1.51(CA-CL)/TA + 1.0(RE/TA) + 6.2(EBITA) + 0.1(MVEQ/TL) + 1.75(SALES/TA)<br>Where:<br>CA = Current assets<br>CL = Current liabilities<br>TA = Total assets |

| | | |
|---|---|---|
| | | RE = Retained earnings<br>EBITA = Earnings before interest and tax divided by total assets<br>MVEQ = Market value of common equity<br>TL = Total liabilities<br>SALES = Total sales |
| *MW* | = | 1 if the firm reported a material weakness in internal control, and 0 otherwise. |
| *RESTATE* | = | 1 if the firm restated financial reports in the current year, and 0 otherwise. |
| *RETURN* | = | Firm's raw stock return over the year. |
| *RMM* | = | Post-audit risk of material misstatement measured using the fitted value from the following logit model:<br>$REST = \alpha_0 + \alpha_1 BIG\ 4 + \alpha_2 AOPIN + \alpha_3 ATURN + \alpha_4 AUDCHG + \alpha_5 BTM + \alpha_6 CFO + \alpha_7 CFOVOLATILITY + \alpha_8 CURR + \alpha_9 EXT + \alpha_{10} FINANCE + \alpha_{11} FOREIGN + \alpha_{12} GOING\ CONCERN + \alpha_{13} ICFR404B + \alpha_{14} INVAR + \alpha_{15} LATE + \alpha_{16} LEVERAGE + \alpha_{17} LITIGATION + \alpha_{18} LNAGE + \alpha_{19} LNASSETS + \alpha_{20} LNSEGMENT + \alpha_{21} LOSS + \alpha_{22} MA + \alpha_{23} MOD\_ALTMAN\ Z + \alpha_{24} MW + \alpha_{25} RESTATE + \alpha_{26} RETURN + \alpha_{27} ROA + \alpha_{28} SALESGROWTH + \alpha_{29} SALESVOLATILITY + \alpha_{30} SPITEMS + \alpha_{31} STEN2 + Industry\ FE + Year\ FE + \varepsilon$<br>Where:<br>*REST* = 1 if the financial report for the current year is subsequently restated, and 0 otherwise. |
| *ROA* | = | Net income divided by average total assets. |
| *SOX404B* | = | 1 if the firm filed the auditor attestation report of internal control over financial reporting under SOX Section 404(b) during the current fiscal year, and 0 otherwise. |
| *SOX404B_1ST_FILING* | = | 1 if the firm is subject to SOX Section 404(b) (requiring auditor attestation of internal controls over financial reporting) for the first time in the current year, and 0 otherwise. |
| *SOX404B_1ST_YEAR* | = | 1 if the firm filed the auditor attestation report of internal control over financial reporting under SOX Section 404(b) during the first year of its implementation (between November 15, 2004 and November 14, 2005), and 0 otherwise. |
| *SALESGROWTH* | = | One-year growth rate of a firm's sales revenue, and the maximum value is winsorized at 2. |
| *SALESVOLATILITY* | = | The standard deviation of sales divided by total assets, calculated over the prior three fiscal years. |
| *SPITEMS* | = | Absolute value of special items divided by total assets. |
| *TENURE_S* | = | 1 if auditor tenure (the duration of the auditor-client relationship in years starting from 1985) is two years or less, and 0 otherwise. |

