Who Did the Audit? Investor Perceptions and Disclosures of Other Audit Participants in PCAOB Filings

Carol Callaway Dee[*]
University of Colorado Denver
Carol.Dee@ucdenver.edu

Ayalew Lulseged
University of North Carolina Greensboro
aalulseg@uncg.edu

Tianming Zhang
Florida State University
TZhang@admin.fsu.edu

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[*] Corresponding author. University of Colorado Denver, 1475 Lawrence St., PO Box 173364, Campus Box 165, Denver CO 80217-3364. Phone 303-315-8463. Carol.Dee@UCDenver.edu

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Abstract

We empirically test whether investors value information about other firms participating in the audits of SEC issuers—that is, firms *other* than the principal audit firm that issues the audit report. A recent proposal by the PCAOB would require disclosure of such information. The PCAOB argues this requirement would increase transparency and provide investors with valuable information about overall audit quality.

We use a matched control sample research design in the study. We examine cumulative abnormal returns (CARs) for issuers that had other auditors participating in their audits as disclosed in registered audit firms' Form 2 filings with the PCAOB, along with a sample of matching control issuers that were not disclosed as having other participant auditors. Using the filing date of Form 2 as the event date, we find that CARs are significantly negative for the experimental sample, but not for the matched control sample. Results hold in a multivariate model that includes firm-specific control variables.

In an analysis of earnings response coefficients (ERCs), we find that market valuation of earnings surprises declines after revelation that others participated in the audit. Taken together, these results suggest that data contained in PCAOB Form 2 filings related to other participants in the external audit provide new information to the market, and investors behave as if they perceive audits in which others participated as being of lower quality. Our empirical results support the PCAOB's position that the disclosure of other participants in audits enhances transparency and is of information value to investors.

INTRODUCTION

We empirically test whether client market valuations are affected by news that other firms participated in their audits—that is, firms *other* than the principal auditor issuing the audit report. Our work is motivated in part by a rule proposed in 2011 by the Public Company Accounting Oversight Board (PCAOB or Board). This rule would require registered accounting firms to disclose in an SEC issuer's audit report the names of other firms or individuals that participated in the audit and the percentage of the audit's total hours these participants provided, subject to certain minimal thresholds.[1]

The PCAOB argues that this requirement would increase transparency and provide investors with valuable information about the overall quality of audits, and surveys indicate that large investor groups want to know about other audit participants (CFA 2010; IAG 2011). However, because under current U.S. auditing standards the principal auditor assumes responsibility for the entire audit (including any portions completed by other auditors) the principal auditor bears the burden of reputation damage and litigation costs in the event of an audit failure. This provides market-based incentives to ensure that the principal auditor delivers a high quality audit (Palmrose 1988; Simunic and Stein 1987) and closely monitors the work of any other firms involved. Thus public disclosure of other participants in the audit may have little or no information value to investors.

We examine whether the disclosure of other audit participants provides new information to the market and if it changes investors' perceptions of the overall quality of the audit. Our study is designed to address some of the questions posed by the Board in its proposed rule, in particular whether disclosure of other participants in the audit would be useful information to

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[1] The proposed rule is in PCAOB Concept Release No. 2011-07 "Improving the transparency of audits: proposed amendments to PCAOB auditing standards and Form 2".

investors. More specifically, we empirically investigate whether the market reacts to the disclosure of other participants in audits and if the market's valuation of earnings surprises changes after this disclosure.

Under current PCAOB interim standard AU §543 "Part of Audit Performed by Other Independent Auditors", principal auditors are prohibited from disclosing the identities of other firms that participated in the audit unless it is a shared responsibility opinion.[2] We thus follow an indirect route to identify the other audit participants and the clients for which they assisted the primary auditor. We obtain data from the annual reports (Form 2) registered audit firms began filing with the PCAOB in 2010. These filings contain the first publicly available data about the participation of other audit firms in SEC issuers' audits. From the information reported in Part 4.2 of the Form 2 filings, we identify auditors that "played a substantial role in the preparation or furnishing of an audit report" for SEC issuers (but did not act as the principal auditor) and the issuers for which they did this work.[3] The PCAOB defines auditors performing a "substantial role" as those auditors whose work either comprises 20% of total hours or total fees for the issuer audit, or who perform the majority of the audit work on a subsidiary constituting 20% of assets or revenues of the issuer.[4] Thus, these auditors provide a non-trivial amount of services to these audits. We then match each of these issuers (experimental issuers) with a control issuer in the same three-digit SIC code that is closest in size to the experimental issuer. We use the filing date of Form 2 as the event date.

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[2] At this time, AU §543 applies to audits of both public and non-public companies. However, as part of its Clarity Project, the American Institute of Certified Public Accountants (AICPA) issued AU-C §600 "Special Considerations—Audits of Group Financial Statements (Including the Work of Component Auditors)" which replaces AU §543 for audits of non-public companies. It is effective for periods ending on or after December 15, 2012.

[3] If the audit firm issued any audit reports of its own during the Form 2 reporting period, the firm is not required to complete part 4.2. Therefore, our sample excludes audit firms that both issued audit reports and participated in other audits for which they were not the principal auditor. We discuss this limitation later in the paper.

[4] PCAOB Rule 1001 (p) (ii).

In univariate market reaction analysis for the experimental issuers, we find that mean two-day (0, +1), three-day (0, +2) and four-day (0, +3) event window cumulative abnormal returns (CARs) are significantly negative; the one-day (0, 0) CARs are negative but not significant. However, for the matching subsample, none of these CARs is significantly different from zero. This provides support for the notion that the negative market reaction we document for companies in the experimental sample is a result of the disclosure by other participating auditors of their involvement in the audits of these issuers (the experimental subsample).

We also estimate a cross sectional CAR regression model on the full sample of experimental and matching companies. This model relates CAR to firm specific control variables, as well as to an indicator variable DISCLOSED which equals one for clients having other participant audit firms as disclosed in those firms' Form 2 filings and zero otherwise. We find that CAR is significantly negatively related to DISCLOSED across all three models (two-, three-, and four-day CAR models). Consistent with the univariate results we report, this finding suggests that the disclosure of other audit participants provides new information that is of value to investors' assessment of the overall quality of the audit, consistent with the views of the PCAOB and other stakeholders (CFA 2010; IAG 2011).

In our analysis of earnings response coefficients, we use a pre-post design, where each issuer acts as its own control, to test if the market valuation of earnings surprises changes after the disclosure of other participants in audits. We estimate four models with two alternative proxies for the dependent variable: size- and risk-adjusted CAR, and two alternative proxies for unexpected earnings: analyst forecast errors and earnings changes from quarter *t-4* to *t*. We estimate the four models separately by subsample (experimental and matching) as well on the full sample (pooled experimental and matching). In all four model specifications, we find that the

variable of interest, $POST \times UE$, is significantly negative for the experimental subsample, indicating that the market perceives earnings of these clients as being less informative after news of the other audit participants is revealed. However, for the matching subsample of firms without disclosure of other audit participants, $POST \times UE$ is not significant in any of the four models. This suggests that the results—declines in ERC in the post event period—are driven by the disclosure by other audit participants of their involvement in the audits of the issuers in the experimental subsample. The results from the ERC model we estimate on the full sample (pooled experimental and matching) fully corroborate our findings in the subsamples. The variable of interest $DISCLOSED \times POST \times UE$ is significantly negative in all four models, confirming that there is a decline in ERC in the post period only for those issuers with other participating audit firms as disclosed in those firms' Form 2 filings.

Overall, these results suggest that PCAOB required disclosures by auditors of their significant participation in the audits of issuers provides new information, and investors behave as if they perceive such audits (those involving other audit participants) as being of lower quality. Thus, our empirical results support the PCAOB's position that the disclosure of other participants in audits enhances transparency and is of information value to investors.

