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Article

Does the Disclosure of an Audit Engagement Partner's Name Improve the Audit Quality? A Difference-in-Difference Analysis

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Abstract: On 15 December 2015, the Public Company Accounting Oversight Board (PCAOB) passed Rule 3211, requiring audit firms registered with PCAOB in the U.S. to disclose the audit engagement partner's name in the Form AP, effective 31 January 2017. The regulation aims to improve the transparency and quality of audits, thereby increasing investors' confidence in financial statements. Using the audit firms registered with the PCAOB and their clients as the treated sample, we employed a difference-in-difference analysis to investigate whether and the extent to which implementing Rule 3211 impacts audit quality and audit costs. We compared the audit quality (proxied by the abnormal discretionary accruals quality, the probability of restating the financial statements, and the ratio of the audit fees to the total fees) and audit costs (proxied by the total audit fees) from one year (up to three years) pre- to one year (up to three years) post-Rule 3211, to a control sample (comprised of U.K. audit firms, which were not subject to such regulation during the sample period). The empirical results generally indicate that there was an increase in the audit quality and in the audit costs from the pre- to the post-Rule 3211 period and also suggest that auditor independence increased in the post-regulation period compared to the pre-regulation period. Our empirical results are new and contribute to the research on the PCAOB and audits.

Keywords: Rule 3211; PCAOB; audit quality; audit fees; difference-in-difference; auditor independence



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1. Introduction

In this paper, we investigate the effect of implementing Rule 3211, which requires the audit firm to disclose the audit engagement partner's name in the Form AP on the audit quality and audit costs. Rule 3211, established by the Public Company Accounting Oversight Board (hereafter PCAOB) in the United States (U.S.), requires audit firms registered with the PCAOB to disclose certain participants in an audit engagement, such as the audit engagement partner (hereafter EP) and other audit firms (i.e., other audit participants) that conducted over 5% of the audit in Form AP on and after 31 January 2017.¹ We focus on the effect of disclosing the EP's name on the audit quality and audit fees because the EP is the one who is mainly responsible for the quality of the audit engagement and the percentage of disclosing other audit participants is a small portion of the filed Form AP.²

Using a novel empirical approach, our study makes several important contributions. We provide new comprehensive empirical evidence on the impact of implementing Rule 3211 on the audit quality over a long sample period, in addition to its impact over a relatively short period. We were able to document the benefits and costs of implementing Rule 3211 in the U.S. over a reasonably long period. The empirical results of this study also address the concern over whether the regulation achieves its goal to promote more

“informative, accurate, and independent audit reports,” thereby improving audit quality, increasing protection for investors, promoting efficiency, competition, and the formation of capital markets.

Before the passage of Rule 3211, there was a lengthy debate on the costs and benefits of implementing such a rule (or a similar one) in the U.S. Proponents of mandating disclosure of the EP’s identity argue that this disclosure may (1) increase the transparency of the audit process to inform investors as to the identity of the EP for the audit engagement and allow investors to learn the quality of the EP based on the quality of the work history of the EP (e.g., whether the EP is associated with any audit failure(s)); (2) increase the audit’s quality by motivating the EP to devote more effort so as to avoid audit failure(s); (3) increasing the quality of audited financial reports to provide more informative financial information to the capital market; (4) ultimately increasing the competitiveness and efficiency of markets (PCAOB 2011, 2013, 2015).

However, opponents of such a rule argue that implementing it may lead to unwanted consequences: (1) excessive auditing by conducting unnecessary audit procedures to avoid a possible audit failure(s) to maintain the EP’s reputation; (2) misleading investors who may make “unwarranted inferences about the EP” by holding her exclusively responsible for the quality of the audit engagement (as opposed to the audit team and/or audit firm) or creating more information asymmetry among investors, who may ignore other information that can be used to evaluate the EP’s performance and audit report (PCAOB 2013; King et al. 2012; Bailey et al. 2010).

After carefully reviewing comments and letters, the PCAOB finally passed Rule 3211 on 15 December 2015. The rule requires the disclosure of the EP’s identity on the Form AP as of 31 January 2017, and of other participants in the audit engagement as of 30 June 2017. The PCAOB also calls for empirical evidence on the benefits and costs of implementing Rule 3211 in the U.S. (PCAOB 2015, 2016).

To date, researchers have focused on the early evidence of the effect of implementing PCAOB Rule 3211 in the U.S. on the quality and costs of audits and investors’ investment decisions. Most studies examine the changes in the quality and costs of the audit five or six months after the implementation of Rule 3211, from the pre-regulation regime (e.g., Burke et al. 2019; Cunningham et al. 2019). These studies document an improvement in discretionary accrual quality (e.g., Burke et al. 2019; Cunningham et al. 2019), a decrease in FSCORE (a proxy to predict the probability of misstating financial statements and/or earnings management, as in (Dechow et al. 2011)), a higher chance of misclassifying suspected firms as a material weakness (INCORRECT-MV) (e.g., Cunningham et al. 2019), as well as an increase in audit fees from the pre-regulation to the post-regulation period. Using a sample of audit-client firms in the U.S. with a fiscal year end from December 2015 to December 2017, Abbott et al. (2021) found that in the post-disclosure period, auditors are less likely to issue a going concern opinion than in the pre-disclosure period. However, different attributes of audit quality (e.g., accruals quality, probability of restating financial statements, etc.) may be impacted by the implementation of PCAOB Rule 3211 over different time periods. The quality of accruals might be improved over a short period if the errors in the accruals can be detected and corrected within a short period, but improving audit quality may take longer if the auditors do not detect or/and cannot correct errors over a short term. Therefore, it is necessary to find out what the long-term effects of implementing Rule 3211 on audit quality are. The results of this paper provide first-hand empirical evidence on the long-term effects of implementing Rule 3211 on audit quality.

In addition to the aforementioned studies, using data from before the implementing Rule 3211 (i.e., 2013–2016), Dao et al. (2019) documented that EP disclosure is associated with a lower level of discretionary accruals and a higher probability of accounting firms detecting material weakness in the internal control. The sample period used by Dao et al. (2019) was from before the implementation of PCAOB Rule 3211, during which the tested sample firms, which voluntarily disclosed the EP’s name, demonstrated a higher audit quality, compared to the control firms. Therefore, we cannot be sure whether the significant

results documented in [Dao et al. \(2019\)](#) were due to sample selection or to the effect of disclosing the EP's identities. This paper uses samples from over a period of one year (up to three years) before and after the implementation of PCAOB Rule 3211, which required the disclosure of the EP's identity. Therefore, by comparing the audit quality before and after the mandatory disclosure of the EP's name, we might be able to tell whether disclosing the EP's name could improve audit quality, or vice-versa. In other words, our research design could help us to find out if there is any causal relationship between the implementation of PCAOB Rule 3211 and a change in audit quality.

Using a U.S. sample of firms over a period in which Form AP was available (1 February 2017 to 30 October 2019), [Doxey et al. \(2021\)](#) found that third-time Form AP filing is associated with lower bid-ask spread and less absolute abnormal return. Their evidence suggests that equity investors respond to the information disclosed in the Form AP, but only in a muted fashion. While the empirical results documented by [Doxey et al. \(2021\)](#) suggest that the implementation of PCAOB Rule 3211 does influence investors' financial decisions, this paper offers a direct link between the implementation of the rule and audit quality. Improving audit quality is one of the primary goals of PCAOB Rule 3211.

The existing evidence on the changes in the quality and costs of audit from the pre-Rule 3211 period to the post-Rule 3211 regime is very limited. The longest post-rule period that has been studied is 11 months. It is important to know what the changes over a longer post-rule period would look like. We believe that such evidence would be important not only for researchers but also the PCAOB. We aim to contribute to this lacuna in current research. We therefore examined the changes in quality and costs of audits over a period of more than 11 months post-rule, compared to the pre-Rule 3211 period.

We hypothesized that, in the disclosure regime, (1) audit quality would improve because, given the reputation costs for EPs, they would devote more effort to audit engagements to prevent audit failure; (2) audit costs would increase due to the performance of more audit procedures. To test our hypotheses, we used discretionary accruals (denoted by ABAQ), the occurrence of restating financial statements (denoted by Restatement), and the ratio of audit fees to total fees (denoted by AFRatio) to measure audit quality (e.g., [Rajgopal et al. 2021](#)). We used audit fees (LNAF) to measure the audit costs.

To compare the change in the audit quality and audit cost from the pre-regulation period to the post-regulation period, we used a balanced panel design. We separated one sample period into two windows: a pre- and a post-regulation window. To examine the effects of the implementation of PCAOB Rule 3211 on outcomes over different periods, we used one-year and three-year windows for both the pre- and the post-regulation periods. We called the one-year window the short-term window, and the three-year window the long-term window. To address the possible concern of latent heterogeneity, we first-differenced the variables used in the regression analyses.

Our univariate test results showed the following: there was an increase in the occurrence of restating financial statements over both the short term (one year) and the long term (three years) in the post-regulation period from the pre-regulation period. We also found that there was an increase in AFRatio and LNAF over the long-term window from the pre-regulation period to the post-regulation period. After first-differencing the variables of the sample that we used in our analyses, the univariate test results showed an increasing trend in the improvement of accrual quality over the short term in the post-regulation period, and a declining trend of restating financial statements over both the short term and the long term in the post-regulation period. These univariate results are not only statistically significant but also economically significant. For example, the change in ABAQ (denoted by ΔABAQ) decreased by 176.87% $((0.011 - (-0.008))/0.011)$ from the one-year pre-regulation period to the one-year post-regulation period, indicating an increasing trend of improving accrual quality from the pre-regulation to the post-regulation period. Furthermore, the univariate tests also documented an increase in the frequency of reported material internal control weakness (denoted by AUD_MW), while there was no significant change in increasing AUD_MW.

Controlling for other factors that may have influenced the dependent variables, we regressed the proxies for the costs and quality of audits on the indicator variable, which was coded as one if the firm filed an audit report with the PCAOB with a due date of or after 31 January 2017; otherwise it was coded as zero.

We found several interesting results. The results of using the baseline model documented (1) an increase in Restatement over the short term but not the long term in the post-regulation period, (2) an increase in AFRatio over the long term but not the short term in the post-regulation period, and (3) an increase in LNAF over both the short and long term in the post-regulation period. Using first-differenced tested U.S. firm data, the regression results documented a statistically significant increasing change in the ratio of audit fees to total fees (Δ AFRatio) and audit cost (Δ LNAF) when controlling for the factors that may influence the audit quality/cost from three years pre-regulation to three years post-regulation. The multivariate results using the tested U.S. sample firms indicated that there was an improvement in the audit quality (proxied by Restatement and AFRatio) and an increase in audit cost in the post-regulation period compared to the pre-regulation period. However, when we used a control sample comprised of U.K. firms, we could not reject the null hypotheses. Overall, our empirical results indicate that implementing PCAOB Rule 3211 is likely to improve audit quality, while it may also increase audit costs, although the magnitude of some improvements in audit quality may not be substantial enough to be statistically significant.

Existing empirical evidence on the effect of Rule 3211 on audit quality and audit fees is very limited, even though such evidence would be of crucial importance to the PCAOB and investor groups. An important contribution of our study is that it offers new empirical evidence by investigating a longer test window (up to three years) before and after the implementation of PCAOB Rule 3211, which may influence different attributes of audit quality over different time periods. We also used different empirical proxies (Restatement and AFRatio) for audit quality from those used in the existing research relevant to the impact of PCAOB Rule 3211. We were also able to study time-varying effects by differencing the variables used in the analyses. We documented a declining trend in the increases in the frequency of restating financial statements, and an increasing trend in the increases in the ratio of audit fees to the total fees (audit and non-audit), while the audit cost was also likely to increase in the post-regulation period compared to the pre-regulation period. Taken together, our empirical evidence indicates that engaging auditors' independence apparently increased, which could be the driver of the increased frequency of restating financial statements (Restatement) and reporting material internal control weakness (AUD_MW). However, we expect that these increases in Restatement and AUD_MW are likely to further decline in the near future, once the quality of financial statements reaches such a low level that the engaged auditor cannot detect material errors in the financial statements and internal control; by then, there is no need to restate financial statements and report material internal control weakness.