Table 2 Descriptive Statistics for Big 4 versus Non-Big 4 Samples

Panel A: Descriptive Statistics for Full Sample

| | Big 4 Clients (n = 50,251) | | | | | Non-Big 4 Clients (n = 19,179) | | | | | t-test | KS-test | $\chi^2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Q1 | Median | Q3 | Mean | SD | Q1 | Median | Q3 | p-value | p-value | p-value |
| *ARLAG** | 65.063 | 35.163 | 51.000 | 59.000 | 73.000 | 81.023 | 50.378 | 64.000 | 75.000 | 89.000 | 0.000 | 0.000 | — |
| *ADA* | 0.078 | 0.091 | 0.023 | 0.051 | 0.098 | 0.132 | 0.148 | 0.034 | 0.079 | 0.167 | 0.000 | 0.000 | — |
| *AOPIN* | 0.000 | 0.018 | 0.000 | 0.000 | 0.000 | 0.000 | 0.016 | 0.000 | 0.000 | 0.000 | — | — | 0.696 |
| *ATURN* | 1.011 | 0.757 | 0.483 | 0.831 | 1.318 | 1.210 | 0.924 | 0.532 | 1.018 | 1.644 | 0.000 | 0.000 | — |
| *AUDCHG* | 0.049 | 0.216 | 0.000 | 0.000 | 0.000 | 0.154 | 0.361 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *BM* | 0.523 | 0.945 | 0.241 | 0.443 | 0.744 | 0.488 | 1.452 | 0.165 | 0.472 | 0.908 | 0.000 | 0.000 | — |
| *BUSYFYE* | 0.767 | 0.423 | 1.000 | 1.000 | 1.000 | 0.661 | 0.474 | 0.000 | 1.000 | 1.000 | — | — | 0.000 |
| *CFO* | 0.059 | 0.166 | 0.030 | 0.084 | 0.137 | -0.036 | 0.265 | -0.090 | 0.033 | 0.111 | 0.000 | 0.000 | — |
| *CFOVOLATILITY* | 0.058 | 0.069 | 0.019 | 0.037 | 0.070 | 0.109 | 0.119 | 0.035 | 0.068 | 0.131 | 0.000 | 0.000 | — |
| *CURR* | 2.617 | 2.424 | 1.250 | 1.901 | 3.029 | 2.900 | 3.168 | 1.050 | 1.899 | 3.444 | 0.000 | 0.000 | — |
| *EXITEMS* | 0.202 | 0.402 | 0.000 | 0.000 | 0.000 | 0.145 | 0.353 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *F10K_60* | 0.381 | 0.486 | 0.000 | 0.000 | 1.000 | 0.083 | 0.275 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *F10K_75* | 0.264 | 0.441 | 0.000 | 0.000 | 1.000 | 0.182 | 0.386 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *FINANCE* | 0.312 | 0.463 | 0.000 | 0.000 | 1.000 | 0.389 | 0.488 | 0.000 | 0.000 | 1.000 | — | — | 0.000 |
| *FOREIGN* | 0.368 | 0.482 | 0.000 | 0.000 | 1.000 | 0.201 | 0.401 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *GOING CONCERN* | 0.029 | 0.168 | 0.000 | 0.000 | 0.000 | 0.163 | 0.370 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *INVAR* | 0.229 | 0.172 | 0.088 | 0.195 | 0.330 | 0.305 | 0.223 | 0.116 | 0.272 | 0.459 | 0.000 | 0.000 | — |
| *LATE* | 0.057 | 0.232 | 0.000 | 0.000 | 0.000 | 0.182 | 0.386 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *LEVERAGE* | 0.237 | 0.236 | 0.025 | 0.200 | 0.359 | 0.250 | 0.342 | 0.002 | 0.132 | 0.350 | 0.000 | 0.000 | — |