BACKGROUND

In the U.S., except for the relatively rare instances where the principal auditor decides to make reference to the work of the other auditors (i.e., opts for a shared responsibility opinion) the principal auditor signs and assumes full responsibility for the audit opinion.[5] Thus, only the signing audit firm is publicly identified as having conducted the audit. Yet for audits of large global companies with international operations, other audit firms are usually involved to some

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[5] Lyubimov (2011) finds 109 shared responsibility opinions filed on EDGAR over the seven year period 2004 through 2010. For ease of exposition, audits we refer to hereafter exclude shared responsibility opinions unless otherwise stated.

extent, even though only the principal auditor issues the audit report (Doty 2011). These other

audit participants are oftentimes foreign affiliates of the principal auditor.

The PCAOB is concerned that investors may be unaware that Big 4 audit firms as well as

other large audit firms with international operations are organized as global networks of member

firms, each a separate legal entity in its home country.[6] This structure provides each affiliated

member with legal protection from liability for the acts of its affiliates in other countries. For

example, Deloitte firms are each members of Deloitte Touche Tohmatsu Limited (DTTL). This

relationship is described on Deloitte's website as follows:

> DTTL does not itself provide services to clients. DTTL and each DTTL member firm are
> separate and distinct legal entities, which cannot obligate each other. DTTL and each
> DTTL member firm are liable only for their own acts or omissions and not those of each
> other. http://www.deloitte.com/view/en_GX/global/about/index.htm.

This legal structure is designed to help protect the governing organization (such as

DTTL) from liability for audit failures, as well as member firms from liability for audit failures

of other member firms. Nevertheless, in the U.S., the audit firm issuing the report bears

responsibility for the entire audit, including audit work done by foreign affiliates and other audit

participants. Thus the legal structure of global audit firms likely will not protect a U.S. audit

firm issuing an audit report from liability for work done on the audit by its foreign affiliates.

Under current U.S. auditing standards, the principal auditor is prohibited from disclosing

in the audit report the involvement of other auditors for fear that it may mislead the reader about

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[6] PCAOB Chairman Doty (2011) states: "I am concerned about investor awareness. I have been surprised to encounter many savvy business people and senior policy makers who are unaware of the fact that an audit report that is signed by a large U.S. firm may be based, in large part, on the work of affiliated firms. Such firms are generally completely separate legal entities in other countries." In his book *No One Would Listen*, Bernie Madoff whistleblower Harry Markopolos (2010) writes "What many people don't realize is that PricewaterhouseCoopers is actually a different corporation in different countries. The corporations have the same brand name, but basically they're franchises."

the extent of responsibility taken by the principal auditor.[7] The principal auditor assumes responsibility for the entire audit—including any portions completed by other auditors such as the firm's foreign affiliates. As a result, the principal auditor fully bears the burden of reputation damage and litigation costs in the event of an audit failure. This provides the principal audit firm market based incentives (Palmrose 1988; Simunic and Stein 1987) to ensure the work of all other audit participants is of uniformly high quality. In the presence of these market based incentives, investors may expect the principal auditor to provide high quality audits regardless of the involvement of other firms, suggesting that disclosure of other audit participants should not affect investors' perceptions of audit quality.

Nevertheless, actions taken by the Board indicate it believes this information is important for the public to know, and surveys conducted by the PCAOB's Investor Advisory Group (IAG) and the Chartered Financial Analysts' Institute conclude that large investor groups want to know about other audit participants. In 2011, the PCAOB issued Concept Release No. 2011-007 "Improving the Transparency of Audits: Proposed Amendments to PCAOB Auditing Standards and Form 2" that would require registered accounting firms to disclose the names of other participants in audits and the portion of the audit these other participants performed.[8] The PCAOB argues that the proposed rule would increase transparency and provide investors with valuable information about the overall quality of the audit for a number of reasons.

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[7] AU §543, par. 4: "If the principal auditor is able to satisfy himself as to the independence and professional reputation of the other auditor and takes steps he considered appropriate to satisfy himself as to the audit performed by the other auditor, he may be able to express an opinion on the financial statements taken as a whole without making reference in his reports to the audit of the other auditor. *If the principal auditor decides to take this position, he should not state in his report that part of the audit was made by another auditor because to do so may cause a reader to misinterpret the degrees of responsibility being assumed.*" [Emphasis added].

[8] The proposal also requires disclosure of the name of the engagement partner responsible for the audit. The proposed rule does not require disclosure of the use of specialists or client personnel such as internal auditors who assist the principal auditor. The use of specialists is covered under AU §336 while using internal auditors to assist the independent auditor is discussed in AU §322.

First, the PCAOB standard will let investors know whether a potentially significant portion of the audit was performed by the audit firm's foreign affiliates. PCAOB Chairman James Doty describes this as follows:

> For many large, multi-national companies, a significant portion of the audit may be conducted abroad—even half or more of the total audit hours. In theory, when a networked firm signs the opinion, the audit is supposed to be seamless and of consistently high quality. In practice, that may or may not be the case. (Doty 2011).

In other words, the PCAOB believes the only way for investors to properly assess audit quality is to have knowledge of the extent that other audit firms and affiliates were involved. Second, because the PCAOB has been unable to conduct inspections in a number of foreign countries, it is quite possible that other registered firms participating in the audit have not been inspected by the Board. Identification of the other audit participants will allow investors to determine whether the firm has been inspected and, if inspected, to evaluate the Board's findings. Finally, identification of other parties that participated in the audit will allow investors to consider other relevant information about the participant, such as firm size, experience and expertise. Overall, this suggests that knowing the identity and involvement of other audit participants will help financial statement users to evaluate the relative quality of the audit and thus the extent to which they will rely on the financial statements.

In an experimental study, Lyubimov et al. (2011) find that their subjects (potential jurors) perceived audit work that was both offshored and outsourced to be of the lowest quality and the highest risk. If outsourced audit work is perceived to be of lower quality and higher risk relative to work that is not outsourced, investors are likely to revise downward the perceived quality of the overall audit upon learning that some audit work was outsourced. The disclosure of other participants in audits may result in a negative market reaction and lower ERC in the post

disclosure period. This is consistent with the PCAOB's arguments regarding the information value of increased transparency about other participants in audits. However, Lyubimov et al. (2011) also find that compensatory damages increase with outsourcing and punitive damages increase with the interaction of outsourcing and offshoring. The potential of facing increased compensatory and/or punitive damages for failed audits that involve other participating auditors (i.e., audit work that is outsourced) may give the principal auditor an added incentive to deliver a higher quality audit when it engages other audit participants. This suggests that increased transparency through public disclosure of other audit participants could help improve audit quality.

In sum, because the principal auditor bears the risk of reputation damage and litigation expense in the event of an audit failure, the principal audit firm has the incentive to ensure the audit is of uniformly high quality. Cognizant of the strong economic incentives of the principal auditor, investors may not change their perceptions of audit quality (and thus earnings quality) upon learning of the presence of other audit participants. If this scenario holds, we will observe no market reaction to the disclosure and no change in ERCs in the post disclosure period.[9] However, the PCAOB believes this disclosure is necessary for investors to properly evaluate the quality of the audit work performed. If investors find (or at least perceive) the disclosure provides new information about the quality of the audit and thus the quality of the information contained in the financial statements, we will observe a significant market reaction to the disclosure and a significant change in ERCs in the post disclosure period. Given these competing views, we empirically investigate whether investors value the disclosure of information about

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[9] The converse is not true of course. That is, finding no result does not necessarily mean that investors did not change their perceptions of audit quality.

other participants in the external audit under the null hypothesis that there will be no market reaction to the disclosure and there will be no change in ERC in the post disclosure period.