This paper proceeds as follows. Section 2 introduces the background of PCAOB Rule 3211, reviews relevant research, and develops our hypotheses. Section 3 describes the research methods used to test our hypotheses. Section 4 reports the results and their interpretation. Section 5 conducts a battery of robustness checks. Section 6 discusses our theoretical framework to explain what our empirical results suggest about the effects of the implementation of PCAOB Rule 3211 on the audit quality, especially unobserved auditor independence. Section 7 concludes the study.

2. Background, Relevant Literature, and Hypotheses Development

In February 2005, the Standing Advisory Group (hereafter SAG) in the U.S. discussed the matter of whether audit reports should be signed by the engagement partner. Some SAG members supported the proposal of requiring an EP to sign the audit report to increase the EP's accountability, thereby increasing the audit quality. Other SAG members expressed concerns about unwanted consequences, such as the argument that misleading users of

audit reports with regards to the entire quality of an audit engagement is the responsibility solely of the EP instead of the entire audit team.

In 2006, the European Union (EU) mandated that EU member countries must require a statutory auditor to sign the audit report through the requirement of the Eighth Company Law Directive (Directive 2006/43/EC).³ EU countries implemented this EP signature requirement on different dates.

In October 2008, the PCAOB again brought up the issue of whether the U.S. should mandate that the EP sign the audit report, in light of the wide implementation of EP signature requirements over the world and the proposed benefits of implementing a similar rule in the U.S.

Subsequently, the PCAOB (2009) received comments and letters on the potential costs and benefits of requiring the EP to sign the audit report. The possible benefits of mandating an EP's signature could be: (1) increasing the EP's own sense of accountability, and (2) increasing the transparency of the audit report in terms of who is responsible for its quality, thereby allowing the users of such information to make informed decisions, such as investing in firms audited by a high-quality EP whose quality could be inferred from his/her audit history (such as if the EP was related to any audit failure). However, opponents argued that mandating the EP's signature on the audit report may not increase audit quality because the audit quality was already high enough, while the requirement may increase the partner's litigation risk and audit costs because, to avoid any association with audit failure, the EP may conduct some unnecessary audit procedures, thereby, increasing audit costs. Therefore, in 2011, the PCAOB proposed to mandatorily disclose the EP's identity instead of signing the audit report.

After carefully reviewing the comments and letters regarding the potential benefits and costs of mandating the disclosure of the EP's identity, the PCAOB determined that such a requirement, without increasing the EP's litigation risk, would still increase the audit quality by increasing the sense of accountability of EPs, who would devote more effort to audit engagement. Therefore, in December 2015, PCAOB finally passed Rule 3211 mandating registered audit firms to disclose the EP's name and other audit participants' information for audit reports due on and after 31 January 2017 and 30 June 2017 on the Form AP, respectively.

Since mandating the disclosure of the EP's name is a relatively recent regulation, the currently existing empirical evidence on the costs and benefits of implementing such a regulation is still limited, and the benefits and costs of the regulation are still not certain.

Before the U.S. data became available, researchers used data from other countries to provide informative inferences to the U.S. regulators about the benefits and costs of the passage of the regulation. Using data from the United Kingdom (U.K.), researchers found that the EP signature requirement had some positive effects on different dimensions of the capital market. Carcello and Li (2013) found that there was an improvement in the audit quality and an increase in the audit fees from one year pre- to post-EP signature requirement. Liu (2017) found that the analysts' information environment improved from two years pre- to two years post-EP signature requirement. John et al. (2017) found that there was a decrease in information asymmetry between investors and management and a reduction in the cost of capital, and an increase in the value of the firms, from one year pre- to one year post-EP signature requirement. These studies provided some early inferences to the U.S. regulators on the benefits and costs of implementing a similar rule in the U.S. because of the cultural and legal similarities between the U.S. and U.K., which make the U.K. a comparable research site to the U.S.

After the implementation of Rule 3211 in the U.S., using the data of audit firms in the U.S., researchers found mixed results about the impact of Rule 3211 on the different dimensions of the capital market. The majority of currently available empirical evidence provides early evidence of the impact of implementing Rule 3211 on audit quality and audit fees over five–six months post-regulation period. We briefly reviewed the following most recent literature, which is most relevant to this study.

[Dao et al. \(2019\)](#) examined the impact of the PCAOB's requirement of disclosing the EP's name on the Form AP on the quality of audit engagement, proxied by discretionary accruals and the probability of detecting material weakness in the internal control. Using a U.S. sample of early disclosure of the EP's name over the period of 2013–2016, [Dao et al. \(2019\)](#) found the disclosure was associated with a lower level of discretionary accruals and a higher probability of accounting firms detecting material weakness in the internal control.

[Cunningham et al. \(2019\)](#) investigated whether and the extent to which disclosing the EP's name required by Rule 3211 influenced the quality and costs of audit services. [Cunningham et al. \(2019\)](#) used discretionary accruals, FSCORE as in [Dechow et al. \(2011\)](#) (a proxy used to predict the probability of misstating financial statements and/or earnings management), the chance of misclassifying suspected firms as material weakness (INCORRECT-MV) to measure audit quality. The results of their baseline model documented that Rule 3211 adoption was associated with an increase in audit quality and audit fees. Their difference-in-difference analyses documented an increase in audit fees when using the S&P 1500 firms that adopted Rule 3211 before the effective date (31 January 2017) as the control group, and an increase in the conservativeness of financial reports (the alternative proxy for audit quality, measured as BASU coefficient) when using firms with an audit report issued immediately before the effective date as the “pseudo adopter” control group. Collectively, [Cunningham et al. \(2019\)](#) provided early empirical evidence that implementing Rule 3211 has a limited impact on audit quality and fees.

[Burke et al. \(2019\)](#) investigated the overall effect of information made available after the implementation of PCAOB Rule 3211 on the audit quality and audit fees, as well as the effect of some EPs' characteristics on audit quality, using a US firm sample over a period of 31 January 2017, through May 2017 as the due date for filing Form AP with the PCAOB for U.S. public firms. [Burke et al. \(2019\)](#) found a statistically significant increase in audit quality (proxied by discretionary accruals) and audit fees, as well as a deduction in the audit delay in the post-regulation period. [Burke et al. \(2019\)](#) also examined whether and the extent to which the characteristics of the EP (e.g., gender, busyness, educational institution, and the social connections of the EP) influenced the quality and costs of audit and audit delay. They found some associations between the characteristics of the EP and audit fees and audit delay.

[Abbott et al. \(2021\)](#) examined whether and the extent to which implementing PCOAB Rule 3211, which requires the disclosure of certain audit engagement participants' identities, influences the auditor's propensity to issue a going concern report. Using a sample of audit client firms in the U.S. with a fiscal year end of from December 2015 to December 2017, [Abbott et al. \(2021\)](#) found that in the post-disclosure period, the auditors were less likely to issue a going concern opinion, compared to in the pre-disclosure period.

In addition to the impact of implementing Rule 3211 on audit quality over a short period (e.g., 5–6 months, up to 11 months) post-regulation, researchers examined the impact of this rule on the liquidity of the U.S. capital market. [Doxey et al. \(2021\)](#) investigated whether the implementation of PCAOB Rule 3211 influenced the investment decisions of users of this, which were proxied by trading volumes, absolute abnormal returns, and bid-ask spreads. Using a U.S. sample firm during the period in which Form AP was available (1 February 2017 to 30 October 2019), [Doxey et al. \(2021\)](#) found that third-time Form AP filing is associated with lower bid-ask spread and less absolute abnormal return. They also found that the detrended volume was negatively associated with the information of component auditors from non-PCAOB inspected jurisdictions. Their empirical evidence suggested that equity investors slightly responded to information disclosed in the Form AP. However, their results did not specifically provide empirical evidence on the impact of disclosing EPs' identity on investment decisions.

Although the above studies examined the impact of disclosing the EP's identity on the costs and quality of audits over a short period (usually less than 11 months) in the disclosure regime, it is important for regulators and capital market participants to know

whether and to what extent disclosure regulation influences the costs and quality of audits over a period of at least 12 months or longer in the regulation regime. The effects of implementation of PCAOB Rule 3211 on different dimensions of audit quality could be different over different lengths of time. For example, the auditor may take from a few days up to a few years to detect and report material errors in financial statements before restating them. Therefore, we attempted to explore the possible effects of Rule 3211 on the audit quality and costs from one year (up to three years) pre-Rule 3211 to one year (up to three years) post-Rule 3211.

Given aforementioned theoretical assumptions discussed in the PCAOB comments letters and since 2008 (PCAOB 2008, 2009, 2011, 2013, 2015), the EP's own sense of accountability would be expected to increase in the disclosure regime compared to when not disclosing the EP's name in the audit report because the EP does not want to risk his/her professional reputation, the quality of audit engagement which he/she supervises and is responsible for. Under the pressure of reputation costs that may be associated with any audit failure, the EP is expected to work harder and devote more effort to the audit engagement in the post-Rule 3211 period, compared to the pre-Rule 3211 period. Therefore, the audit quality should increase in the post-Rule 3211 period compared to the pre-Rule 3211 period. We state our first hypothesis in null form as follows:

Hypothesis 1 (H1). *There is no association between implementing Rule 3211 and audit quality in the U.S.*

Moreover, the audit costs could increase in the post-Rule 3211 period compared to the pre-Rule 3211 because the EP may over audit the clients' financial statements to avoid connection with any audit failure, which could cost the EP a significant amount in terms of his/her career and economic loss. The more audit procedures are conducted, the higher the audit fees. Therefore, we expected the audit fees to increase in the post-Rule 3211. Our second hypothesis is stated in null form as follows:

Hypothesis 2 (H2). *There is no association between implementing Rule 3211 and audit fees in the U.S.*

3. Research Method

3.1. Empirical Models

Adapting empirical models from previous studies (e.g., Carcello and Li 2013; Cunningham et al. 2019; Rajgopal et al. 2021), we used the following baseline model Equation (1) to test our H1 and H2. We suppressed the subscripts for firm (*j*) and fiscal year (*t*) in the Equation (1). In addition to analyzing the results of regression Equation (1), we also conducted our analyses through Equation (1) by first differencing all variables, except the industry dummies:

$$AQ_i/AF = \gamma_0 + \alpha_1 AP + \sum \gamma_k \text{Control}_k + \sum \beta_i \text{Industry}_i + \varepsilon \quad (1)$$

where AQ_i represents firm *j*'s value of the *i*th audit quality proxy in the fiscal year *t*, while *i* includes accruals quality (symbolized by ABAQ in this paper), the likelihood of restating financial statements (symbolized by Restatement in this paper), and the ratio of audit fees to the total fees of audit and non-audit (symbolized by AFRatio in this paper). Audit quality cannot be directly observed and is difficult to measure. In previous research (DeFond and Zhang 2014), audit quality was measured by audit input variables (e.g., auditor motivations, audit industry expertise), audit process variables (e.g., internal control), and audit outcome variables (e.g., financial reporting quality proxies—accruals quality, earnings response coefficient, conservativeness, restatements, litigation). In this study, we use these three proxies for audit quality for the following reasons.

First, improving audit quality, and consequently improving financial reporting quality, is one of main aims of PCAOB Rule 3211 in the U.S. Furthermore, accrual quality is a

commonly used proxy for audit quality. Therefore, we included it in this study to examine whether and to what extent the implementation of PCAOB Rule 3211 influenced the audit quality reflected in the financial reporting quality. Adapting the accrual quality measure from Kothari et al. (2005), we used the absolute value of the residual of regression of total accruals (scaled by the lag value of total assets) on the change in revenues (scaled by the lag value of total assets), PPE (scaled by the lag value of total assets), and ROA. The larger the value of ABAQ, the lower audit quality.