| *LITIGATION* | 0.346 | 0.476 | 0.000 | 0.000 | 1.000 | 0.348 | 0.476 | 0.000 | 0.000 | 1.000 | — | — | 0.700 |
| *LNAGE* | 2.644 | 0.545 | 2.197 | 2.773 | 3.045 | 2.644 | 0.554 | 2.197 | 2.773 | 3.091 | 0.942 | 0.000 | — |
| *LNASSETS* | 6.724 | 2.078 | 5.305 | 6.684 | 8.106 | 3.662 | 1.860 | 2.450 | 3.642 | 4.909 | 0.000 | 0.000 | — |
| *LNAFEE* | 13.836 | 1.321 | 12.948 | 13.862 | 14.705 | 12.140 | 1.125 | 11.396 | 12.093 | 12.869 | 0.000 | 0.000 | — |
| *LNSEGMENT* | 1.563 | 0.730 | 1.099 | 1.609 | 2.079 | 1.117 | 0.712 | 0.693 | 1.099 | 1.609 | 0.000 | 0.000 | — |
| *LOSS* | 0.325 | 0.468 | 0.000 | 0.000 | 1.000 | 0.525 | 0.499 | 0.000 | 1.000 | 1.000 | — | — | 0.000 |
| *MA* | 0.181 | 0.385 | 0.000 | 0.000 | 0.000 | 0.101 | 0.301 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *MOD_ALTMAN Z* | 2.089 | 4.378 | 1.202 | 2.551 | 4.001 | -1.011 | 9.748 | -1.464 | 1.886 | 3.940 | 0.000 | 0.000 | |
| *MW* | 0.055 | 0.228 | 0.000 | 0.000 | 0.000 | 0.155 | 0.362 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *RESTATE* | 0.069 | 0.253 | 0.000 | 0.000 | 0.000 | 0.080 | 0.271 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *RETURN* | 0.177 | 0.866 | -0.248 | 0.044 | 0.345 | 0.256 | 1.232 | -0.375 | -0.037 | 0.382 | 0.000 | 0.000 | — |
| *RMM* | 0.114 | 0.068 | 0.067 | 0.097 | 0.145 | 0.089 | 0.061 | 0.047 | 0.070 | 0.114 | 0.000 | 0.000 | — |
| *ROA* | -0.018 | 0.207 | -0.033 | 0.033 | 0.078 | -0.140 | 0.358 | -0.218 | -0.011 | 0.062 | 0.000 | 0.000 | — |
| *SALESGROWTH* | 0.115 | 0.358 | -0.033 | 0.067 | 0.194 | 0.115 | 0.473 | -0.095 | 0.049 | 0.215 | 0.916 | 0.000 | — |
| *SALESVOLATILITY* | 0.161 | 0.180 | 0.049 | 0.104 | 0.203 | 0.244 | 0.274 | 0.069 | 0.149 | 0.304 | 0.000 | 0.000 | — |
| *SOX404B* | 0.637 | 0.481 | 0.000 | 1.000 | 1.000 | 0.291 | 0.454 | 0.000 | 0.000 | 1.000 | — | — | 0.000 |
| *SOX404B_1ST_FILING* | 0.076 | 0.265 | 0.000 | 0.000 | 0.000 | 0.035 | 0.183 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *SOX404B_1ST_YEAR* | 0.044 | 0.206 | 0.000 | 0.000 | 0.000 | 0.011 | 0.106 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *SPITEMS* | 0.027 | 0.075 | 0.000 | 0.004 | 0.018 | 0.041 | 0.106 | 0.000 | 0.001 | 0.023 | 0.000 | 0.000 | — |
| *TENURE_S* | 0.111 | 0.314 | 0.000 | 0.000 | 0.000 | 0.240 | 0.427 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |

Panel B: Descriptive Statistics for Matched Sample

| | Big 4 Clients (n = 8,098) | | | | | Non-Big 4 Clients (n = 8,098) | | | | | t-test | KS-test | $\chi^2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Q1 | Median | Q3 | Mean | SD | Q1 | Median | Q3 | p-value | p-value | p-value |
| *ARLAG** | 74.312 | 38.640 | 58.000 | 70.000 | 82.000 | 75.160 | 42.653 | 59.000 | 72.000 | 84.000 | 0.185 | 0.000 | — |
| *ADA* | 0.103 | 0.116 | 0.030 | 0.065 | 0.131 | 0.105 | 0.121 | 0.028 | 0.065 | 0.132 | 0.213 | 0.088 | — |
| *AOPIN* | 0.000 | 0.016 | 0.000 | 0.000 | 0.000 | 0.000 | 0.016 | 0.000 | 0.000 | 0.000 | — | — | 1.000 |
| *ATURN* | 1.053 | 0.775 | 0.520 | 0.903 | 1.397 | 1.058 | 0.794 | 0.490 | 0.894 | 1.421 | 0.719 | 0.028 | — |
| *AUDCHG* | 0.050 | 0.217 | 0.000 | 0.000 | 0.000 | 0.162 | 0.368 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *BM* | 0.461 | 1.068 | 0.182 | 0.406 | 0.765 | 0.653 | 1.214 | 0.257 | 0.531 | 0.936 | 0.000 | 0.000 | — |
| *BUSYFYE* | 0.756 | 0.430 | 1.000 | 1.000 | 1.000 | 0.677 | 0.468 | 0.000 | 1.000 | 1.000 | — | — | 0.000 |
| *CFO* | -0.014 | 0.249 | -0.073 | 0.054 | 0.126 | -0.006 | 0.232 | -0.046 | 0.050 | 0.117 | 0.025 | 0.000 | — |
| *CFOVOLATILITY* | 0.091 | 0.098 | 0.032 | 0.059 | 0.111 | 0.089 | 0.100 | 0.029 | 0.056 | 0.106 | 0.117 | 0.000 | — |
| *CURR* | 3.108 | 2.755 | 1.430 | 2.298 | 3.784 | 3.066 | 3.021 | 1.258 | 2.110 | 3.682 | 0.352 | 0.000 | — |
| *EXITEMS* | 0.142 | 0.349 | 0.000 | 0.000 | 0.000 | 0.156 | 0.363 | 0.000 | 0.000 | 0.000 | — | — | 0.009 |
| *F10K_60* | 0.204 | 0.403 | 0.000 | 0.000 | 0.000 | 0.156 | 0.362 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *F10K_75* | 0.302 | 0.459 | 0.000 | 0.000 | 1.000 | 0.272 | 0.445 | 0.000 | 0.000 | 1.000 | — | — | 0.000 |
| *FINANCE* | 0.337 | 0.473 | 0.000 | 0.000 | 1.000 | 0.393 | 0.488 | 0.000 | 0.000 | 1.000 | — | — | 0.000 |
| *FOREIGN* | 0.347 | 0.476 | 0.000 | 0.000 | 1.000 | 0.272 | 0.445 | 0.000 | 0.000 | 1.000 | — | — | 0.000 |
| *GOING CONCERN* | 0.070 | 0.256 | 0.000 | 0.000 | 0.000 | 0.092 | 0.289 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *INVAR* | 0.254 | 0.190 | 0.097 | 0.217 | 0.373 | 0.281 | 0.205 | 0.111 | 0.247 | 0.412 | 0.000 | 0.000 | — |
| *LATE* | 0.088 | 0.283 | 0.000 | 0.000 | 0.000 | 0.138 | 0.345 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *LEVERAGE* | 0.201 | 0.289 | 0.000 | 0.085 | 0.301 | 0.204 | 0.259 | 0.001 | 0.115 | 0.318 | 0.520 | 0.000 | — |