RESEARCH DESIGN

We use a matched control sample design in this study. From 2010 Form 2 filings by registered firms participating in audits but not signing audit opinions, we identify issuer clients for which parts of the audit were conducted by firms other than the signing audit firm. For each identified company ("experimental company"), we find the company closest to it in total assets as of the beginning of 2010 that is in the same three-digit SIC code but was not disclosed as having other auditors participate in its audits ("control company"). Each control company may be matched with only one experimental company. We use the Form 2 filing date for registered audit firms that substantially participated in issuer audits as the event date, because this is the first opportunity investors have to learn that auditors other than signing audit firms participated in issuer audits. For our samples of experimental and control companies, we examine client stock market reactions to the Form 2 filings, and the relation between unexpected earnings and abnormal returns before and after the filing dates. While it is possible that companies in the control group have other participants in their audits, investors have no way of knowing whether that is the case because the information is not publicly disclosed. Thus what we capture in our analysis is the difference in investors' *perceptions* of audit quality (and thus earnings quality) between companies that have been identified as having other participants in audits and those that have not—not necessarily the *actual* quality of the audits and earnings.

Market Reaction Analysis

Using the date audit firms that substantially participate in audits but do not issue audit opinions file their 2010 annual reports as event dates, we examine stock price reactions of the

companies in our experimental and matched control groups. We estimate the abnormal returns using the following standard market model

$$R_{it} = \alpha_i + \beta_i R_{mt} + \mu_{it},$$ (1)

where R_{it} equals the return of firm i on day t, R_{mt} is the market return on day t, α_i is the intercept, β_i is an estimate of beta for firm i, and μ_{it} is the mean zero error term. The CRSP value-weighted index is our proxy for market returns. The estimation period for the market model begins 260 days before and ends 10 days before each event date, in order to minimize contamination of the event window. We require a minimum 60 days of return information for estimating equation (1).

The abnormal return for firm i on day t (AR_{it}) equals the difference between the firm's actual return and its expected return estimated using the market model

$$AR_{it} = R_{it} - \left(\hat{\alpha}_i + \hat{\beta}_i R_{mt}\right).$$ (2)

The event window abnormal return (CAR) is the sum of the abnormal returns over four alternative event windows, one-day (0, 0), two-days (0, +1), three-days (0, +2) and four-days (0, +3), as follows:

$$CAR = \sum_{t=0}^{T} AR_{it}.$$ (3)

First, we conduct univariate parametric t-tests and non-parametric randomization, sign and Wilcoxon signed rank tests to assess the statistical significance of the cumulative abnormal returns. The validity of the standard parametric t-test results is predicated on the assumption that the market model excess returns for individual companies are normally distributed. However, Brown and Warner (1985) document that the distributions of returns and market model excess returns for individual companies are far from normal in smaller samples. Because of this, we

check the robustness of the *t*-test results using non-parametric tests that do not require the normality assumption. In addition to the median based nonparametric sign and Wilcoxon signed rank tests, we report *p*-values from a non-parametric randomization test as in Blacconiere (1991) and Blacconiere and Patten (1994).[10]

The *p*-values in the randomization test are derived by comparing the actual one-, two-, three- or four-day event window CARs to the 999 "pseudo-event" CARs from corresponding event windows randomly selected from all event and non-event days one year before and one year after the actual event dates. The randomization test *p*-value is the proportion of times the actual event window CAR is greater than the 999 pseudo-event CARs.[11] According to Noreen (1989), the randomization test (unlike most parametric procedures) does not have strict normality assumption requirements and 1,000 iterations (one for the actual event date and 999 for the pseudo-event dates) are sufficient to ensure that the null is correctly rejected when it is false.

Next we estimate a multivariate cross sectional regression model on the pooled sample of companies in both the experimental and matched control groups, to see if the abnormal returns are associated with investors' knowledge of the presence of other participants in audits after controlling for certain client-specific characteristics that prior research identifies as being associated with abnormal returns (firm subscripts excluded).

$$CAR = \alpha + \beta_1 DISCLOSED + \beta_2 PRBANKRUPT \; \beta_3 LAGRET + \beta_4 LNASSET + \beta_5 BM + \beta_6 LEV + \beta_7 GROWTH + \beta_8 ROA + \beta_9 FEERATIO + \beta_{10} NEWAUD + \beta_{11} INSTHOLD + \varepsilon \tag{4}$$

Where

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[10] Bowen, Johnson and Shevlin (1989) and Blacconiere and Defond (1997) are two other examples of studies using a randomization test.

[11] The p-value is computed as number the of times the actual event window CAR is greater than the pseudo-event CARs, plus one, divided by the total number of iterations.
$pvalue = [(\#times\; actual\; event\; window\; CAR > pseudoevent\; CAR) + 1]/(iterations)$

CAR	=	issuer *i*'s cumulative abnormal return over a two-, three-, or four-day window, beginning with the day the other participating auditor filed its Form 2;
DISCLOSED	=	one for issuers that are disclosed in the participating auditor's Form 2 (experimental firms) and zero otherwise (matching firms);
PRBANKRUPT	=	Zmijewski's [1984] financial distress measure for issuer;
LAGRET	=	issuer's one year cumulative raw returns prior to the participating auditor's Form 2 filing;
LNASSET	=	natural log of issuer's total assets (in millions of dollars);
BM	=	issuer's book value of equity scaled by market value of equity;
LEV	=	issuer's total debt scaled by total assets;
GROWTH	=	issuer's growth rate in sales;
ROA	=	issuer's 2-digit SIC code median adjusted return on assets;
FEERATIO	=	ratio of non-audit fees to total fees paid by issuer;
NEWAUD	=	one if issuer switched audit firms during the year prior to the participating auditor's Form 2 filing and zero otherwise; and
INSTHOLD	=	percentage of issuer shares owned by institutional shareholders.

The variable of interest is *DISCLOSED*, an indicator variable set to one when a company

is identified as having other participants in its audits and zero otherwise. Consistent with Baber

et al. (1995), the control variables in the model include client financial distress (*PRBANKRUPT*),

prior return (*LAGRET*), client size (*LNASSET*), and new engagement or not (*NEWAUD*). As in

Krishnamurthy et al. (2006), we include *FEERATIO* as a proxy for the economic bonding

between the client and auditor and institutional holding (*INSTHOLD*) as a proxy for

effectiveness of corporate governance. We add proxies for client opportunities and incentives to

manage earnings such as book to market (*BM*), leverage (*LEV*), prior sales growth (*GROWTH*),

and *ROA* (Krishnamurthy et al. 2006).

Market Valuation of Earnings (ERC) Analysis

To assess whether the disclosure of other participants in audits affects investors'

perceptions of the quality of the audits and hence the valuation of earnings, we estimate the

following pooled cross-sectional regression earnings response coefficient (ERC) model similar to

that in Baber et al. (2012) and Francis and Ke (2006).[12] We estimate the ERC model for

companies in the experimental and matched control groups separately as well as in a pooled

sample of all companies in both the experimental and control groups. We use quarterly earnings

announcements made two quarters before and two quarters after the event dates—the dates the

audit firms filed their 2010 annual reports (Form 2) with the PCAOB.[13]

$$CAR_{it} = \alpha + \beta_1 POST_{it} + \beta_2 UE_{it} + \beta_3 POST_{it} \times UE_{it} + \sum_{k=4}^{11} \beta_k X + \sum_{k=12}^{19} \beta_k UE_{it} \times X + \varepsilon_{it},$$

$$where\ X = BM_{it} + StdRet_{it} + LEV_{it} + SIZE_{it} + ABSUE_{it} + LOSS_{it} + FQTR4_{it} + RESTR_{it}\ \ (5)$$

CAR_{it}	=	Issuer i's cumulative abnormal return over a 3-day window from one day before to one day after the quarter t earnings announcement, measured in two ways: size-adjusted return and risk-adjusted return;
$POST_{it}$	=	one if the quarterly earnings announcement is after the annual report filing date of the participating auditor and zero otherwise;
UE_{it}	=	Issuer i's unexpected earnings for quarter t, measured in two ways: FE_{it}: actual quarterly earnings per share from I/B/E/S for issuer i in quarter t minus most recent median consensus analyst forecast, scaled by price or QUE_{it}: issuer i's quarter t earnings minus quarter t-4 earnings scaled by market value of equity.