Second, Rajgopal et al. (2021) suggest that the probability of restating financial statements and the ratio of audit fees to total fees offer good predictive power for the degree of auditor independence and the strength of the internal control, the two unobserved audit input qualities. Third, in the PCAOB comments and letters, the supporters of PCAOB Rule 3211 argued that disclosing the EP's name could motivate the EP to devote more effort to the audit engagement, increase independence (e.g., proxied by the ratio of audit fees to total fees), and reduce the likelihood of being associated with adverse audit outcomes, such as restatements or material internal control weakness. Therefore, we used the probability of restating financial statements (Restatement) and the ratio of audit fees to the total fees of audit and non-audit (AFRatio). Restatements were coded as one if the financial statement for a certain firm-year was restated, and zero otherwise. Larger values of the variable Restatement indicated a higher chance of restating the financial statement for that firm-year. The AFRatio was measured as the amount of money paid for audit services scaled by the total amount of money paid for the audit service and non-audit service but performed by audit firm(s). The larger the value of the variable AFRatio the higher the audit quality.

The tested variable in the regression Equation (1) is AP, coded as one if the fiscal year is (later than or /and) the fiscal year filed first Form AP with PCAOB, zero otherwise. If the implementation of PCAOB Rule 3211 could improve audit quality, then we could expect the coefficients of the ABAQ and AFRatio to be negative and positive, respectively, in both level and first-differencing regressions. We did not predict the sign of the coefficient on the AP when the AQ_i was Restatement. The probability of restating financial statements may be higher after the implementation of PCAOB Rule 3211 because the auditor could be more independent and more likely to report the breach detected by the auditor in the client's financial statements when holding constant other factors that may lead to the restatement. However, we may also observe a decrease in the occurrence of restatements in the post-regulation period because auditors may try to avoid association with audit failure. In either scenario, we would expect a decreasing trend in the occurrence of restatements in the post-regulation period. Therefore, we expected the coefficient on the AP in the first-differencing regression of audit quality on the AP to be negative.

AF represents audit fees, the proxy for audit cost, measured by the natural logarithm value of the total audit fees in U.S. dollars, paid to the signing auditor. Compared to the pre-regulation period, if more audit procedure(s) were conducted in the post-regulation period, then we would expect the audit fees to increase in the post-regulation period. Therefore, we would expect the coefficient on AP in the regression with the dependent variable of AF to be positive. We did not predict the sign of coefficient on AP in the first-differencing regression with the dependent variable of ΔAF (the difference between the value of AF in the current period, t , and previous period, $t-1$) because the audit fee may not have displayed an increased trend after an increase in the amount of audit fees in the post-regulation period.

Control_k represents firm j 's value of the k th control variable in the fiscal year t . As into previous research (Carcello and Li 2013; Rajgopal et al. 2021), in Equation (1), we controlled for factors that may have influenced the outcome variables (audit quality and costs): size, $LLeverage$, the occurrence of loss in operation (Loss), market-to-book ratio (MB), sale growth rate (Growth), return on assets (ROA), the occurrence of material internal control weakness issued by the auditor (AUD_MW), foreign operations (Foreign), firm's busyness (Busy), Big4 audit firms (Big4), and industry dummy variables. In the first differencing regressions, the dependent and independent variables are the changes in the

values between current year and one-year prior. When the dependent variables are Restatement, AFRatio and AF in the Equation (1), we also control for ABAQ in addition to the aforementioned control variables because accrual quality may affect the occurrence of restatements, the ratio of audit fees to total fees, and total audit fees.

Appendix A summarizes the definitions of all the variables employed in our analyses.

3.2. Sample Selection and Descriptive Statistics

3.2.1. Sample Selection

We referred to [Greene and Liu \(2020\)](#)'s difference-in-difference analyses when constructing our empirical samples because we investigated a research question testing the effect (i.e., benefit, any improvement in audit quality, and cost, any increase in audit fees) the treatment (PCAOB Rule 3211) on a treated group (the publicly listed U.S. firms). We used a difference-in-difference research design to mitigate the possible confounding effects of economic events and other factors that may have influenced the outcomes of the regulation.

In order to determine the change in the audit quality and audit fees after the implementation of PCAOB Rule 3211, we split the sample period into two audit practice windows (i.e., the pre- and post-Rule 3211). To examine the short-term (and long-term) effect of PCAOB Rule 3211 on audit quality and audit fees, we used the last one (up to three) fiscal year(s) before the implementation of PCAOB Rule 3211 as the pre-Rule 3211 window(s) and the first one (three) fiscal year(s) with the PCAOB Rule 3211 requirement as the post-rule 3211 window(s).

To split the sample into the two windows, we needed find the cut-off date as the implementation date of PCAOB Rule 3211. The first date for disclosing the EP's name would be the event date (i.e., the date of the implementation of the rule).

PCAOB Rule 3211 requires that registered audit firms disclose the name of the engagement partner (EP), who charges the audit engagement for U.S. firms in the Form AP, as 31 January 2017. Rule 3211 also requires registered audit firms to disclose other audit participants, who are not the signing auditor but participate in the auditing of U.S. firms, in the Form AP, as of 30 June 2017. Therefore, we first began our sample selection from the PCAOB website to collect the first filing date of the Form AP (beginning from 31 January 2017 to 8 July 2021).⁴

Next, we collected financially and auditor-relevant (auditor opinions, disclosure of internal control material weakness, audit fees, non-audit fees and total fees, and restatements) data for the U.S. test firms from Compustat and Audit Analytics, respectively. We excluded banking firms because they are subject to different regulations and have different financial structures from other industries. We required the sample firms to have all the data available to compute the variables used in the analyses. We then merged the data from Compustat and Audit Analytics with the data we obtained from the PCAOB website by the central index key of the issuer and fiscal year. If there was more than one Form AP filed during a fiscal year, we only kept the first AP form with the disclosure of the EP's name for the following reasons.

First, doing so is to make the merger to base on the earliest date of the disclosure of the EP's name. Second, we could use the first Form AP filing date as the event cut-off date for a given U.S. firm to construct balanced panel design sample(s) to conduct difference-in-difference analyses, in order to test the effect of disclosing the EP's name on the audit quality and audit fees from the pre-regulation regime to the post-regulation regime. In other words, for a given U.S. firm, the fiscal year of the financial statements, audited by the EP, documented in the first filed Form AP would be the first year in the post-regulation regime, while the year immediately preceding the fiscal year documented in the first filed Form AP would be the first year pre-regulation.

We further required the sample firms to be the same in both pre- and post-regulation periods to meet the stable unit assumptions of difference-in-difference analyses. We first constructed the sample to test the effects of the implementation of PCAOB Rule 3211

on accrual quality from one year pre- to one year post-regulation window. We labeled this treated sample as one-year balanced panel designed ABAQ sample. To satisfy all the requirements imposed on the sample selection, we obtained 8312 observations (4156 distinct firms) for the one year balanced panel designed ABAQ sample. After deleting observations with missing values for audit fees and non-audit fees, we obtained 7220 observations (3610 distinct firms) as the one-year balanced panel designed ABAQ, Restatement, and AF treated sample, to test the effect of implementing PCAOB Rule on the other two audit quality proxies (i.e., occurrence of restatements and the ratio of audit fees to total audit and non-audit fees) as well as on audit costs/fees.

In addition to the requirements for the one-year balanced panel designed samples, we further required that the variables used in the analyses of the long-term effects of the implementation of PCAOB Rule 3211 on audit quality and audit fees had three years of consecutive data available in both the pre- and post-regulation windows. For example, if the firm *j*'s signing auditor first filed Form AP with the PCAOB for the firm *j*'s financial statement ending in 2017, then the firm *j* was required to have data available to compute all the variables used in the analyses in from 2014–2016 as the pre-regulation window and 2017–2019 as the post-regulation window. To satisfy all the requirements for the data availability, we obtained 16,800 (16,098) observations (2800 (2683) distinct firms) as the three-year balanced panel designed ABAQ (ABAQ, Restatement, and AF) sample.

Table 1 summarizes the sample selection procedures.

Table 1. Sample Selection.

Descriptions	Distinct Firms
Form AP disclosing the EP's name from 31 January 2017 to 8 July 2021	19,715
Less: When a CIK has more than one observation, keep only the first filed Form AP	(1)
Potential firms in the sample	19,714
Less: Firms missing data with which to compute accrual quality for the one-year balanced panel design sample	(15,558)
One-year pre- and one year post-regulation balanced panel accrual quality (ABAQ) sample	4156
Less: Firms missing data of audit fees and non-audit fees in Audit Analytics	
for one-year balanced panel sample	(546)
One-year pre- and one-year post-regulation balanced panel ABAQ, Restatement, and AF sample	3610
Less: Firms missing data with which to compute accrual quality for the three-year balanced panel ABAQ sample	(810)
Three-year pre- and three-year post-regulation balanced panel accrual quality (ABAQ) sample	2800
Less: Firms missing data of audit fees and non-audit fees in Audit Analytics	
for three-year balanced panel design sample	(117)
Three-year pre- and three-year post-regulation balanced panel ABAQ, Restatement, and AF sample	2683

This table summarizes the sample selection procedure for the tested U.S. firms used in one-year and three-year balanced panel samples. The U.K. control sample was subject to the same selection criteria as the tested U.S. firms. The one-year (three-year) balanced panel designed U.K. control comprised 858 (563) distinct firms.

To minimize the possible issue of omitted variables and confounding effects on analysts' information environment, we constructed control samples, comparing the U.S. firms to firms listed in the London Stock Exchange in the United Kingdom (U.K.). The U.K. implemented a requirement similar to the PCAOB Rule 3211, requiring the EP to sign the auditor's report, effective in 2009. Therefore, the U.K. control firms were not subject to the change in regulation during the tested sample period, while the U.S. firms were subject to the change in PCAOB Rule 3211 requirement during the sample period. We applied the

criteria used to select the U.S. firms for the U.K. control firms. We obtained the financial, security, and audit fee data for the U.K. firms from WorldScope.⁵

However, because restating financial statements in the U.K. is very rare, we did not obtain the data separating audit fees and non-audit fees for the U.K. firms. Therefore, we used the total amount of audit fees and non-audit fees (symbolized as LNTF) to substitute total audit fees (LNAF) as the proxy for the audit costs in the analyses of the U.K. control sample. Thus, we only output the results of the regressions of ABAQ and LNTF in Section 5. The selection procedure led to a control sample of one year (up to three years) balanced panel designed U.K. controls with 1716 observations (858 distinct firms) (3378 observations (563 distinct firms)).

3.2.2. Sample Descriptive Statistics

The tabulated statistics are based on the data winsorized at the 1st and 99th percentiles to avoid the effect of extreme-value outliers.

Table 2 provides descriptive statistics for the test ABAQ, Restatement and the AF test sample using data with and without first-differencing. Panel A (E) (C (G)) and B (F) (D (H)) of Table 2 reports sample descriptive statistics for the one (three) year pre-regulation window and the one (three) year post-regulation window, respectively. Table 2 also provides univariate comparisons for potential differences between the pre- and post-regulation windows within the sample.

As demonstrated in Panel A (B) (C (D)) of Table 2, for the U.S. ABAQ sample (with first-differenced variables), the means of ABAQ, Restatement, AFRatio, and LNAF (after first-differencing) are 0.123 (0.123) (0.011 (−0.008)), 0.052 (0.063) (0.039 (0.012)), 0.865 (0.869) (0.004 (0.004)) and 13.641 (13.690) (0.023 (0.055)) in the one year pre-regulation window, respectively. While the level of ABAQ did not statistically change from one year pre-regulation regime to one year post-regulation regime, the accrual quality demonstrated statistically significant improvement from one year pre-regulation period to one-year post-regulation period. The improvement in accrual quality after the implementation of PCAOB Rule 3211 was also economically significant: the change in ABAQ (Δ ABAQ) decreased by 176.87% $((0.011 - (-0.008))/0.011)$ from the one-year pre-regulation period to the one-year post-regulation period.⁶ The occurrence of restating financial statements was statistically significant (at 0.05), higher by 0.011 in the one-year post-regulation window compared to the one-year pre-regulation window, with a statistically significant (at 0.01 level) decreasing trend in the one-year post-regulation period. The decreasing trend in the occurrence of restating financial statements in the one-year post-regulation window compared to the one-year pre-regulation window was not only statistically significant but also economically significant, with important litigation indication: the change in the occurrence of restatement decreased by 69.23% $((0.039 - 0.012)/0.039)$ from the one-year pre-regulation regime to the one-year post-regulation regime. According to the nonparametric analyses of the differences in the median values of the variables, changes in occurrence of restatement displayed a decreasing trend from one-year pre-regulation period to one-year post-regulation period. These univariate test results indicated that the accrual quality improved when using data with and without first-differencing and the incidence of restatement displayed a decreasing trend when using first-differenced data in the one-year post-regulation period compared to the one-year pre-regulation period.