| *LITIGATION* | 0.470 | 0.499 | 0.000 | 0.000 | 1.000 | 0.432 | 0.495 | 0.000 | 0.000 | 1.000 | — | — | 0.000 |
| *LNAGE* | 2.545 | 0.527 | 2.197 | 2.565 | 2.944 | 2.632 | 0.536 | 2.197 | 2.708 | 3.045 | 0.000 | 0.000 | — |
| *LNASSETS* | 4.724 | 1.639 | 3.623 | 4.715 | 5.819 | 4.714 | 1.641 | 3.609 | 4.753 | 5.791 | 0.689 | 0.581 | — |
| *LNAFEE* | 13.017 | 1.081 | 12.250 | 13.097 | 13.808 | 12.660 | 1.089 | 11.926 | 12.682 | 13.399 | 0.000 | 0.000 | — |
| *LNSEGMENT* | 1.361 | 0.724 | 0.693 | 1.386 | 1.946 | 1.274 | 0.716 | 0.693 | 1.386 | 1.792 | 0.000 | 0.000 | — |
| *LOSS* | 0.494 | 0.500 | 0.000 | 0.000 | 1.000 | 0.484 | 0.500 | 0.000 | 0.000 | 1.000 | — | — | 0.226 |
| *MA* | 0.142 | 0.349 | 0.000 | 0.000 | 0.000 | 0.138 | 0.345 | 0.000 | 0.000 | 0.000 | — | — | 0.442 |
| *MOD_ALTMAN Z* | 0.313 | 7.184 | -0.497 | 2.108 | 3.882 | 0.740 | 6.730 | 0.164 | 2.230 | 3.965 | 0.000 | 0.000 | — |
| *MW* | 0.099 | 0.299 | 0.000 | 0.000 | 0.000 | 0.111 | 0.314 | 0.000 | 0.000 | 0.000 | — | — | 0.015 |
| *RESTATE* | 0.074 | 0.261 | 0.000 | 0.000 | 0.000 | 0.076 | 0.265 | 0.000 | 0.000 | 0.000 | — | — | 0.591 |
| *RETURN* | 0.258 | 1.107 | -0.331 | 0.006 | 0.429 | 0.225 | 1.123 | -0.344 | -0.014 | 0.376 | 0.055 | 0.021 | — |
| *RMM* | 0.098 | 0.069 | 0.054 | 0.078 | 0.121 | 0.097 | 0.062 | 0.054 | 0.080 | 0.123 | 0.375 | 0.225 | — |
| *ROA* | -0.098 | 0.295 | -0.177 | 0.003 | 0.068 | -0.102 | 0.310 | -0.150 | 0.004 | 0.063 | 0.439 | 0.001 | — |
| *SALESGROWTH* | 0.124 | 0.440 | -0.073 | 0.064 | 0.228 | 0.130 | 0.451 | -0.071 | 0.062 | 0.221 | 0.426 | 0.166 | — |
| *SALESVOLATILITY* | 0.188 | 0.195 | 0.062 | 0.129 | 0.244 | 0.205 | 0.229 | 0.062 | 0.129 | 0.258 | 0.000 | 0.014 | — |
| *SOX404B* | 0.530 | 0.499 | 0.000 | 1.000 | 1.000 | 0.478 | 0.500 | 0.000 | 0.000 | 1.000 | — | — | 0.000 |
| *SOX404B_1ST_FILING* | 0.069 | 0.254 | 0.000 | 0.000 | 0.000 | 0.052 | 0.223 | 0.000 | 0.000 | 0.000 | — | — | 0.000 |
| *SOX404B_1ST_YEAR* | 0.029 | 0.169 | 0.000 | 0.000 | 0.000 | 0.022 | 0.146 | 0.000 | 0.000 | 0.000 | — | — | 0.002 |
| *SPITEMS* | 0.034 | 0.089 | 0.000 | 0.003 | 0.022 | 0.037 | 0.097 | 0.000 | 0.003 | 0.023 | 0.036 | 0.699 | — |
| *TENURE_S* | 0.134 | 0.341 | 0.000 | 0.000 | 0.000 | 0.292 | 0.455 | 0.000 | 0.000 | 1.000 | — | — | 0.000 |