Control variables are:

BM	=	Book-to-market ratio;
$STDRET$	=	Standard deviation of stock returns, computed using daily returns from 90 days to seven days before the earnings announcement date with a required minimum of 10 non-missing daily returns;
LEV	=	Leverage, measured as the ratio of total debt to total equity;
$SIZE$	=	Size, measured by the natural log of firm market value at the beginning of the quarter;
$ABSUE$	=	Absolute value of unexpected earnings, measured two ways: $ABSFE$: the absolute value of FE or $ABSQUE$: the absolute value of QUE
$LOSS$	=	One when quarterly earnings are less than zero, and zero otherwise;

[12] As in Baber et al. (2012), our model includes the control variables as well as the interaction of the control variables with unexpected earnings as explanatory variables. Although Francis and Ke (2006) report results from a similar model as part of their sensitivity analysis, the primary results they report include only the interaction of the control variables with unexpected earnings (excluding the main effects of the control variables).

[13] As a robustness check, we rerun the model using a sample of quarterly earnings announcements 3 and 4 quarters before and after the event dates. The tenor of our results does not change.

FQTR4	=	One when the observation is from the fourth quarter of the company's fiscal year and zero otherwise; and
RESTR	=	Indicator variable for restructuring, equal to one when the ratio of quarterly special items (Compustat data item SPIQ) to total assets is less than −0.05 and zero otherwise.

Francis and Ke (2006) argue the pre-post design that allows each firm to act as its own control serves two purposes. First, the inclusion of earnings surprises in the pre-event period controls for unobservable determinants of *CAR* not included in the control variables. Second, the ERC in the pre-disclosure period serves as a benchmark to assess whether the disclosure provides new information that allows investors to reassess the overall quality of audits and hence the quality of earnings.

As discussed in Francis and Ke (2006), the ERC model presented above is derived from the theoretical models of Choi and Salamon (1989) and Holthausen and Verrecchia (1988) that specify prices as a function of the expected value and uncertainty of future cash flows. Earnings serve as noisy signals of cash flow and the informativeness of earnings is dependent on investors' perceptions of the characteristics (i.e. quality) of earnings. The earnings response coefficient is predicted to be positively associated with both the uncertainty of cash flows and the perceived quality of the earnings signal. A significantly negative coefficient on $POST \times UE_{it}$ is consistent with the view that investors' perceptions of the quality of audits and hence the quality of earnings becomes lower when investors learn that there were other participants in the audit in addition to the primary audit firm.

As described earlier, *DISCLOSED* is an indicator variable set to one when we identify (from participating auditors' Form 2 filings) a company as having other participants in its audits and zero otherwise. In the pooled model which includes all companies in the experimental and matched control groups, we include *DISCLOSED*, the interaction of *DISCLOSED* with *POST*,

the interaction of $DISCLOSED$ with UE, and a three way interaction variable $DISCLOSED \times POST \times UE$ as additional explanatory variables.

$$CAR_{it} = \alpha + \beta_1 DISCLOSED_{it} + \beta_2 POST_{it} + \beta_3 UE_{it} + \beta_4 POST \times UE_{it} + \beta_5 DISCLOSED_{it} \times POST_{it} + \beta_6 DISCLOSED_{it} \times UE_{it} + \beta_5 DISCLOSED_{it} \times POST_{it} + \beta_6 DISCLOSED_{it} \times UE_{it} + \beta_7 DISCLOSED_{it} \times POST_{it} \times UE_{it} + \sum_{k=8}^{15} \beta_k X + \sum_{k=16}^{23} \beta_k UE_{it} \times X + \varepsilon_{it,}$$

$$X = BM_{it} + STDRET_{it} + LEV_{it} + SIZE_{it} + ABSUE_{it} + LOSS_{it} + FQTR4_{it} + RESTR_{it} \qquad (6)$$

The variable of interest in the pooled model is the three way interaction variable $DISCLOSED \times POST \times UE$. A significantly negative coefficient on the three way interaction variable will indicate that ERCs are lower for issuers identified in the POST period as having other participants in their audits—that is, in the quarters after the public disclosure of other participants in the audits of these companies.

As in most prior research, we compute *CAR* over a three-day event window (-1, +1) to account for information leakage prior to the event date and earnings announcements made after normal trading hours. We do not have industry control variables in our model due to the relatively small sample size. However, we use standard errors that are robust to heteroskedasticity and two-digit SIC code clustering in our tests.

SAMPLE

In this section, we discuss the data collection procedure and characteristics of the sample firms. We then present the sample selection procedure for the market reaction and the market valuation of earnings surprises (ERC) analysis.

Data Collection and Characteristics of the Other Audit Participants

We gather data for the study from the first Annual Reports (Form 2) that registered auditors filed with the PCAOB in 2010. These annual reports are available on the PCAOB

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website at https://rasr.pcaobus.org/search/search.aspx. Under current PCAOB reporting rules, only auditors that did not issue audit opinions are required to disclose the audits in which they significantly participated. Thus, we limit our search to the annual reports of audit firms that "Did not issue audit reports on issuers, but played a substantial role in the preparation or furnishings of audit reports with respect to an issuer". We find 111 annual report filings by such audit firms for 2010.[14] According to PCAOB Rule 1001 (p) (ii), auditors performing a "substantial role" are those that either (1) perform "material services" for the principal audit firm, defined as 20% of total hours or 20% of total fees for the issuer audit, or (2) perform the majority of the audit work on a subsidiary that constitutes 20% of assets or revenues of the issuer. Thus these auditors provide a significant amount of services to these audits.

We note that not all auditors that substantially participate in audits of SEC issuers are required to disclose their participation in the Form 2. Specifically, auditors that issue opinions for any SEC issuers do not disclose their significant participation in the audits of *other* SEC issues for which they *do not* issue opinions. For example, assume that PCAOB registered audit firms A and B substantially participate in the audits of issuers P and Q, respectively. In addition, Firm A has one issuer client X for which it serves as the principal auditor, while Firm B does not act as principal auditor for any issuers. Under current PCAOB standards, because Firm B does not act as principal auditor for any issuers, Firm B will list issuer Q on its Form 2. However, because Firm A *does* serve as principal auditor for at least one issuer, it will not list issuer P on its Form 2 even though it substantially participated in the audit of issuer P.[15] Thus, issuer Q will be included

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[14] Eight of the 111 firms filed amendments (Form 2/A) shortly after filing their Form 2. A close examination of the amendments reveals that the amended information does not affect this study. Therefore, when examining market reaction, we use the date of original Form 2 filing and ignore the date of amendment filing.

[15] Firms must list in another section of Form 2 the issuer clients for which they act as principal auditor. Thus Firm A will disclose issuer X on its Form 2, but not issuer P.

in our sample of companies having other participant auditors while issuer P will not. This will pose some generalizability problems to our findings that we discuss later in the paper.

After obtaining the report filing date from the PCAOB website, we read the annual reports and collect the following information about each of the participating auditors: the name of the firm; the country in which it is located; the total number of its personnel, accountants, and CPAs; and the names of issuers for which it substantially participated in audits. For each issuer identified in the report, we obtain its name and CIK, the name of its principal auditor and the nature of the substantial role played by the participating auditor(s). Table 1 presents summary statistics about the 111 audit firms we identified. As our sample is taken from the first public filings by registered audit firms of Form 2, we provide a detailed description of the sample.

Panel A presents the number and percentage of firms by filing date. Annual reports must be filed by June 30 each year, and cover the period from April 1 of the previous year through March 31 of the reporting year. Despite this deadline, we find that about 21% of auditors filed late. The filings are concentrated on the last three days of June (about 61%). To address the statistical problems that may arise due to this event day clustering, we use standard errors robust to event day clustering in our tests.