Table 2. Descriptive Statistics and Univariate Test for the U.S. Firms.

Panel A: Descriptive Statistics for the ABAQ, Restatement, and AF of U.S. sample firms in 1-year pre-Rule 3211 period.					
Variable	Mean	Median	Std	Q1	Q3
ABAQ	0.123	0.056	0.247	0.022	0.118
Restatement	0.052	0.000	0.222	0.000	0.000
AFRatio	0.865	0.906	0.142	0.796	0.984
LNAF	13.641	13.824	1.613	12.550	14.742
LNTF	13.702	13.864	1.622	12.588	14.806
Size	6.236	6.530	2.895	4.469	8.244
Leverage	1.002	0.548	2.894	0.350	0.741
Loss	0.421	0.000	0.494	0.000	1.000
MB	2.532	1.828	9.151	0.876	3.591
Growth	0.096	0.013	0.646	−0.101	0.123
ROA	−0.359	0.016	1.807	−0.115	0.063
AUD_MW	0.034	0.000	0.180	0.000	0.000
Foreign	0.548	1.000	0.498	0.000	1.000
Busy	0.744	1.000	0.437	0.000	1.000
NegRet	0.604	1.000	0.489	0.000	1.000
Big4	0.655	1.000	0.475	0.000	1.000
Panel B: Descriptive Statistics for the ABAQ, Restatement, and AF of U.S. sample firms in 1-year post-Rule 3211 period.					
Variable	Mean	Median	Std	Q1	Q3
ABAQ	0.123	0.055	0.247	0.023	0.117
Restatement	0.063 **	0.000 **	0.244	0.000	0.000
AFRatio	0.869	0.911	0.140	0.797	0.987
LNAF	13.690	13.881	1.611	12.595	14.789
LNTF	13.749	13.921	1.621	12.650	14.842
Size	6.244	6.578	2.952	4.463	8.281
Leverage	1.134 *	0.565 **	3.315	0.366	0.770
Loss	0.413	0.000	0.492	0.000	1.000
MB	2.440	1.968 **	9.840	0.950	3.692
Growth	0.082	0.022	0.576	−0.081	0.122
ROA	−0.379	0.016	1.899	−0.099	0.063
AUD_MW	0.041 *	0.000*	0.199	0.000	0.000
Foreign	0.557	1.000	0.497	0.000	1.000
Busy	0.749	1.000	0.434	0.000	1.000
NegRet	0.378 ***	0.000 ***	0.485	0.000	1.000
Big4	0.648	1.000	0.478	0.000	1.000
Panel C: Descriptive Statistics for the ABAQ, Restatement, and AF of U.S. sample firms in 1-year pre-Rule 3211 period, after 1st-differencing data.					
Variable	Mean	Median	Std	Q1	Q3
ΔABAQ	0.011	0.000	0.426	−0.029	0.032
ΔRestatement	0.039	0.000	0.214	0.000	0.000
ΔAFRatio	0.004	0.000	0.135	−0.025	0.041
ΔLNAF	0.023	0.025	1.068	−0.068	0.140
ΔLNTF	0.017	0.022	0.790	−0.086	0.152
ΔSize	0.018	0.005	0.573	−0.097	0.112
ΔLeverage	1.345	0.009	57.275	−0.025	0.060
ΔLoss	0.055	0.000	0.409	0.000	0.000
ΔMB	−3.470	−0.127	139.914	−0.723	0.354
ΔGrowth	−3.240	−0.048	160.405	−0.190	0.048
ΔROA	0.038	−0.004	1.961	−0.051	0.020
ΔAUD_MW	0.001	0.000	0.213	0.000	0.000
ΔForeign	0.017	0.000	0.134	0.000	0.000
ΔNegRet	0.111	0.000	0.678	0.000	1.000
ΔBusy	0.001	0.000	0.037	0.000	0.000
ΔBig4	−0.006	0.000	0.142	0.000	0.000

Table 2. Cont.

Panel D: Descriptive Statistics for the ABAQ, Restatement, and AF of U.S. sample firms in 1-year post-Rule 3211 period, after 1st-differencing data.					
Variable	Mean	Median	Std	Q1	Q3
ΔABAQ	−0.008 *	0.000	0.420	−0.031	0.031
ΔRestatement	0.012 ***	0.000 ***	0.262	0.000	0.000
ΔAFRatio	0.004	0.000	0.138	−0.026	0.032
ΔLNAF	0.055	0.026	1.171	−0.059	0.134
ΔLNTF	0.052 *	0.025	0.944	−0.068	0.145
ΔSize	0.006	0.020 **	0.538	−0.082	0.112
ΔLeverage	0.350	0.005 **	49.744	−0.027	0.053
ΔLoss	−0.008 ***	0.000 ***	0.395	0.000	0.000
ΔMB	−1.085	0.137 ***	114.131	−0.344	0.685
ΔGrowth	−0.496	0.005 ***	28.657	−0.107	0.116
ΔROA	−0.029	0.000 ***	1.865	−0.035	0.036
ΔAUD_MW	0.008	0.000	0.224	0.000	0.000
ΔForeign	0.009 **	0.000 **	0.137	0.000	0.000
ΔNegRet	−0.226 ***	0.000 ***	0.709	−1.000	0.000
ΔBusy	0.005	0.000	0.070	0.000	0.000
ΔBig4	−0.007	0.000	0.140	0.000	0.000
Panel E: Descriptive Statistics for the ABAQ, Restatement, and AF of U.S. sample firms in 3-year pre-Rule 3211 period.					
Variable	Mean	Median	Std	Q1	Q3
ABAQ	0.090	0.049	0.137	0.021	0.101
Restatement	0.066	0.000	0.249	0.000	0.000
AFRatio	0.860	0.898	0.139	0.785	0.977
LNAF	13.819	13.943	1.541	12.835	14.845
LNTF	13.882	14.000	1.553	12.888	14.913
Size	6.630	6.836	2.670	4.929	8.437
Leverage	0.635	0.526	0.799	0.342	0.705
Loss	0.326	0.000	0.469	0.000	1.000
MB	3.018	2.082	7.361	1.121	3.774
Growth	0.086	0.037	0.429	−0.051	0.130
ROA	−0.107	0.031	0.634	−0.034	0.074
AUD_MW	0.032	0.000	0.176	0.000	0.000
Foreign	0.570	1.000	0.495	0.000	1.000
Busy	0.736	1.000	0.441	0.000	1.000
NegRet	0.433	0.000	0.496	0.000	1.000
Big4	0.703	1.000	0.457	0.000	1.000
Panel F: Descriptive Statistics for the ABAQ, Restatement, and AF of U.S. sample firms in 3-year post-Rule 3211 period.					
Variable	Mean	Median	Std	Q1	Q3
ABAQ	0.091	0.050	0.137	0.022	0.102
Restatement	0.074 *	0.000	0.262	0.000	0.000
AFRatio	0.869 ***	0.908 ***	0.134	0.797	0.981
LNAF	13.960 ***	14.125 ***	1.541	12.971	14.999
LNTF	14.017 ***	14.168 ***	1.554	13.024	15.062
Size	6.747 ***	7.044 ***	2.715	5.058	8.602
Leverage	0.690 ***	0.557 ***	0.912	0.370	0.732
Loss	0.342 **	0.000	0.475	0.000	1.000
MB	2.889	1.958 ***	7.562	1.004	3.692
Growth	0.096	0.050 ***	0.407	−0.033	0.145
ROA	−0.109	0.028	0.659	−0.037	0.073
AUD_MW	0.042 ***	0.000	0.200	0.000	0.000
Foreign	0.599 ***	1.000	0.490	0.000	1.000
Busy	0.742	1.000	0.437	0.000	1.000
NegRet	0.462 ***	0.000	0.499	0.000	1.000
Big4	0.681 ***	1.000	0.466	0.000	1.000

Table 2. Cont.

Panel G: Descriptive Statistics for the ABAQ, Restatement, and AF of U.S. sample firms in 3-year pre-Rule 3211 period, after 1st-differencing.					
Variable	Mean	Median	Std	Q1	Q3
ΔABAQ	0.002	0.000	0.300	−0.026	0.027
ΔRestatement	0.020	0.000	0.253	0.000	0.000
ΔAFRatio	0.004	0.000	0.130	−0.028	0.039
ΔLNAF	0.042	0.031	1.048	−0.046	0.133
ΔLNTF	0.041	0.031	0.859	−0.061	0.143
ΔSize	0.052	0.031	0.399	−0.053	0.123
ΔLeverage	0.443	0.005	36.465	−0.026	0.046
ΔLoss	0.018	0.000	0.382	0.000	0.000
ΔMB	0.343	0.045	66.695	−0.412	0.576
ΔGrowth	−0.133	−0.016	8.552	−0.124	0.072
ΔROA	0.001	−0.002	1.302	−0.032	0.020
ΔAUD_MW	0.003	0.000	0.203	0.000	0.000
ΔForeign	0.165	0.000	0.372	0.000	0.000
ΔBusy	0.086	0.000	0.657	0.000	1.000
ΔNegRet	0.001	0.000	0.047	0.000	0.000
ΔBig4	−0.006	0.000	0.144	0.000	0.000
Panel H: Descriptive Statistics for the ABAQ, Restatement, and AF of U.S. sample firms in 3-year post-Rule 3211 period, after 1st-differencing.					
Variable	Mean	Median	Std	Q1	Q3
ΔABAQ	−0.001	0.000	0.360	−0.027	0.027
ΔRestatement	0.001 ***	0.000 ***	0.281	0.000	0.000
ΔAFRatio	0.004	0.000	0.128	−0.025	0.035
ΔLNAF	0.050	0.032	1.103	−0.047	0.133
ΔLNTF	0.046	0.033	0.923	−0.056	0.142
ΔSize	0.043	0.029	0.363	−0.048	0.117
ΔLeverage	3.095	0.000 ***	174.090	−0.032	0.041
ΔLoss	−0.006 ***	0.000	0.419	0.000	0.000
ΔMB	13.772	−0.005 ***	1291.340	−0.517	0.501
ΔGrowth	−0.139	0.011 ***	9.848	−0.088	0.117
ΔROA	0.004	0.001 ***	1.282	−0.031	0.035
ΔAUD_MW	0.003	0.000	0.235	0.000	0.000
ΔForeign	0.004 ***	0.000	0.125	0.000	0.000
ΔBusy	0.018	0.000	0.723	−1.000	1.000
ΔNegRet	0.002 ***	0.000	0.057	0.000	0.000
ΔBig4	−0.007	0.000	0.137	0.000	0.000

Panels A and B (C and D, using data after 1st-differencing) (Panels E and F (G and H, using data after 1st-differencing)) report the descriptive statistics of proxies for audit quality (ABAQ, Restatement, AFRatio) and audit cost (LNAF) and the total audit and non-audit fees (LNTF) for the control variables used in the regression analyses for the U.S. test sample in the pre- and post-regulation period, respectively. The sample statistics are based on the test sample of 3,610 distinct firms from the U.S. from one-year (three-year) pre- to one-year (three-year) post-regulation period. *, **, and *** indicate statistical significance in mean (median) values of differences in the variables from pre- to post-regulation period at the 10%, 5%, and 1% levels, respectively, based on two-tailed t-statistics (and two-sided Wilcoxon test). Please refer to the variable measurements in Appendix A.

The univariate tests presented in Panel A–D of Table 2 also show a few independent variables with statistically significant changes from the one-year pre-regulation period to the one-year post-regulation period: an increase in leverage with a decreasing trend and a reduction in the occurrence of negative stock return (NegRet), with an increasing deduction trend.