*We use the log transformation (*LNARLAG*) in the regression analysis.

Table 3: Audit Efficiency Analysis Using Audit Report Lag: Big 4 vs. Non-Big 4 Auditors

| | Predicted Sign | Full Sample (n = 69,430) | | Propensity-Score Matched Sample (n = 16,196) | |
|---|---|---|---|---|---|
| | | Coeff. | t value | Coeff. | t value |
| Intercept | | 4.317*** | 61.75 | 4.259*** | 37.32 |
| *BIG4* | - | 0.021*** | 3.21 | 0.019** | 2.35 |
| *ADA* | ? | 0.063*** | 4.04 | 0.100*** | 3.78 |
| *AOPIN* | + | 0.167** | 2.28 | 0.220*** | 2.65 |
| *ATURN* | ? | -0.045*** | -9.78 | -0.058*** | -7.46 |
| *AUDCHG* | ? | -0.012** | -2.19 | -0.017* | -1.78 |
| *BM* | + | 0.015*** | 6.82 | 0.006* | 1.66 |
| *BUSYFYE* | + | 0.027*** | 4.49 | 0.026*** | 2.95 |
| *CFO* | - | 0.018 | 1.12 | -0.010 | -0.39 |
| *CFOVOLATILITY* | + | -0.092*** | -3.81 | -0.060 | -1.58 |
| *CURR* | - | -0.006*** | -6.55 | -0.006*** | -4.10 |
| *EXITEMS* | + | 0.009** | 2.11 | 0.013 | 1.53 |
| *F10K_60* | - | -0.049*** | -5.53 | -0.078*** | -5.88 |
| *F10K_75* | - | 0.021*** | 2.96 | -0.006 | -0.56 |
| *FINANCE* | + | 0.011*** | 3.41 | 0.009 | 1.50 |
| *FOREIGN* | + | 0.074*** | 12.51 | 0.049*** | 5.42 |
| *GOING CONCERN* | + | 0.078*** | 8.12 | 0.054*** | 3.60 |
| *INVAR* | + | 0.135*** | 7.14 | 0.142*** | 4.71 |
| *LATE* | + | 0.337*** | 45.39 | 0.335*** | 27.90 |
| *LEVERAGE* | + | 0.066*** | 6.86 | 0.056*** | 3.85 |
| *LITIGATION* | + | -0.005 | -0.56 | -0.005 | -0.33 |
| *LNAGE* | ? | -0.027*** | -5.52 | -0.006 | -0.85 |
| *LNASSETS* | - | -0.049*** | -13.37 | -0.040*** | -6.71 |
| *LNAFEE* | + | 0.017*** | 2.86 | 0.012 | 1.32 |
| *LNSEGMENT* | + | 0.004 | 1.07 | 0.011* | 1.77 |
| *LOSS* | + | 0.023*** | 5.06 | 0.020** | 2.48 |
| *MA* | + | -0.049*** | -10.28 | -0.038*** | -4.91 |
| *MOD_ALTMAN Z* | - | 0.001** | 2.47 | 0.001 | 1.62 |
| *MW* | + | 0.042*** | 3.35 | 0.088*** | 3.76 |
| *RESTATE* | + | -0.006 | -0.93 | -0.011 | -0.89 |
| *RETURN* | - | -0.001 | -0.89 | -0.005* | -1.95 |
| *RMM* | ? | 0.717*** | 8.10 | 0.528*** | 3.04 |
| *ROA* | - | 0.023* | 1.68 | 0.045** | 1.97 |
| *SALESGROWTH* | + | 0.003 | 0.69 | 0.001 | 0.18 |
| *SALESVOLATILITY* | + | 0.014 | 1.36 | 0.025 | 1.42 |
| *SOX404B* | + | -0.108*** | -15.17 | -0.113*** | -10.65 |
| *SOX404B_1ST_FILING* | + | 0.080*** | 11.12 | 0.060*** | 4.61 |
| *SOX404B_1ST_YEAR* | + | 0.071*** | 6.21 | 0.059** | 2.52 |
| *SPITEMS* | + | 0.036* | 1.70 | 0.044 | 1.29 |
| *TENURE_S* | + | 0.078*** | 13.04 | 0.057*** | 6.10 |
| *Industry FE* | | Included | | Included | |
| *Year FE* | | Included | | Included | |
| *Adjusted* $R^2$ | | 37.06% | | 33.18% | |

See Table 1 for variable definitions. All *p*-values are two-tailed. ***, **, * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. We cluster the standard errors by firm to correct the standard errors for serial-correlation.