Panel B reports the country breakdown (number and percentage) of the 111 audit firms. Only eight (7.21%) of the other participant auditors in our sample are U.S. domiciled. The foreign domiciled other participant auditors are widely dispersed across 45 countries. The three countries with the largest concentration of the participating auditors in the sample are United Kingdom (9 auditors or 8.11%), China (8 auditors or 7.21%) and Hong Kong (7 auditors or 6.31%). Interestingly, these three countries are among those countries that prevented the PCAOB

from conducting inspections at that time (June 2010).[16] Panel C tabulates the number and percentage of the 111 auditors by the number of SEC issuer audits in which they have "substantially participated". The vast majority of these auditors (102, or 91.9%) are involved in the audits of four or fewer SEC issuers. In fact, 76 (68.5%) of the auditors are involved in the audit of a single SEC issuer.

Panel D presents descriptive statistics on the number of accountants, CPAs, and personnel as well as the percentage of accountants and CPAs hired by these auditors. 107 of the 111 audit firms report this information in their annual reports and are used in the analysis. The CPA category includes accountants licensed in the US or those holding equivalent certifications from other countries (such as Chartered Accountants of England and Wales or Chartered Accountants of India). The average (median) audit firm in our sample hires 449 (166) total personnel. The average (median) percentage of accountants is 67% (71%) and the average (median) percentage of CPAs is 34% (29%).

Sample Selection: Market Reaction Analysis

Table 2 presents the sample selection procedures to identify the SEC issuers used in the market reaction analysis. We begin with 236 SEC issuers we identify from the 111 annual reports filed by firms that substantially participate in the audits of SEC issuers but do not serve as principal auditor for any issuer. We eliminate 44 issuers with missing CIKs and 59 issuers we cannot match to CRSP and Compustat. An additional 17 issuers are eliminated because they fail to meet the CRSP data requirements for the calculation of CAR. Issuers must have stock return data for at least 60 of the 250 days in the estimation period ($-260, -10$) to be included in the sample. Finally, as in Baber et al. (1995), we drop 12 issuers that made potentially value relevant

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[16] In January 2011, the Board announced a cooperative agreement with its U.K. counterpart that will allow the PCAOB to conduct inspections of U.K. domiciled audit firms registered with the PCAOB.

disclosures around the event date (the date the auditors in our sample filed their annual reports with the PCAOB). Announcements of earnings, dividends, mergers, acquisitions, repurchases, equity issuances, bankruptcy filings, and tax related events are considered value-relevant disclosures (Thompson et al. 1987).

The above procedures result in a final sample for the univariate market analysis of 104 SEC issuers audited by 46 unique principal auditors (auditors that issue audit opinions) along with 57 unique other participating auditors. 75 of the 104 issuers have a U.S. domiciled principal auditor (33 Big 4 and 42 non-Big 4) and the remaining 29 have a non-U.S. (including Canada) domiciled principal auditor (24 Big 4 affiliated and five other). The other participating auditors for 60 of the issuers are domiciled in countries such as China, Sweden and U.K. that at the time denied the Board access to inspection. For 62 of the issuers, the other participating auditors identify their role in the audit as "Audit Issuer Subsidiary", while 29 of the issuers had other participating auditors describe their role as "Subcontractor Assist Principal Auditor". For the remaining 13 issuers, the other participating auditors assumed different roles which we classify as "other".

As discussed earlier, we use a matched control sample design in our analysis. Thus for each of the above 104 companies identified as having other participants in their audits (experimental companies), we find a matching company that (1) has not been identified as having other participants in its audit, (2) is in the same three digit SIC code as the experimental company, and (3) is closest in total assets to the experimental company.

In the multivariate analysis that examines whether CAR is lower for issuers identified as having other participants in their audits, we drop 18 pairs of issuers—i.e., experimental and matched control, or 36 total issuers—because information needed to compute one or more of the

independent variables in the regression is not available. Thus we use 172 issuers (86 experimental and 86 matching control issuers) in the cross-sectional regression relating CAR to a dummy variable that indicates whether the issuer is identified as having other participants in its audits (along with control variables to proxy for firm-specific characteristics).

Sample Selection: Market Valuation of Earnings Surprises (ERC) Analysis

As discussed in the research design section, the principal purpose of the ERC analysis is to test if the market perceives the disclosure of other audit participants informative and reflects this in its valuation of unexpected earnings in the post disclosure period. We define unexpected earnings (UE) in two ways: analyst forecast error (FE) and quarterly earnings changes (QUE). FE is arguably a better proxy for unexpected earnings than QUE, because FE reflects changes in earnings expectations after last quarter's earnings announcement up to the release of the latest analyst forecast. However, data limitations in I/B/E/S significantly reduce the number of issuer firms for which we can compute FE and may result in a low power test. Thus we report results from both ERC models: one using FE as a proxy for unexpected earnings and another using QUE.

For the ERC model using QUE, all 104 pairs of experimental and matched control issuers (i.e., 208 issuers) have complete information in Compustat needed to compute QUE. We use quarterly earnings announced two quarters before and after the event dates—the dates the other participating audit firms filed Form 2. Thus, we have 416 issuer-quarters for both the experimental and matching control subsamples when using *QUE*, or a total of 832 issuer-quarters in the pooled models.

For the analysis using *FE*, 48 pairs of experimental and control issuers (96 issuers) have complete data in I/B/E/S for the two quarters immediately before and after the event date. As a

result, when using *FE* to proxy for unexpected earnings we have 192 issuer-quarters for each of the experimental and matched control subsamples, and 384 issuer-quarters in the pooled ERC analyses.

RESULTS

In this section we report the results from our market reaction and ERC analyses. First we present the univariate results from the market reaction analysis for the experimental and matched control subsamples. Next we show results from a pooled cross-sectional regression model of experimental and control issuers. The model estimates CAR as a function of an indicator variable *DISCLOSED*, set to one when a company is identified by a participant audit firm as having other participants in its audits and zero otherwise, and certain client-specific characteristics identified in prior research as being associated with abnormal returns. We then discuss results from the market valuation of earnings (ERC) analysis by subsamples (experimental and matched control) and full sample (pooled experimental and matched).

Results: Market Reaction Analysis

Univariate

Table 3 presents results from the univariate market reaction analysis. In panel A, we report the results for the companies that are identified as having other participants in their audits (experimental companies) and in Panel B the results for the matched control firms. CAR is computed for four alternative event windows: one day (0, 0), two days, (0, +1), three days, (0, +2) and four days (0, +3). The event day (day 0) is the day the other participating auditors filed their annual reports with the PCAOB. The *p*-values we report are from the parametric *t*-test, the non-parametric randomization test and the two median based non-parametric tests—the sign and the Wilcoxon signed rank tests.

In the experimental subsample (Panel A), neither the parametric *t*-test nor the non-parametric tests (randomized, sign, and signed rank tests) reject the null hypothesis that the one day CAR is not significantly different from zero. However, the mean (median) CAR for the two day, three day, and four day event windows are −0.88 (−0.69), −0.91 (−0.71), and −1.36 (−1.03) percent, respectively and all but one are statistically significant at two-tail *p*-values of 0.10 or less.[17] Investors appear to be revising down the market prices of issuers upon learning about the presence of other participants in the audits.

In contrast, for the matched control subsample (Panel B), the mean and median CARs are smaller in magnitude, have mixed signs (some positive and some negative) and neither the parametric *t*-test nor the non-parametric randomized, sign and signed rank tests reject the null hypothesis that CAR is not significantly different from zero, across all windows. While we find a significant negative market reaction for the companies that have been identified as having other participants in their audits, we do not find any significant market reactions for the companies in the matched control group. This implies that the significant negative market reaction we document for the companies identified as having other participants in audits is a result of the disclosure of other participants in audits.