As in the analyses of Panel A (B) (C (D)) of Table 2, the results of Panels E–H of Table 2 show that: from the three-year pre-regulation period to the three-year post-regulation period, (1) there was an increase in the mean value of ABAQ and Restatement, but a decrease in the change in ABAQ and Restatement; and (2) there was an increase in the mean values of AFRatio, total audit fees (LNAF), and total fees of audit and non-audit.

Overall, the results of the univariate tests in Table 2 suggested that there was an improvement in the audit quality over the short and long term, while there was an increase in the audit cost over the long term, after the implementation of PCAOB Rule 3211. These results were consistent with our hypotheses. However, since these results were possibly due to other factors, we conducted further multivariate analyses, which are discussed in the next section.

4. Results

4.1. Correlations

Panel A (B) of Table 3 report the correlation matrix of the variables used in our analyses for one-year (three-year) balanced panel designed sample.

In Panel A of Table 3, the Pearson (Spearman) correlations for the pair of ABAQ and Restatement, AFRatio, and LNAF are 0.041 (p -value < 0.01) (0.017 (p -value > 0.1)), 0.045 (p -value < 0.01) (0.076 (p -value < 0.01)), and -0.385 (p -value < 0.01) (-0.326 (p -value < 0.01)), respectively. These correlation coefficients indicate that ABAQ, Restatement, and AFRatio capture different attributes of the audit quality. This is consistent with the conventional rationale that a firm-year with a lower accrual quality is likely to restate its financial statements. Both Pearson and Spearman correlations between AP and Restatement are positive and statistically significant. As we discussed in Section 3.1, this phenomenon may have occurred because, with the greater level of scrutiny in the post-regulation period compared to the pre-regulation period, auditors may have been more likely to detect the material errors in client financial statements; and, being more independent, auditors may have been more likely to report the detected errors in the financial statements. Therefore, we may observe a greater occurrence of restatements. Consistent with previous research, ABAQ (and Restatement) is positively associated with Leverage, Loss, Growth, and NegRet, as well as negatively associated with Size, ROA, and Big4.

The analyses presented in Panel B of Table 3 are similar to those of Panel A of Table 3. In general, in Panel B of each table, the relationships among variables used in our regression analyses are the same, while the correlations between the control variables in the regression and the outcome variables (i.e., ABAQ, Restatement, AFRatio, and LNAF) had a stronger statistical significance than those in Panel A of Table 3.

The correlations between the control variables did not indicate a collinearity concern.

Table 3. Pearson (above the diagonal) and Spearman (below the diagonal) correlations for variables in the regression analyses.

Panel A: Correlations for the one-year balanced panel designed ABAQ, Restatement, and AF of U.S. sample firms.															
Variable	ABAQ	Restatement	AFRatio	LNAF	LNTF	AP	Size	Leverage	Loss	MB	Growth	ROA	AUD_MW	Foreign	Busy
ABAQ		0.041	0.045	−0.385	−0.383	−0.001	−0.486	0.558	0.271	−0.095	0.154	−0.755	−0.022	−0.199	−0.020
Restatement	0.017		−0.015	−0.016	−0.015	0.025	−0.024	0.024	0.004	−0.031	0.004	−0.025	0.036	−0.009	−0.046
AFRatio	0.076	−0.015		−0.090	−0.137	0.013	−0.163	0.075	0.118	−0.046	−0.002	−0.061	0.035	−0.076	0.011
LNAF	−0.326	−0.010	−0.224		0.997	0.015	0.889	−0.281	−0.386	0.072	−0.082	0.350	0.065	0.359	0.081
LNTF	−0.325	−0.009	−0.258	0.997		0.014	0.892	−0.280	−0.388	0.073	−0.081	0.348	0.063	0.357	0.081
AP	0.001	0.025	0.012	0.015	0.014		0.001	0.021	−0.008	−0.005	−0.012	−0.005	0.020	0.009	0.006
Size	−0.389	−0.020	−0.260	0.891	0.894	0.005		−0.406	−0.466	0.079	−0.076	0.454	0.030	0.294	0.096
Leverage	0.021	0.025	−0.010	0.186	0.188	0.028	0.164		0.187	−0.134	−0.063	−0.676	−0.026	−0.171	−0.020
Loss	0.257	0.004	0.161	−0.386	−0.388	−0.008	−0.461	0.081		−0.052	0.030	−0.283	0.018	−0.162	0.066
MB	−0.019	−0.037	−0.142	0.207	0.210	0.024	0.161	−0.167	−0.227		0.029	0.116	−0.012	0.048	−0.004
Growth	0.022	0.004	−0.039	0.004	0.008	0.020	0.003	−0.061	−0.187	0.232		−0.068	0.009	−0.057	0.005
ROA	−0.223	−0.008	−0.174	0.379	0.381	0.006	0.443	−0.179	−0.854	0.312	0.219		0.024	0.192	0.035
AUD_MW	−0.004	0.036	0.031	0.062	0.060	0.020	0.018	0.014	0.018	−0.012	0.006	−0.020		0.050	0.024
Foreign	−0.108	−0.009	−0.120	0.363	0.361	0.009	0.272	−0.091	−0.162	0.150	−0.009	0.220	0.050		−0.027
Busy	−0.014	−0.046	−0.002	0.068	0.070	0.006	0.092	0.064	0.066	−0.016	−0.033	−0.093	0.024	−0.027	
NegRet	0.022	0.001	0.028	−0.070	−0.070	−0.227	−0.083	0.064	0.185	−0.236	−0.205	−0.198	0.008	−0.046	0.050
Big4	−0.258	−0.036	−0.220	0.682	0.684	−0.007	0.660	0.054	−0.295	0.181	0.019	0.299	0.012	0.233	0.094

Table 3. Cont.

Panel B: Correlations for the three-year balanced panel designed ABAQ, Restatement, and AF of U.S. sample firms.															
Variable	ABAQ	Restatement	AFRatio	LNAF	LNTF	AP	Size	Leverage	Loss	MB	Growth	ROA	AUD_MW	Foreign	Busy
ABAQ	1.000	0.008	0.040	−0.344	−0.342	0.003	−0.437	0.449	0.273	−0.004	0.151	−0.704	−0.009	−0.153	0.007
Restatement	0.012		−0.003	0.030	0.030	0.015	0.007	0.012	0.015	−0.018	−0.002	−0.003	0.107	0.010	−0.035
AFRatio	0.058	−0.006		−0.112	−0.158	0.033	−0.167	0.049	0.121	−0.068	−0.015	−0.059	0.038	−0.073	0.013
LNAF	−0.259	0.033	−0.229		0.997	0.046	0.892	−0.166	−0.364	0.055	−0.061	0.353	0.036	0.325	0.078
LNTF	−0.258	0.033	−0.263	0.997		0.044	0.894	−0.164	−0.364	0.058	−0.059	0.349	0.035	0.323	0.078
AP	0.011	0.015	0.032	0.051	0.048		0.022	0.032	0.017	−0.009	0.013	−0.002	0.026	0.029	0.007
Size	−0.322	0.007	−0.251	0.889	0.891	0.027		−0.262	−0.446	0.044	−0.054	0.451	0.003	0.242	0.093
Leverage	−0.036	0.040	−0.047	0.293	0.295	0.048	0.284		0.178	−0.159	0.010	−0.602	−0.002	−0.137	0.036
Loss	0.226	0.015	0.164	−0.360	−0.361	0.017	−0.431	0.038		−0.046	−0.005	−0.402	0.048	−0.136	0.050
MB	0.050	−0.035	−0.153	0.166	0.169	−0.030	0.114	−0.074	−0.202		0.050	0.064	−0.025	0.040	−0.002
Growth	0.041	−0.011	−0.022	0.005	0.008	0.046	0.029	−0.026	−0.184	0.206		−0.082	0.004	−0.065	0.030
ROA	−0.123	−0.031	−0.161	0.299	0.300	−0.012	0.355	−0.141	−0.817	0.313	0.217		0.000	0.190	−0.014
AUD_MW	−0.003	0.107	0.042	0.033	0.031	0.026	−0.011	0.026	0.048	−0.038	−0.018	−0.060		0.036	−0.007
Foreign	−0.053	0.010	−0.107	0.330	0.327	0.029	0.226	−0.066	−0.136	0.134	−0.033	0.171	0.036		−0.023
Busy	−0.015	−0.035	0.008	0.073	0.074	0.007	0.101	0.116	0.050	−0.018	0.014	−0.090	−0.007	−0.023	
NegRet	0.002	0.016	0.056	−0.050	−0.052	0.028	−0.058	0.036	0.174	−0.258	−0.194	−0.182	0.041	−0.017	0.003
Big4	−0.202	0.006	−0.219	0.659	0.661	−0.024	0.636	0.143	−0.280	0.146	0.015	0.245	−0.008	0.191	0.090

Panel A (B) of this table reports correlation statistics among dependent and independent variables for the US ABAQ, Restatement, and AF of sample firms of 7220 (16,098) firm-year observations (3610 (2683) distinct firms). All continuous variables were winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. Values bolded represent statistical significance at the 0.1 level or lower, while the *p*-values for the test statistics of the estimated correlation coefficients are based on two-sided *t*-tests. Please refer to the variable measurements in Appendix A.

4.2. Regressions Analyses

To control for unobserved firm-specific fixed effects, we reported all regression results using OLS, clustering the standard errors by firms to account for the possible correlation of regression residuals (Petersen 2009).

4.2.1. Baseline Regression Analyses

Using the U.S. one-year (three-year) balanced panel sample firms, Panel A (B) of Table 4 reports the results of the regressions of proxies for audit quality (i.e., ABAQ, Restatement, and AFRatio) and cost (i.e., LNAF) for the tested variable (AP) and control variables, which may have influenced the dependent variables.

Table 4. Regression results of the association between PCAOB Rule 3211 and audit quality and audit fee for the US firms.

Panel A: One-year balanced panel designed ABAQ, Restatement, and AF U.S. sample firms.				
	ABAQ	Restatement	AFRatio	LNAF
Constant	0.070 (0.229)	0.003 (0.842)	0.890 *** (0.000)	9.875 *** (0.000)
AP	−0.004 (0.244)	0.012 ** (0.013)	0.004 (0.113)	0.037 *** (0.000)
Size	−0.012 *** (0.000)	0.002 (0.395)	−0.008 *** (0.000)	0.488 *** (0.000)
Leverage	0.006 * (0.081)	−0.002 (0.427)	0.002 * (0.071)	0.048 *** (0.000)
Loss	−0.013 *** (0.001)	−0.001 (0.901)	0.014 *** (0.002)	0.199 *** (0.000)
MB	0.000 (0.265)	−0.001 *** (0.003)	0.000 (0.124)	0.000 (0.919)
Growth	0.031 *** (0.000)	0.000 (0.999)	0.002 (0.582)	−0.025 * (0.085)
ROA	−0.091 *** (0.000)	−0.001 (0.605)	0.000 (0.819)	0.001 (0.947)
AUD_MW	0.001 (0.886)	0.039 ** (0.035)	0.028 *** (0.001)	0.244 *** (0.000)
Foreign	−0.002 (0.552)	−0.003 (0.663)	0.000 (0.938)	0.170 *** (0.000)
Busy	0.005 (0.353)	−0.022 ** (0.021)	0.004 (0.435)	0.001 (0.953)
Big4	−0.008 * (0.083)	−0.011 (0.208)	−0.014 ** (0.019)	0.453 *** (0.000)
ABAQ		0.040 (0.123)	−0.042*** (0.007)	0.145** (0.037)
Cluster by Firm	Yes	Yes	Yes	Yes
Industry Dummy	Included	Included	Included	Included
Observations	8312	7220	7220	7220
R-squared	0.563	0.025	0.067	0.840

Table 4. Cont.