Table 4: Audit Fee Premium

| | LNAFEE (n = 69,430) | |
|---|---|---|
| | Coeff. | t value |
| Intercept | 9.991 | 130.13 |
| *BIG4* | 0.228*** | 12.64 |
| *MATCHED* | -0.003 | -0.19 |
| *BIG4 x MATCHED* | 0.070*** | 3.74 |
| *ADA* | -0.054* | -1.72 |
| *AOPIN* | 0.129 | 0.47 |
| *ATURN* | 0.183*** | 17.87 |
| *AUDCHG* | 0.013 | 1.15 |
| *BM* | -0.044*** | -11.64 |
| *BUSYFYE* | 0.029** | 2.16 |
| *CFO* | -0.276*** | -9.22 |
| *CFOVOLATILITY* | 0.250*** | 5.10 |
| *CURR* | -0.018*** | -9.15 |
| *EXITEMS* | 0.145*** | 15.93 |
| *F10K_60* | 0.049*** | 2.59 |
| *F10K_75* | 0.055*** | 3.41 |
| *FINANCE* | -0.021*** | -3.75 |
| *FOREIGN* | 0.060*** | 5.06 |
| *GOING CONCERN* | 0.042** | 2.38 |
| *INVAR* | 0.170*** | 4.32 |
| *LATE* | 0.103*** | 8.24 |
| *LEVERAGE* | -0.153*** | -7.36 |
| *LITIGATION* | 0.017 | 0.79 |
| *LNAGE* | -0.004 | -0.39 |
| *LNASSETS* | 0.490*** | 98.37 |
| *LNSEGMENT* | 0.134*** | 15.34 |
| *LOSS* | 0.109*** | 12.27 |
| *MA* | 0.063*** | 6.14 |
| *MOD_ALTMAN Z* | -0.015*** | -13.47 |
| *MW* | 0.028 | 1.18 |
| *RESTATE* | 0.092*** | 7.88 |
| *RETURN* | 0.008*** | 3.15 |
| *RMM* | 1.195*** | 7.12 |
| *ROA* | -0.091*** | -3.45 |
| *SALESGROWTH* | -0.099*** | -13.67 |
| *SALESVOLATILITY* | -0.116*** | -5.78 |
| *SOX404B* | 0.310*** | 20.08 |
| *SOX404B_1ST_FILING* | 0.086*** | 6.59 |
| *SOX404B_1ST_YEAR* | 0.171*** | 8.48 |
| *SPITEMS* | 0.382*** | 10.44 |
| *TENURE_S* | -0.025** | -2.11 |
| *Industry FE* | Included | |
| *Year FE* | Included | |
| *Adjusted $R^2$* | 86.59% | |
| *MATCHED+BIG4 X MATCHED* | 0.067*** | F value = 83.69 |

See Table 1 for variable definitions. All *p*-values are two-tailed. ***, **, * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. We cluster the standard errors by firm to correct the standard errors for serial-correlation.

Table 5: Audit Efficiency Analysis Using Audit Report Lag: Big 4 vs. Non-Big 4 Auditors (2000 – 2008)