In additional subsample analysis (not tabulated), we examine if the negative market reaction to the disclosure of the other participants in audits we document in the experimental sample differs across major classes of issuers. First, we put the 104 issuers into two groups on the basis of whether they have a U.S. (75) or non-U.S. domiciled (29) principal auditor. The mean CARs are negative for both groups across all four event windows and the difference of means *t*-tests do not reject the equality of the mean market reactions for the two groups. Next, we compare the mean market reactions between issuers with participating auditors domiciled in

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[17] The only exception is the sign test p-value for the two day event window, which is 0.112.

countries that prevent the PCAOB from conducting inspections (60) and those domiciled in countries that allow PCAOB inspections, including the U.S. (44). We find a significant difference in mean market reaction on the event day (0, 0). The market reaction is significantly more negative for issuers with participating auditors from countries that prevent PCAOB inspections, with two-tail p-value of 0.08. However, we do not find a statistically significant difference between the negative market reactions of the two groups in the other three windows.

In our final subsample analysis, we group issuers in the experimental sample by the role the participating auditors played as reported in Form 2 ("audit issuer subsidiary", "assist the principal auditor" and "other"). In an analysis that classifies "other" as a part of the "assist principal auditor" group, we find that the market reaction is more negative for the "assist principal auditor" group (n=42) than the "audit issuer subsidiary" group (n=62), with difference of mean two-tailed p-values of 0.006 and 0.08 in the one-day and two-day event windows, respectively. We find similar results, albeit stronger, when we put the issuers in the other group as part of the audit issuer subsidiary group or completely exclude them from the analysis.

Multivariate

In order to ensure that the results we find in the univariate analysis are robust to controlling for firm specific characteristic variables that previous research finds to be associated with CAR, we estimate a multivariate cross sectional regression model on the pooled sample of companies in both the experimental and matched control groups. This allows us to see if the abnormal returns are associated with investors' knowledge of the presence of other participants in audits after controlling for certain client-specific characteristics.

Table 4, Panels A and B present the descriptive statistics by subsample (experimental and matching) for the control variables in the cross sectional market reaction model. The descriptive

statistics show that the experimental and matching firms are similar across most dimensions. In difference of means tests for each control variable, we cannot reject the null hypothesis that the experimental and matched samples were taken from the same population.

Results for the cross sectional regression analysis are in Table 4, Panel C. The model is estimated on the full sample (pooled experimental and matching companies). The dependent variables are the CARs for the two-day, three-day, and four-day event windows. The models include an indicator variable *DISCLOSED*, which equals one for clients with other participant audit firms disclosed in PCAOB Form 2 filings, and zero otherwise. All continuous independent variables are demeaned. Heteroskedasticity and event-day clustering robust standard errors are used in the statistical tests.

All three models in Table 4 Panel C are well specified with adjusted R-squares of 19.68%, 12.87% and 15.51%, respectively. Many of the control variables are significant in at least one of the models at 10% or less (two-tail) level. *LAGRET* and *INSTHOLD* are statistically significant in all models, *PRBANKRUPT* in the two-day and four-day models, *ROA* in the two-day and three-day models, and *LNASSET* and *FEERATIO* in the four-day model. CAR is increasing (i.e., is less negative) with the size of the issuer and the percentage of institutional holding; and decreasing (i.e., is more negative) for firms with higher financial distress, higher previous returns, higher ROA and higher fee ratio. More importantly, the variable of interest, *DISCLOSED*, is negative and significant in all three models. These results indicate that the negative market reaction to the disclosure of other audit participants is robust to controlling for firm specific variables that previous research finds to be associated with CAR.

In additional analyses not tabulated, we estimate the multivariate model (equation 4) on the experimental companies subsample and include variables that proxy for the workforce size

and expertise of the substantially participating auditors.[18] We estimate 2 models: one that includes in equation 4 the number of personnel, number of CPAs, and number of accountants for the other audit participants, and one that includes number of personnel, percentage of CPAs and percentage of accountants for the other audit participants. In these models, we find that number (percentage) of CPAs is positively related to CAR, with two-tailed p-value of 0.088 (0.075). Number of personnel, and number and percentage of accountants are not significantly related to CAR. This indicates that the negative market reaction to the announcement of other audit participants is decreasing (i.e., is less negative) with the ratio or number of CPAs hired by the other audit participant of the issuer.

Results: Market Valuation of Earnings Surprises (ERC)

Tables 5 and 6 report the results from the estimation of the ERC regression model (Equation 5) we specified in the research design section by subsample (experimental and matching companies). In Table 5, we report the results from the regression model that uses analyst forecast error (FE) as the proxy for unexpected earnings. In Table 6, we report the results from the model that proxies unexpected earnings with change in actual earnings from quarter *t-4* to quarter *t* (QUE). In both Tables 5 and 6, descriptive statistics on the dependent and independent variables are presented in Panel A for the experimental subsample and Panel B for the matching subsample. The regression results for both subsamples are in Panel C of Tables 5 and 6.

For each subsample (experimental and matching) in Table 5, the regression results (Panel C) from the model that defines CAR as the size-adjusted return (risk-adjusted return) are reported on the left (right). Both models are well specified with adjusted R-squares of 9.88% and

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[18] We exclude the control sample issuers because we cannot obtain information about whether their audits are conducted using auditors other than the principal auditor.

10.15%, respectively for the experimental companies subsample and 14.58% and 15.54%, respectively for the matching subsample. In the experimental companies subsample, the variable of interest, $POST \times FE$, is negative and significant (two-tail p-value < 0.01) in both models. This finding is consistent with the notion that (1) the PCAOB's required disclosure by auditors of their significant participation in the audits of issuers provides new information to investors, and (2) investors behave as if they perceive the participation of other auditors as reducing the quality of the audit. However, in the matching companies subsample, $POST \times FE$ is not significant at traditional levels suggesting that the decline in ERC for the experimental companies is likely driven by the disclosure by other participant auditors of their involvements in the audits of these companies.

In the experimental subsample, FE is positive and significant in both models (two-tail p-value < 0.05); the market values unexpected earnings positively. Moreover, all the control variables in the model have signs consistent with those documented in prior research, although not all are significant. In the size-adjusted CAR model, LEV, $LOSS$, $FE \times LOSS$, and $FE \times FQTR4$ are significant, and LEV, $LOSS$, $FE \times FQTR4$, and $FE \times LEV$ are significant in the risk-adjusted CAR model. $FE \times LEV$ is weakly significant in the size-adjusted CAR model (with two-tail p-value of 0.13), while $FE \times LOSS$ is weakly significant in the risk-adjusted CAR model (with two-tail p-value of 0.12). In sum, ERC is lower for loss firms and for the fourth quarter compared to the other three quarters in the size adjusted model. ERC is lower for risky firms (LEV) and the fourth quarter compared to the other three quarters in the risk adjusted model. In the matching companies subsample, FE and all the other control variables generally have the same signs as those in the experimental subsample. However, only FE, $LOSS$ and $FE \times FQTR4$ are statistically significant at traditional levels.

Panel C in Table 6 presents the results from the regression model that uses QUE as a proxy for unexpected earnings. The general tenor of the results in Table 6 is similar to those we report in Table 5, with few exceptions. Both the size (left column) and risk-adjusted (right column) CAR models are well specified, with adjusted R-squares of 11.79% and 9.83%, respectively in the experimental subsample and 8.57% and 8.30%, respectively in the matching subsample. The variable of interest $POST \times QUE$ for the experimental sample is negative and significant, albeit weaker in significance than in the model using FE, with two tail p-value $<$ 0.08. The variable of interest $POST \times QUE$ is insignificant in the matching sample. QUE is positive and significant (p-value < 0.01) in both the experimental and matching subsamples. All the control variables in the experimental subsample have the expected signs although not all are significant. In the experimental subsample, the control variables LEV, $SIZE$, $LOSS$, and $QUE \times ABSQUE$ are significant in both models. $QUE \times BM$ is significant in only the size-adjusted model, while $QUE \times LOSS$ is significant in only the risk-adjusted CAR model. Likewise, all the control variables in the matching subsample have the expected signs but not all are significant. The control variables $STDRET$, $SIZE$, $QUE \times ABSQUE$, and $QUE \times LOSS$ are significant in both models for the matching subsample, while BM and $LOSS$ are significant only in the risk-adjusted CAR model.