Panel B: Three-year balanced panel designed ABAQ, Restatement, and AF of U.S. sample firms.				
	ABAQ	Restatement	AFRatio	LNAF
Constant	0.062 (0.111)	0.037 (0.449)	0.951 *** (0.000)	9.901 *** (0.000)
AP	0.000 (0.764)	0.007 (0.178)	0.009*** (0.000)	0.079 *** (0.000)
Size	−0.007 *** (0.000)	0.002 (0.128)	−0.009 *** (0.000)	0.500 *** (0.000)
Leverage	0.012 *** (0.002)	0.002 (0.606)	0.002 (0.492)	0.146 *** (0.000)
Loss	−0.023 *** (0.000)	0.016 ** (0.012)	0.016 *** (0.000)	0.168 *** (0.000)
MB	0.001 *** (0.001)	−0.001 ** (0.031)	−0.001 *** (0.000)	0.002 ** (0.024)
Growth	0.000 (0.560)	0.001 (0.848)	−0.005 (0.153)	−0.042 *** (0.003)
ROA	−0.119 *** (0.000)	0.008 (0.247)	0.006 (0.154)	−0.011 (0.634)
AUD_MW	0.000 (0.988)	0.141 *** (0.000)	0.023 *** (0.000)	0.183 *** (0.000)
Foreign	0.000 (0.839)	0.000 (0.993)	−0.001 (0.852)	0.182*** (0.000)
Busy	0.002 (0.352)	−0.019 *** (0.007)	0.007 (0.177)	0.004 (0.857)
Big4	−0.001 (0.668)	0.003 (0.664)	−0.017 *** (0.002)	0.441 *** (0.000)
ABAQ		0.033 (0.215)	−0.001 (0.953)	0.205 *** (0.008)
Cluster by Firm	Yes	Yes	Yes	Yes
Industry Dummy	Included	Included	Included	Included
Observations	16,800	16,098	16,098	16,098
R-squared	0.507	0.024	0.079	0.845

Panel A (B) of this table reports the results of the regressions of the audit quality (ABAQ, Restatement, AFRatio) and audit fees (LNAF) on the implementation of the PCAOB Rule 3211 (AP) and the control variables from the one-year (three-year) pre- to the post-regulation period. All regressions include an intercept and industry-fixed effects. The table reports OLS coefficient estimates and, in (), *p*-values based on robust standard errors corrected for firm-level clustering and by White's heteroskedasticity-consistent estimator. *, **, and *** indicate statistical significance in means at the 10%, 5%, and 1% levels (two-tailed), respectively. Please refer to the variable measurements in Appendix A.

In Panel A of Table 4, the coefficients for AP in the regression of ABAQ, Restatement, AFRatio, and LNAF are −0.004 (*p*-value > 0.1), 0.012 (*p*-value < 0.05), 0.004 (*p*-value > 0.1), and 0.037 (*p*-value < 0.01), respectively. These results suggest that there was an improvement in accrual quality, a higher occurrence of restating financial statements, a higher ratio of total audit to the total of audit and non-audit fees, and a higher audit cost (fees), from the one-year pre-regulation period to the one-year post-regulation period, when controlling for other factors that may have caused the outcome. In the regression of ABAQ, among the coefficients of the control variables, the signs of the coefficient of Size (−0.012, *p*-value < 0.01), Growth (0.031, *p*-value < 0.01), ROA (−0.091, *p*-value < 0.01), and Big4 (−0.008, *p*-value < 0.1) were consistent with our expectation that firms with larger, more profitable firms with Big4 auditors would demonstrate higher accrual quality, while we did not predict the sign of coefficient of Loss (−0.013, *p*-value < 0.01) for its unclear effect on accrual quality. In the regression of Restatement, the sign of coefficient of AUD_MW (0.039, *p*-value < 0.05) was consistent with our expectation that a greater incidence of material weakness in the internal control would be associated with a greater occurrence of restating financial statements due to the lack of scrutiny and rigor during the process of producing financial statements within firms with weak internal control systems.⁷ In the regression of

LNAF, among the statistically significant coefficients, the sign of coefficient of Size (0.488, p -value < 0.01), Leverage (0.048, p -value < 0.01), Loss (0.199, p -value < 0.01), AUD_MW (0.244, p -value < 0.01), Foreign (0.170, p -value < 0.01), Big4 (0.453, p -value < 0.01), and ABAQ (0.145, p -value < 0.01) were consistent with our expectation that the audit firm may charge higher audit fees for the audit risk involved in the audit engagement and for the audit expertise provided by Big4 auditors.

In Panel B of Table 4, the coefficients for AP in the regression of ABAQ, Restatement, AFRatio, and LNAF are 0.000 (p -value > 0.1), 0.007 (p -value > 0.1), 0.009 (p -value < 0.01), and 0.079 (p -value < 0.01), respectively. These results suggest that there was a higher occurrence of restating financial statements, a higher ratio of total audit to the total of audit and non-audit fees, and a higher audit cost (fees), from the one-year pre-regulation period to the one-year post-regulation period, when controlling for other factors that may have caused the outcome. The analyses, using the three-year balanced panel design data, for the control variables in the regressions of audit quality and cost were the same as those obtained using the one-year balanced panel design data.

The results reported in Table 4 suggest that the implementation of PCAOB Rule 3211 could: (1) increase the occurrence of restating financial statements over the short term but not the long term in the post-regulation period, (2) increase the ratio of audit fees to total fees (AFRatio) over the long term but not the short term in the post-regulation period, and (3) increase the total audit fees (LNAF) over both the short and long term in the post-regulation period.

4.2.2. Difference-in-Difference Analyses

The control samples, which were employed to conduct difference-in-difference analyses, included two sets. We first used the U.S. firms as their own benchmark by first-differencing the values of all the variables used in the regression. The advantage of using the first-differencing method is to remove any possible latent heterogeneity from the model (Greene 2008; Greene and Liu 2020). Next, we analyzed the results using a control sample comprised of the U.K. firms that were selected by using the same criteria as that applied to the U.S. firms.

Results of Using First-Differenced U.S. Treatment Sample

Equation (2) modifies Equation (1) to test our H1 and H2, using the first-differenced one-year (three-year) balanced panel U.S. treated sample firms:

$$\Delta AQ_i / \Delta AF = \theta + \sum \gamma_k \Delta \text{Control}_k + \sum \beta_i \text{Industry}_i + \varepsilon \quad (2)$$

where ΔAQ_i is the change in the AQ_i , measured as the difference between the current value of AQ_i and the one-year lagged value of AQ_i . AQ_i is defined as in Section 3.1. for Equation (1). ΔAF is the change in the AF , measured as the difference between the current value of AF and the one-year lagged value of AF . AF is defined in Section 3.1. The tested variable is the constant term in Equation (2). The value of θ represents the effect of the implementation of PCAOB Rule 3211 on the outcomes (i.e., changes in the audit quality costs, $\Delta AQ_i / \Delta AF$). We also took first-differencing for the control variables used in the Equation (2).

Using the one-year balanced panel design U.S. test firms, Panel A of Table 5 reports that the constant terms in the regressions of $\Delta ABAQ$, $\Delta \text{Restatement}$, $\Delta \text{AFRatio}$, and ΔLNAF are -0.026 (p -value > 0.1), -0.068 (p -value > 0.1), -0.026 (p -value > 0.1), and -0.055 (p -value > 0.1), respectively. The analyses for the control variables were similar to those in Section 4.1. These results do not indicate that there was a statistically significant effect of the implementation of PCAOB Rule 3211 on the change in audit quality and cost, when controlling for the factors that may influence the audit quality/cost from the one-year pre-regulation to one-year post-regulation period.

Using the three-year balanced panel design U.S. test firms, Panel B of Table 5 reports that the constant term in the regressions of $\Delta ABAQ$, $\Delta Restatement$, $\Delta AFRatio$, and $\Delta LNAF$ are 0.003 (p -value > 0.1), -0.028 (p -value > 0.1), 0.028 (p -value < 0.01), and 0.072 (p -value < 0.05), respectively. The analyses for the control variables are similar to those in Section 4.1. These results indicated that there was no statistically significant effect from the implementation of PCAOB Rule 3211 on the change in accrual quality or the change in the probability of restating financial statements, while there was a statistically significant increasing change in the ratio of audit fees to total fees ($\Delta AFRatio$) and audit cost ($\Delta LNAF$) when controlling for the factors that may have influenced the audit quality/cost from three-year pre-regulation to the three-year post-regulation period.

The results of Table 5 indicate that the implementation of PCAOB Rule 3211 may not have affected the change in the audit quality or cost over the short term, while it may have improved the audit quality and increased audit costs over the long term.

Table 5. Regression results of the association between PCAOB Rule 3211 and audit quality and audit fee for the US treated firms using 1st-differenced data.

Panel A: One-year balanced panel designed ABAQ, Restatement, and AF of U.S. sample firms.				
	$\Delta ABAQ$	$\Delta Restatement$	$\Delta AFRatio$	$\Delta LNAF$
Constant	−0.026 (0.422)	−0.068 (0.305)	−0.026 (0.393)	−0.055 (0.259)
$\Delta Size$	0.041 *** (0.003)	0.016 (0.159)	−0.011 * (0.061)	0.242 *** (0.000)
$\Delta Leverage$	−0.002 (0.847)	−0.002 (0.573)	−0.002 (0.237)	0.020 *** (0.003)
$\Delta Loss$	−0.008 * (0.076)	−0.003 (0.739)	0.008 ** (0.043)	0.045 *** (0.000)
ΔMB	0.000 (0.558)	−0.000 * (0.087)	0.000 (0.984)	0.000 (0.216)
$\Delta Growth$	0.014 ** (0.018)	−0.009 ** (0.044)	0.000 (0.935)	0.001 (0.859)
ΔROA	−0.098 *** (0.000)	0.000 (0.959)	0.002 (0.653)	−0.009 (0.426)
ΔAUD_MW	−0.005 (0.547)	0.009 (0.676)	0.003 (0.637)	0.094 *** (0.000)
$\Delta Foreign$	0.026 (0.210)	−0.014 (0.580)	0.032 ** (0.017)	0.085 ** (0.026)
$\Delta Busy$	0.000 (0.922)	0.017 ** (0.012)	−0.001 (0.806)	−0.013 (0.169)
$\Delta Big4$	−0.008 * (0.053)	−0.005 (0.309)	0.004 (0.139)	0.016 * (0.070)
$\Delta ABAQ$		0.021 (0.465)	−0.021 (0.142)	−0.070 (0.102)
Cluster by Firm	Yes	Yes	Yes	Yes
Industry Dummy	Included	Included	Included	Included
Observations	8312	7220	7220	7220
R-squared	0.162	0.014	0.011	0.081

Table 5. Cont.

Panel B: Three-year balanced panel designed ABAQ, Restatement, and AF of U.S. sample firms.				
	Δ ABAQ	Δ Restatement	Δ AFRatio	Δ LNAF
Constant	0.003 (0.835)	−0.028 (0.252)	0.028 ** (0.000)	0.072 ** (0.021)
Δ Size	0.030 *** (0.000)	0.020 ** (0.034)	−0.024 *** (0.000)	0.300 *** (0.000)
Δ Leverage	−0.023 *** (0.008)	0.006 (0.496)	−0.003 (0.403)	0.085 *** (0.000)
Δ Loss	−0.019 *** (0.000)	−0.006 (0.340)	0.006 ** (0.025)	0.023 *** (0.002)
Δ MB	0.000 (0.421)	0.000 (0.430)	0.000 (0.177)	0.000 (0.346)
Δ Growth	0.000 (0.164)	0.000 (0.974)	0.002 (0.381)	0.006 (0.366)
Δ ROA	−0.128 *** (0.000)	0.012 (0.264)	0.010* (0.074)	−0.005 (0.771)
Δ AUD_MW	0.002 (0.652)	0.041 ** (0.020)	0.002 (0.630)	0.074 *** (0.000)
Δ Foreign	−0.005 ** (0.029)	0.033 *** (0.000)	0.006 ** (0.037)	0.001 (0.912)
Δ Busy	0.000 (0.765)	0.008 *** (0.002)	−0.002 (0.168)	−0.005 (0.213)
Δ Big4	−0.001 (0.341)	−0.006 ** (0.038)	0.001 (0.333)	0.022 *** (0.000)
Δ ABAQ		0.038 (0.164)	−0.016 (0.156)	−0.070* (0.051)
Cluster by Firm	Yes	Yes	Yes	Yes
Industry Dummy	Included	Included	Included	Included
Observations	16,800	16,098	16,098	16,098
R-squared	0.100	0.005	0.007	0.076

Panel A (B) of this table reports the results of the regressions of the changes in audit quality (Δ ABAQ, Δ Restatement, and Δ AFRatio) and audit fees (Δ LNAF) on the change in implementation of PCAOB Rule 3211 (Δ AP) and changes in the control variables from the one-year (three-year) pre- to the post-regulation period. All the regressions include an intercept and industry-fixed effects. The table reports OLS coefficient estimates and, in (), p -values based on robust standard errors corrected for firm-level clustering and by White's heteroskedasticity-consistent estimator. *, **, and *** indicate statistical significance in means at the 10%, 5%, and 1% levels (two-tailed), respectively. Please refer to the variable measurements in Appendix A.