| | Predicted Sign | Full Sample (n = 36,136) Coeff. | t value | Propensity-Score Matched Sample (n = 8,302) Coeff. | t value |
|---|---|---|---|---|---|
| Intercept | | 3.847*** | 47.05 | 3.743*** | 26.37 |
| *BIG4* | - | 0.055*** | 6.11 | 0.035*** | 2.90 |
| *ADA* | ? | 0.089*** | 3.76 | 0.173*** | 4.13 |
| *AOPIN* | + | 0.193*** | 3.03 | 0.221* | 1.88 |
| *ATURN* | ? | -0.051*** | -8.52 | -0.066*** | -6.09 |
| *AUDCHG* | ? | -0.024*** | -2.96 | -0.027** | -1.96 |
| *BM* | + | 0.019*** | 6.68 | 0.004 | 0.71 |
| *BUSYFYE* | + | 0.024*** | 3.19 | 0.029** | 2.35 |
| *CFO* | - | 0.036 | 1.57 | -0.024 | -0.58 |
| *CFOVOLATILITY* | + | -0.148*** | -4.27 | -0.151*** | -2.72 |
| *CURR* | - | -0.008*** | -5.89 | -0.008*** | -3.37 |
| *EXITEMS* | + | 0.014** | 2.40 | 0.023* | 1.89 |
| *F10K_60* | - | 0.012 | 1.03 | -0.030 | -1.47 |
| *F10K_75* | - | 0.043*** | 5.03 | 0.005 | 0.34 |
| *FINANCE* | + | 0.015*** | 3.14 | 0.013 | 1.34 |
| *FOREIGN* | + | 0.067*** | 8.02 | 0.037** | 2.56 |
| *GOING CONCERN* | + | 0.099*** | 7.08 | 0.075*** | 3.41 |
| *INVAR* | + | 0.167*** | 6.84 | 0.177*** | 4.41 |
| *LATE* | + | 0.340*** | 37.21 | 0.317*** | 21.61 |
| *LEVERAGE* | + | 0.120*** | 9.20 | 0.094*** | 4.21 |
| *LITIGATION* | + | -0.020 | -1.61 | -0.005 | -0.27 |
| *LNAGE* | ? | -0.018** | -2.38 | 0.004 | 0.30 |
| *LNASSETS* | - | -0.074*** | -16.70 | -0.057*** | -6.80 |
| *LNAFEE* | + | 0.054*** | 7.70 | 0.055*** | 4.77 |
| *LNSEGMENT* | + | 0.003 | 0.53 | 0.009 | 0.96 |
| *LOSS* | + | 0.038*** | 5.41 | 0.030** | 2.44 |
| *MA* | + | -0.034*** | -3.29 | -0.015 | -0.71 |
| *MOD_ALTMAN Z* | - | 0.003*** | 3.36 | 0.003** | 1.96 |
| *MW* | + | 0.069*** | 3.42 | 0.103*** | 2.81 |
| *RESTATE* | + | 0.026*** | 2.76 | 0.005 | 0.27 |
| *RETURN* | - | 0.001 | 0.34 | -0.008* | -1.80 |
| *RMM* | ? | 0.614*** | 5.27 | 0.544** | 2.24 |
| *ROA* | - | 0.013 | 0.62 | 0.046 | 1.35 |
| *SALESGROWTH* | + | 0.007 | 1.15 | 0.010 | 1.02 |
| *SALESVOLATILITY* | + | 0.011 | 0.79 | 0.020 | 0.84 |
| *SOX404B* | + | -0.116*** | -11.06 | -0.147*** | -8.62 |
| *SOX404B_1ST_FILING* | + | 0.140*** | 11.45 | 0.094*** | 4.39 |
| *SOX404B_1ST_YEAR* | + | -0.006 | -0.42 | 0.020 | 0.69 |
| *SPITEMS* | + | 0.025 | 0.85 | 0.030 | 0.62 |
| *TENURE_S* | + | 0.083*** | 10.14 | 0.058*** | 4.35 |
| *Industry FE* | | Included | | Included | |
| *Year FE* | | Included | | Included | |
| *Adjusted* $R^2$ | | 34.78% | | 31.38% | |

See Table 1 for variable definitions. All *p*-values are two-tailed. ***, **, * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. We cluster the standard errors by firm to correct the standard errors for serial-correlation.