Tables 7 and 8 report the results from estimation of Equation 6—the full sample (pooled experimental and matching) ERC model. In Table 7, we report the results from the regression model that uses analyst forecast error (FE) as the proxy for unexpected earnings. In Table 8, we report the results from the model that proxies unexpected earnings by change in actual earnings from quarter t-4 to quarter t (QUE). In both Tables 7 and 8, descriptive statistics are in panel A

and regression results in Panel B. The regression results on the left (right) of Panel B are for the size-adjusted (the risk-adjusted) CAR models.

Both the size-adjusted and risk-adjusted CAR models in Table 7 are well specified, with adjusted R-squares of 11.15% and 11.47%, respectively. All the control variables that are significant have their expected signs. *FE* is positive and significant in both models (at 5% level). In both models, CAR is significantly negatively related to standard deviation of returns (*STDRET*), leverage (*LEV*), *LOSS*, $FE \times ABSFE$, and $FE \times FQTR4$. CAR is significantly related to *BM* only in the risk-adjusted CAR model.

More importantly, in Panel B of Table 7 the variable of interest $DISCLOSED \times POST \times FE$ is significantly negative at traditional levels (p < 0.10) in both the size-adjusted and risk-adjusted models. This suggests that ERC is lower in the post period (i.e., the period after other participating auditors disclosed their participation in the audit of issuers) *only* for those issuers identified in these disclosures (experimental companies).

Both the size-adjusted and risk-adjusted CAR models in Table 8 are well specified, with adjusted R-squares of 6.74% and 6.22%, respectively. All the control variables that are significant have their expected signs. *QUE*, like *FE*, is positive and significant in both models (at 5% level). In both models, CAR is significantly negatively related to standard deviation of returns (*STDRET*), *LOSS*, $QUE \times BM$, $QUE \times ABSQUE$, $QUE \times LOSS$, and $QUE \times RESTR$. However, more importantly, as in the model using *FE* to proxy for unexpected earnings, the variable of interest $DISCLOSED \times POST \times QUE$ is significantly negative at traditional levels. Again, this suggests that ERC is lower in the post period only for those issuers identified as having other participant auditors (the experimental sample).

As robustness check, we repeat the ERC analysis using earnings announcements (1) three quarters immediately before and three quarters immediately after, and (2) four quarters immediately before and four quarters immediately after the event date. Lastly, we re-estimate 1 and 2 after excluding the quarter immediately before and the quarter immediately after the event date. The results (not tabulated) remain essentially the same.

CONCLUSION

We empirically test whether investors' perceptions of audit quality are affected by news that firms other than the principal auditor participated in the audit. Our work is motivated in part by a proposed PCAOB rule that would require registered accounting firms to disclose in the audit report the names of other firms or individuals that participated in the audit and the percentage of the audit's total hours these participants provided. The PCAOB argues that this requirement would increase transparency and provide investors with valuable information about the overall quality of the audit. Our study is designed to address some of the questions raised by the Board in its proposed rule, in particular whether disclosure of other participants in the audit would be useful information to investors.

Under current PCAOB standards, principal auditors are prohibited from disclosing the identities of other firms that participated in the audit unless it is a shared responsibility opinion. Therefore, we obtain data from the annual reports (Form 2) registered audit firms began filing with the PCAOB in 2010. From the information reported in Part 4.2 of the Form 2 filings, we identify non-principal auditors that played a "substantial role" in the audits of SEC issuers and the issuers for which they did this work. Auditors performing a "substantial role" are defined by the PCAOB as those (1) whose work either comprises 20% of total hours or total fees for the issuer audit, or (2) who perform the majority of the audit work on a subsidiary constituting 20%

of assets or revenues of the issuer. Thus, these auditors provide a significant amount of services to these audits.

We use a matched control sample research design in the study. Each experimental company is matched with a control company that is closest in size to the experimental company within the same three-digit SIC code. Using the filing date of Form 2 as the event date, we find that cumulative abnormal returns (CARs) are significantly negative in the two-day, three-day, and four-day event windows for the experimental sample—that is, our sample of issuers that were listed in an audit firm's Form 2 as a client for which the firm participated in the audit but was not the principal auditor. For companies in the matching control sample, none of the CARs is significantly different from zero. This suggests that the negative market reaction we document for companies in the experimental sample is a result of the disclosure by other participating auditors of their involvement in the audits of these issuers.

In order to ensure that the results we find in the univariate analysis are robust to controlling for firm specific characteristics that previous research finds to be associated with CAR, we estimate a multivariate cross sectional regression model using the pooled sample of companies in both the experimental and matched control groups. This allows us to see if the abnormal returns are associated with investors' knowledge of the presence of other participants in audits after controlling for certain client-specific characteristics. The models include an indicator variable *DISCLOSED*, which equals one for issuers with audits that used other participant audit firms (as disclosed by the participant audit firm in its Form 2 filings) and zero otherwise. We find that CAR is significantly negatively related to *DISCLOSED* across all three event windows, suggesting that the disclosure of other audit participants provides new

information that is of value to investors' assessment of the overall quality of the audit, consistent with the views of the Board and major investor groups.

In our analysis of earnings response coefficients, we use a pre-post design, where each issuer acts as its own control, to test if the market valuation of earnings surprises changes after the disclosure of other participants in audits. We estimate four models with two alternative proxies for the dependent variable: size and risk-adjusted CAR and two alternative proxies for unexpected earnings: analyst forecast errors and earnings changes from quarter *t-4* to *t*. We estimate the four models by subsample (experimental and matching) as well as on the full sample (pooled experimental and matching). In all four model specifications, we find that the variable of interest, $POST \times UE$, is significantly negative for the experimental subsample. This indicates that the market valuation of earnings surprises declines after news of other audit participants is revealed in the participating audit firms' Form 2 filings.

However, for the matching subsample, $POST \times UE$ is not significant in any of the four models. The significance of $POST \times UE$ in only the experimental subsample suggests that the declines in ERC in the post event period are related to the disclosures made by other audit participants of their involvement in the audits of the issuers in the experimental subsample. The results from the ERC model estimated on the full sample (pooled experimental and matching) corroborate our findings in the subsamples. The variable of interest $DISCLOSED \times POST \times UE$ is significantly negative in all four models confirming that there is a decline in ERC in the post period only for those issuers with other participating auditors as disclosed in those firms' Form 2 filings.

Overall, these results suggest that PCAOB required disclosures by auditors of their significant participation in the audits of issuers provide new information, and investors behave as

if they perceive audits in which other auditors participate negatively after the information is disclosed. Thus, our empirical results support the PCAOB's position that the disclosure of other participants in audits enhances transparency and is of information value to investors.

As indicated earlier, only the auditors that do not issue audit opinions during the reporting period are required to report their participation in other audits. Thus if an issuer's audit received substantial services from other audit participants, but those other audit participants issued audit opinions to at least one SEC issuer during the reporting period, it will not be included in our sample. To the extent that the issuers that receive substantial audit services from auditors required to disclose such services could be systematically different from those that receive similar services from auditors not required to disclose, our findings may not generalize to the issuers excluded from the sample due to data availability limitations. With this limitation in mind, we believe our study provides important empirical evidence that news of other participants in audits is value-relevant to investors.

REFERENCES

American Institute of Certified Public Accountants. 1972. AU Section 543: Part of audit performed by other independent auditors. http://www.aicpa.org/Research/ Standards/AuditAttest/DownloadableDocuments/AU-00543.pdf. Accessed August 30, 2012.

Baber, W., K. Kumar, and T. Verghese. 1995. Client security price reactions to the Laventhol and Horwath bankruptcy. *Journal of Accounting Research* 33: 385-395.

Baber,W., J. Krishnan, and Y. Zhang. 2012. Investor Perceptions of the Earnings Quality Consequences of Hiring an Affiliated Auditor. Working paper, Georgetown University, Temple University, and American University.

Blacconiere, W. 1991. Market reactions to accounting regulations in the Savings and Loan industry. *Journal of Accounting and Economics* 14: 91-113.