Results of Regressions Using U.S. Treatment with U.K. Control Sample

To minimize the possible issue of omitted variables and confounding effects on audit quality and audit cost, we use firms listed in the London Stock Exchange in the United Kingdom (U.K.) as our control sample for the following reasons. First, the two countries have similar legal systems, cultures, and accounting environments. Second, the U.K. firms do not experience the rule change (i.e., PCAOB Rule 3211) during the sample period because the U.K. adopted a similar rule, requiring the EP to sign the audit report, from April 2009, while PCAOB Rule 3211 became effective on 31 January 2017.

We used the following Equation (3) to test our H1 and H2, using samples comprised of U.S. test and U.K. control firms:

$$\text{ABAQ/LNTF} = \gamma_0 + \alpha_1 \text{AP} + \alpha_2 \text{US} + \alpha_3 \text{USAP} + \sum \gamma_k \text{Control}_k + \sum \beta_i \text{Industry}_i + \varepsilon \quad (3)$$

where ABAQ is the proxy for audit quality (i.e., accrual quality). We did not use Restatement and AFRatio in the audit quality regression because restating financial statements is rare for U.K. firms and the database we used for this project did not separate audit fees from non-audit fees. Therefore, we used the total amount of audit fees and non-audit fees as a substitute for the audit cost in our audit cost regression. Specifically LNTF represents audit cost, measured as the natural logarithm value of the total amount of audit fees and non-audit fees.

US is an indicator variable, coded as one for U.S. firms and zero for U.K. firms. Our interested variable is USAP, which is the interaction between the two indicator variables (i.e., US and AP). Compared to the control firms listed in the U.K., if the testec U.S. firms experienced a greater improvement in the audit quality and increase in audit fees from the pre-regulation period to the post-regulation period, then the sign of coefficient of USAP (i.e., α_3) was expected to be negative in the ABAQ regression and to be positive in the LNTF regression.

We included the same the control variables in the regression Equation (3) as those in Equation (1), except for the variable of AUD_MW (i.e., the material internal control weakness) because U.K. firms are not required to disclose the material internal control weakness.

In Column 1 (3) and 2 (4) of Panel A of Table 6, the coefficient of the interaction term USAP, our tested variable, is -0.005 (p -value > 0.1) (-0.004 (p -value > 0.1)), and 0.020 (p -value > 0.1) (-0.003 (p -value > 0.1)) in the regression of ABAQ and LNTF, respectively, using a one-year (three-year) balanced panel designed sample comprised with U.S. and U.K. firms. Although the sign of coefficient of USAP was consistent with the prediction for the ABAQ regression over the short-term and long-term period and for the LNTF regression over the short term, none of the coefficient was statistically significantly different from zero. Therefore, we cannot conclude that the tested U.S. firms experienced a greater improvement in their audit quality or a greater increase in their audit costs than the U.K. control firms from the pre-regulation period to the post-regulation period. The analyses for the control variables were similar to those using only the U.S. test firms.

Table 6. Difference-in-difference regressions of the audit quality and audit cost on the implementation of PCAOB Rule 3211 for the U.S. and U.K. firms, both without and with first-differenced data.

Panel A: U.S. and U.K. firms.				
	1	2	3	4
	ABAQ	LNTF	ABAQ	LNTF
Constant	0.020 (0.449)	9.110 *** (0.000)	0.064 *** (0.000)	8.991 *** (0.000)
US	0.042 *** (0.000)	0.695 *** (0.000)	0.034 *** (0.000)	0.616 *** (0.000)
AP	0.002 (0.758)	0.013 (0.671)	0.005** (0.044)	0.066 *** (0.002)
USAP	-0.005 (0.456)	0.020 (0.563)	-0.004 (0.109)	-0.003 (0.914)
Size	-0.010 *** (0.000)	0.516 *** (0.000)	-0.007 *** (0.000)	0.529 *** (0.000)
Leverage	0.004 *** (0.000)	0.066 *** (0.000)	0.014 *** (0.000)	0.211 *** (0.000)
Loss	-0.015 *** (0.000)	0.201 *** (0.000)	-0.017 *** (0.000)	0.159 *** (0.000)
MB	0.000 (0.917)	0.001 (0.320)	0.001 *** (0.000)	0.005 *** (0.000)
Growth	0.024 *** (0.000)	-0.027 ** (0.013)	0.024 *** (0.000)	-0.045 *** (0.000)
ROA	-0.107 *** (0.000)	-0.007 (0.570)	-0.128 *** (0.000)	-0.105 *** (0.000)
Foreign	0.000 (0.969)	0.256 *** (0.000)	0.004 *** (0.004)	0.317 *** (0.000)
Busy	0.007 ** (0.017)	0.051 *** (0.002)	0.004 *** (0.002)	0.059 *** (0.000)
Big4	-0.003 (0.291)	0.321 *** (0.000)	0.000 (0.864)	0.308 *** (0.000)
ABAQ		0.236 *** (0.000)		0.244 *** (0.000)
Cluster by Firm	Yes	Yes	Yes	Yes
Industry Dummy	Included	Included	Included	Included
Observations	10,028	8936	20,178	19,476
R-squared	0.591	0.849	0.398	0.852

Table 6. Cont.

Panel B: First-differenced data of U.S. and U.K. firms.				
	1	2	3	4
	Δ ABAQ	Δ LNTF	Δ ABAQ	Δ LNTF
Constant	−0.011 (0.691)	−0.020 (0.797)	−0.013 (0.419)	0.088 (0.146)
US	−0.003 (0.543)	0.016 (0.302)	−0.002 (0.485)	−0.014 (0.159)
Δ Size	0.035 *** (0.000)	0.269 *** (0.000)	0.021 *** (0.000)	0.356 *** (0.000)
Δ Leverage	−0.012 *** (0.000)	0.033 *** (0.000)	−0.040 *** (0.000)	0.095 *** (0.000)
Δ Loss	−0.014 *** (0.000)	0.049 *** (0.000)	−0.009 *** (0.000)	0.026 *** (0.000)
Δ MB	0.000 (0.478)	0.000 (0.524)	−0.000 *** (0.001)	0.001 *** (0.003)
Δ Growth	0.015 *** (0.000)	0.004 (0.355)	0.016 *** (0.000)	0.013 ** (0.014)
Δ ROA	−0.119 *** (0.000)	−0.013 (0.147)	−0.102 *** (0.000)	−0.041 ** (0.012)
Δ Foreign	−0.006 * (0.059)	−0.012 (0.133)	−0.001 (0.638)	−0.010 (0.121)
Δ Busy	0.002 (0.445)	−0.012 (0.157)	0.000 (0.842)	−0.001 (0.860)
Δ Big4	−0.006 * (0.066)	0.006 (0.461)	−0.001 (0.515)	0.010 * (0.063)
Δ ABAQ		−0.048 (0.101)		0.018 (0.555)
Cluster by Firm	Yes	Yes	Yes	Yes
Industry Dummy	Included	Included	Included	Included
Observations	10,028	8936	20,178	19,476
R-squared	0.169	0.074	0.053	0.083

Panel A (B) of this table reports the results of the regressions of (the changes in) proxies for audit quality (i.e., (Δ)ABAQ, (Δ)Restatement, (Δ)AFRatio) and audit fees ((Δ)LNAF) on (the change in) implementation of PCAOB Rule 3211 ((Δ)AP) and (changes in) the control variables from the one-year pre- to the post-regulation period. The results reported in columns 1 and 2 (3 and 4) of Panel A and B of this table are based on the ABAQ and ABAQ, Restatement, and AF of the one-year balanced panel designed 5014 and 4468 (3363 and 3246) U.S. and U.K. distinct firms, respectively. All the regressions include an intercept and industry-fixed effects. The table reports OLS coefficient estimates and, in (), p -values based on robust standard errors corrected for firm-level clustering and by White's heteroskedasticity-consistent estimator. *, **, and *** indicate statistical significance in means at the 10%, 5%, and 1% levels (two-tailed), respectively. Please refer to the variable measurements in Appendix A.

To minimize the time trend effect on our results, we used the first-differencing method to redo our regression analyses, using the following Equation (4):

$$\Delta \text{ABAQ} / \Delta \text{LNTF} = \gamma_0 + \beta_1 \text{US} + \sum \gamma_k \Delta \text{Control}_k + \sum \beta_i \text{Industry}_i + \varepsilon \quad (4)$$

where Δ ABAQ is the change in ABAQ from year $t-1$ to year t , measured as the difference between the current value of ABAQ and the one-year lagged value of ABAQ. Δ LNTF is the change in LNTF from year $t-1$ to year t . We also differenced all the control variables in Equation (4).

Our interest in the variable in Equation (4) is the indicator variable of US. From the pre-regulation period to the post-regulation period, if the tested U.S. firms experienced greater changes in the improvement in their audit quality and in the increase in their audit costs than the U.K. control firms, then the sign of the coefficient of U.S. was expected to be negative in the Δ ABAQ regression and to be positive in Δ LNTF regression. The results of using the first-differenced data are reported in Panel B of Table 6.

Columns 1 (3) and 2 (4) of Panel B of Table 6 show that the coefficient of the indicator variable, US, our tested variable, is -0.003 (p -value > 0.1) (-0.002 (p -value > 0.1)) and 0.016 (p -value > 0.1) (-0.014 (p -value > 0.1)) in the regression of Δ ABAQ and Δ LNTF, respectively, using a one-year (three-year) balanced panel designed sample comprised of

U.S. and U.K. firms. The results of the first-differencing analyses for the U.S. and U.K. firms did not provide statistically significant evidence that the tested U.S. firms experienced a greater change in the improvement of their audit quality or a greater change in the increase in their audit costs than the U.K. control firms from pre-regulation to the post-regulation period. The analyses for the control variables were similar to those in the regressions, only using the U.S. tested firms.

5. Robustness Check

5.1. Delete Firms Disclosing Other Auditors

We are aware that Form AP also discloses the other audit participants in addition to the EP's name. Therefore, if our sample had included firms disclosing both the EP's name and other audit participants in the Form AP, we may not have been able to isolate the impact of the disclosure of the EP's name on the audit quality and audit fees. To address this potential sample selection issue, we deleted the observations where the Form AP disclosed both the EP's name and the other audit participants. This procedure deleted 6.09–6.33% of the sample observations for the one-year and three-year balanced samples. The results of deleting the observations disclosing the EP's name and other auditors in the Form AP were qualitatively the same as those reported in Tables 4–6.

5.2. Alternative Measurement of Audit Quality

Since it is difficult to measure audit quality, we also used other financial quality measurements as alternative proxies for the audit quality. We used a small increase in the profit from one year prior to the current year and the earnings response coefficient to replace accrual quality. We then repeated all of our regression analyses and obtained qualitatively same statistical results as those of using ABAQ as the proxy for the audit quality (reported in Tables 4–6). Collectively, the untabulated and reported (in Tables 4–6) results of the effect of implementation of PCAOB Rule 3211 on audit quality proxies measured by the financial reporting quality suggested that there was no statistical evidence to suggest that disclosing the EP's name leads to an increase in audit quality.

5.3. Additional Control Variables

Because a change in auditors for the sample firms may have led to a change in audit quality and audit costs, we also controlled for the variable of change in auditor in our regression analyses.⁸ The results of the regressions including this indicator variable were qualitatively same as those reported in Tables 4–6. To check whether the occurrence of negative stock return (NegRet) would influence the effect of tested variables on outcomes, we included this variable in our regressions, repeated our analyses, and obtained results that were qualitatively the same as those reported in Tables 4–6.

6. Discussion

The aim of the implementation of PCAOB Rule 3211 was to improve audit quality, thereby increasing investors' confidence. However, because audit quality is unobservable and difficult to measure, the empirical results of testing the effect of the implementation of PCAOB Rule 3211 on the audit quality may vary with the models and samples selected by the researchers. Comparing the accrual quality from the pre-regulation period to the post-regulation period, while previous studies (e.g., [Cunningham et al. 2019](#); [Burke et al. 2019](#)) found that there was a statistically significant improvement using the U.S. sample, we also found a weak statistically significant improvement in our untabulated univariate tests when we used the one-year balanced panel designed U.S. sample firms without winsorization. The difference between the results of this paper and those of previous studies (e.g., [Cunningham et al. 2019](#); [Burke et al. 2019](#)) was possibly due to the difference in the sample selection. [Cunningham et al. \(2019\)](#) and [Burke et al. \(2019\)](#) used a sample period covering U.S. firms filing Form AP from 31 January 2017 to 29 June 2017 (31 May 2017), which is a shorter period than the sample period (one-year and three-year balanced

panel with a cut-off event date of 31 January 2017) in this study. Moreover, in [Cunningham et al. \(2019\)](#), the statistical significance of the effect of the implementation of PCAOB Rule 3211 on accrual quality disappeared when using a control sample composed of U.S. firms. This result is similar to that documented in this study: that the statistical significance of impact of implementation of PCAOB Rule 3211 on accrual quality is sensitive to the model and sample used in the statistical tests.

While [Cunningham et al. \(2019\)](#) found a statistically significant improvement in the Basu coefficient, a proxy for the level of conservatism in the financial report from the pre- to the post-regulation period, we did not detect a significant change in the Basu coefficient and/or earnings response coefficient from the pre- to the post-regulation period. This difference in findings between the two studies may have been due to the sensitivity of the results to the sample selection.

The findings of interest in this study are as follows. First, to our best knowledge, this is the first study to use the probability of restating financial statements and the ratio of the total audit fees to the total amount of audit and non-audit fees as proxies for audit quality in order to test the effect of PCAOB Rule 3211 on audit quality. Fortunately, these proxies are empirically observable and reliable. More interestingly, our results consistently showed that there was an improvement in the ratio of the audit fees to the total fees (audit and non-audit) over short-term and long-term periods after the implementation of PCAOB Rule 3211; even after taking off the time trend effect, we still found a statistically significant improvement in the ratio of the audit fees to total fees (AFRatio) over the long-term period after implementing PCAOB Rule 3211. Second, the audit cost also showed the same change as the ratio of the audit fees to the total fees, from the pre- to the post-regulation period. Third, empirical evidence documented in [Rajgopal et al. \(2021\)](#) indicates that AFRatio is a robust audit proxy in the setting of testing the auditor independence and internal control weakness.

Our univariate results showed that, from the pre-regulation period to post-regulation period, there was a statistically significant increase in the probability of restating financial statements, while there was a statistically significant decreasing trend in the change in the probability of restatement: the mean values of restatement increased by 0.011 (0.008), significant at 0.05 (0.1), from the one-year (three-year) pre-regulation period to the one-year (three-year) post-regulation period; after the first-differencing, the mean values of the change in restatement decreased by 0.027 (0.019), significant at 0.01 (0.01), from the one-year (three-year) pre-regulation period to the one-year (three-year) post-regulation period. Similarly, our univariate results showed that, from the pre- to the post-regulation period, there was an increase in reporting material internal control weakness, while there was no change in the trend of reporting material internal control weakness (AUD_MW): the mean values of the frequency of reporting material internal control weakness increased by 0.007 (0.010), significant at 0.1 (0.01), from the one-year (three-year) pre-regulation period to the one-year (three-year) post-regulation period, while after taking off the time trend effect, there was no significant difference in the mean values of change in the frequency of reporting material internal control weakness.

These univariate results are very important and of great interest. The finding that increasing the number of restating financial statements and reporting material internal control weakness from the pre-regulation period to the post-regulation period, along with a declining trend in restating financial statements and no change in reporting material internal control weakness, could indicate that there was an increase in auditor independence because auditors were more likely to report the detected breach in financial reporting from the pre- to the post-regulation period because of the disclosure of the EP's name. Furthermore, it is possible that the quality of financial statements still improved, although we did not detect a statistically significant improvement in the post-regulation period.

These possible, unobserved reasons may have caused a higher frequency of Restatements, but this increasing in the number of Restatements demonstrated a declining trend. This suggests a lower frequency of Restatements in the future, although we did not see

it during our sample period. Moreover, the sample statistics for the variable of reported material internal control weakness support this argument, since there was a statistically significant increase in the frequency of reporting material internal control weakness, but there was no increase in change in the frequency of reporting material internal control weakness (AUD_MW). Therefore, although the univariate tests demonstrated an increase in the AUD_MW, we predict that such a significant increase in AUD_MW will disappear over a sample period longer than ours (three-year balanced panel).

In sum, the empirical results of this study indicate that auditor independence, an important attribute of audit quality, increased in the post-regulation period compared to pre-regulation period.

7. Conclusions

In this study, we examined the effect of implementing PCAOB Rule 3211 on audit quality (proxied by accrual quality (AB AQ), the probability of restating financial statements (Restatement), the ratio of total audit fees to the total fees of audit and non-audit (AFRatio)) and the audit cost (proxied by the total audit fees, LNAF). The univariate tests show that there was a marginal, statistically significant improvement in the accrual quality over a short term after the implementation of PCAOB Rule 3211, a statistically significant decline in the change in the frequency of restatements, and an increase in the AFRatio and audit costs over the long term after the implementation of the regulation. Among the changes in characteristics of the tested U.S. sample firms, the opposite direction of change in frequency of reported material internal control weakness (AUD_MW) (i.e., a statistically significant increase) and the change in AUD_MW (i.e., no statistically significant change) is of interest, since it indicates a possible increase in auditor independence when holding other factors constant.

The multivariate empirical test results indicate that the frequency of Restatements and audit costs increased from the one-year pre-regulation period to the one-year post-regulation period, while there was an increase in AFRatio and LNAF from the three-year pre-regulation period to the three-year post-regulation period. After first-differencing, the change in the AFRatio and LNAF increased from the three-year pre-regulation period to the three-year post-regulation period. When using the U.K. control sample, the empirical evidence was not statistically significant enough to reject our null hypotheses.

Collectively, the empirical evidence of this study indicates a reduction in the trend of Restatement, an increase in the level of AFRatio and in the change in AFRatio, and an increase in audit costs. This increase in audit costs may persist. Our empirical evidence suggests that the implementation of PCAOB Rule 3211 is likely to achieve its goal of improving audit quality, but at the cost of increased auditing fees for auditees.

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Appendix A. Variable Measurement

In the following measurements, we omit the subscripts j representing a firm and t representing the fiscal year.

Appendix A.1. Test Variables

AP = 1 on and after the date filed the first Form AP for an issuer, otherwise 0.

US = 1 for the U.S. tested firms and 0 for the U.K. control firms.

USAP = interaction variable between the variables of US and AP.

Appendix A.2. Dependent Variables

Proxies for Audit Quality

AQ_i = firm *j*'s value of the *i*th proxy for audit quality at the client firm level in year *t*, *i* includes ABAQ, Restatement, and AFRatio. The larger value of ABAQ and Restatement (AFRatio) variable indicates a lower (or higher) audit quality.

ABAQ = discretionary accrual quality, measured as following:

We measured accrual quality by modifying the Jones (1991) model and controlling for return on assets, ROA (e.g., Kothari et al. 2005).

$$TC_{j,t} = \phi_{0,j} + \phi_{1,j} \Delta Rev_{j,t} + \phi_{2,j} PPE_{j,t} + \phi_{3,j} ROA_{j,t-1} + v_{j,t} \quad (A1)$$

where, $TC_{j,t}$ is firm *j*'s total accruals in year *t*, calculated as $TC_{j,t} = IB_{j,t} - Cash_{j,t}$. IB is firm *j*'s income before extraordinary items in fiscal year *t*. $Cash_{j,t}$ is the cash flows from operation. $\Delta Rev_{j,t}$ is firm *j*'s change in revenues between year *t*−1 and year *t*. $PPE_{j,t}$ is firm *j*'s gross value of PPE in year *t*. $TCA_{j,t}$, $Rev_{j,t}$, and $PPE_{j,t}$ are deflated by firm *j*'s lag value of total assets. $ROA_{j,t-1}$ is firm *j*'s return on assets in year *t*. We estimated Equation (A1) for each industry-year. Each industry has at least seven firms. The regression residual, $v_{j,t}$, is the accruals quality. This procedure demonstrated that the larger (small) the residuals, the poorer (better) the accruals quality.

Restatement = an indicator variable, coded as 1 if firm *j* has a restatement for fiscal year *t*, otherwise 0 (audit analytics).

AFRatio = ratio of total audit fees to the total amount of audit and non-audit fees (audit analytics).

Proxies for audit cost

LNAF = proxied for the audit cost, natural logarithm value of the total fees paid for the audit service (audit analytics).

LNTF = proxied for the audit cost, natural logarithm value of the total fees paid for the audit and non-audit service (audit analytics for the U.S. firms, WorldScope for the U.K. firms).

Appendix A.3. Measurements of Control Variables Used in the Regressions

Size = the natural log value of firm *j*'s total asset.

Leverage = ratio of interest-bearing debt to total assets in year *t*.

Loss = 1 if the firm reports a loss in the net income for year *t*, otherwise 0.

MB = market-to-book ratio, measured by the ratio of the market value of equity to the book value of equity.

Growth = growth in sales, measured as the change in sales between current year and prior year, scaled by sales value for the prior year.

ROA = return on assets, measured as income before extraordinary items divided by the lag value of total assets.

AUD_MW = 1 if auditor reports a material internal control weakness for the client firm *j*, otherwise 0.

Foreign = 1 if firm *j* has sales in other country, 0 otherwise.

Busy = 1 if firm *j*'s fiscal year ends at December, 0 otherwise.

Big4 = 1 if firm *j* was audited by a Big 4 audit firm in year *t*, 0 otherwise.

NegRet = 1 if firm *j*'s stock return in year *t* is negative, 0 otherwise.

Change_auditor = 1 if firm *j* change its signed auditor (at firm level), 0 otherwise.

Δ denotes the first-differencing operator, which subtracting the value of the variable in prior year from the value of the variable in current year. For example, Δ Size denotes first-differenced variable of Size.

Notes

- ¹ The other audit participants include the accounting firms participating in the audit, but not the accounting firm signed on the Form AP as the principal auditor.
- ² In this study, we used the first filed Form AP disclosing the EP's name if there were multiple Form APs filed for one issuer. A total of 3.79% of total number of the first Form AP filed over the period of 31 January 2017–8 July 2021 disclosed other audit participants.
- ³ According to the International Standards on Auditing, the statutory auditor is equivalent to the engagement partner in the United States (PricewaterhouseCoopers (PwC) Legal 2010).
- ⁴ <https://pcaobus.org/resources/auditorsearch> (accessed on 8 July 2021).
- ⁵ We used Compustat Global Vantage to check some of the variables.
- ⁶ Using data without 1 and 99% two-tailed winsorization, the supplementary sample descriptive statistics showed that the mean value of ABAQ in the one-year post-regulation period was statistically significantly (at 0.1), which was lower than that of ABAQ in the one-year pre-regulation period, indicating a significant improvement in the accrual quality one year after the implementation of PCAOB Rule 3211 in the U.S. (supplementary tables are available upon request).
- ⁷ We do not discuss the signs of statistically significant coefficients in the AFRatio regression because their predictive signs are ambiguous.
- ⁸ Change in auditor is an indicator variable, coded as one if there was a change in the signing auditor, and as zero otherwise. The results of the regressions including the indicator variable of change in auditor are available upon request.

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