Blacconiere, W., and M. DeFond. 1997. An investigation of independent audit opinions and subsequent independent auditor litigation of publicly-traded failed savings and loans. *Journal of Accounting and Public Policy* 16: 415–454.

Blacconiere, W., and D. Patten. 1994. Environmental disclosures, regulatory costs, and changes in firm value. *Journal of Accounting and Economics* 18: 357-377.

Bowen. R., M. Johnson, and T. Shevlin. 1989. A joint test of market efficiency and the information content of earnings during the stock market crash of October 1987. *Journal of Accounting and Economics* 11: 225-254.

Brown, S., and J. Warner. 1985. Using daily returns: The case of event studies. *Journal of Financial Economics* 14: 3-31.

CFA Institute. 2010. Independent auditor's report survey results. http://www.cfainstitute.org/Survey/independent_auditors_report_survey_results.pdf. Accessed August 30, 2012.

Choi, S. K., and G. Salamon. 1989. External reporting and capital asset prices. In C.f. Lee (Ed.), *Advances in Quantitative Analysis of Finance and Accounting* 3 (Part A): 85-110.

Doty, J. 2011. "Statement on Proposed Amendments to Improve Transparency through Disclosure of Engagement Partner and Certain Other Participants in Audits." Speech, PCAOB Open Board Meeting, October 11. Washington DC.

Francis, J.R., and B. Ke. 2006. Disclosure of fees paid to auditors and the market valuation of earnings surprises. *Review of Accounting Studies* 11: 495-523.

Hothausen, R., and R. Verrecchia. 1988. The effect of sequential information releases on the variance of price changes in an intertemporal multi-asset market. *Journal of Accounting Research* 26: 82-106.

Investor Advisory Group (IAG). 2011. Presentation of the working group on auditor's report and the role of the auditor. http://pcaobus.org/News/Events/Pages/03162011_IAGMeeting.aspx . Accessed August 13, 2012.

Krishnamurthy, S., J. Zhou, and N. Zhou. 2006.Auditor reputation, auditor independence, and the stock-market impact of Andersen's indictment on its client firms. *Contemporary Accounting Research* 23 (2): 465–90.

Levin, C. 2012. Comment letter on PCAOB Rulemaking Docket No. 29. January 3. http://pcaobus.org/Rules/Rulemaking/Docket029/017b_Levin.pdf

Lyubimov, A. 2011. Accepting full responsibility in the audit opinion: Implications for audit quality. Working paper, University of Central Florida.

Lyubimov, A., V. Arnold, and S. G. Sutton. 2011. Perceptions of quality, risk, and legal liability associated with outsourcing and offshoring audit procedures. Working paper, University of Central Florida.

Markopolos, H. 2010. *No One Would Listen: A True Financial Thriller*. John Wiley & Sons, Inc.: Hoboken, NJ.

Noreen, E. 1989. An introduction to testing hypothesis using computer-intensive statistics. Wiley: New York, NY.

Palmrose, Z.V., 1988. An analysis of auditor litigation and audit service quality. *The Accounting Review* 63 (January): 55-73

Simunic, D.A., and M. T. Stein. 1987. The impact of litigation risk on audit pricing: A review of the economics and evidence. *Auditing: A Journal of Practice and Theory* 15: 120–134.

Thompson, R., C. Olsen, and R. J. Dietrich. 1987. Attributes of news about firms: An analysis of firm-specific news reported in the wall street journal index. *Journal of Accounting Research* 25 (2): 245 – 274.

Zmijewski, M. 1984. Methodological Issues Related to the Estimation of Financial Distress Prediction Models. *Journal of Accounting Research* 24 (Supplement): 59-82.

Table 1
Summary statistics

Panel A. By filing date of Form 2

Filing Date	Number of firm filings	Percentage
In May 2010	6	5.41%
From June 1, 2010 to June 27, 2010	14	12.61%
On June 28, 2010	6	5.41%
On June 29, 2010	21	18.92%
On June 30, 2010	41	36.94%
In July 2010	5	4.50%
In August 2010	7	6.31%
In September 2010	9	8.11%
After September 30, 2010	2	1.80%
Total	111	100.00%

Table 1
Summary statistics (cont.)

Panel B. By Audit Firm Country

Auditor Country	No. of Firms	%	Auditor Country	No. of Firms	%
Argentina	3	2.70%	Malta	1	0.90%
Australia	4	3.60%	Netherlands	3	2.70%
Austria	2	1.80%	Norway	1	0.90%
Barbados	1	0.90%	Paraguay	1	0.90%
Belgium	3	2.70%	Peru	1	0.90%
Brazil	1	0.90%	Philippines	2	1.80%
Canada	2	1.80%	Romania	1	0.90%
Cayman Islands	2	1.80%	Russian Fed.	4	3.60%
China	8	7.21%	Singapore	4	3.60%
Czech Republic	1	0.90%	Slovakia	2	1.80%
Egypt	1	0.90%	South Africa	1	0.90%
Finland	2	1.80%	Spain	1	0.90%
France	2	1.80%	Sweden	2	1.80%
Germany	3	2.70%	Switzerland	1	0.90%
Ghana	1	0.90%	Taiwan	2	1.80%
Hong Kong	7	6.31%	Thailand	1	0.90%
Hungary	1	0.90%	Turkey	1	0.90%
Iceland	1	0.90%	U. A. E.	3	2.70%
India	4	3.60%	United Kingdom	9	8.11%
Ireland	1	0.90%	United States	8	7.21%
Israel	2	1.80%	Venezuela	2	1.80%
Italy	2	1.80%	Viet Nam	1	0.90%
Japan	2	1.80%	Total	111	100.00%
Malaysia	3	2.70%			

Table 1
Summary statistics (cont.)

Panel C. By number of issuer clients

Number of issuer clients	Audit firms with that number of issuer clients	%
1	76	68.47%
2	12	10.81%
3	8	7.21%
4	6	5.41%
5	1	0.90%
6	1	0.90%
7	2	1.80%
8	2	1.80%
9	1	0.90%
14	1	0.90%
24	1	0.90%
	111	100.00%

Panel D. Number of accountants, CPAs, and personnel

	N	Mean	Std Dev	Min.	Lower Quartile	Med.	Upper Quartile	Max.
No. of Accountants	107	282	541	1	32	106	279	3,652
No. of CPAs	107	99	174	0	13	42	104	1,340
No. of Personnel	107	449	791	1	48	166	529	4,719
Accountants ratio	107	67%	23%	5%	50%	71%	86%	100%
CPA ratio	107	34%	23%	0%	16%	29%	48%	100%

Accountants ratio (CPA ratio) is the number of accountants (CPAs) as a percentage of the number of personnel.

TABLE 2

Sample selection for market reaction analysis

	No. of Issuers
Issuers identified from the 111 audit firm annual reports	236
Less: issuers with missing CIK	(44)
Issuers with CIK	192
Less: issuers that cannot be matched to CRSP and Compustat	(59)
Sample issuers available in both CRSP and Compustat	133
Less: issuers that have insufficient return data from CRSP for CAR calculation	(17)
Issuers with sufficient information for CAR calculation	116
Less: issuers that made potentially value-relevant disclosures around filing date	(12)
Final sample	104

The event date (day 0) is the day the issuer's other participating auditor (not the principal auditor) filed its 2010 annual report with PCAOB. The estimation period for calculating the CARs is 250 days before day −10. Firms must have returns for at least 60 of the 250 trading days to be included in the sample. To mitigate the concern that significant abnormal return actions may be associated with confounding events, we exclude firms that made potentially value-relevant disclosures around the event date (as in Baber et al. 1995). Announcements of earnings, dividends, mergers, acquisitions, repurchases, equity issuances, bankruptcy filings, and tax-related events are treated as value-relevant disclosures (Thompson et al. 1987).

TABLE 3
Abnormal Returns

Panel A: Abnormal returns for issuer clients of audit firms that disclosed in Form 2 that they acted as other participant auditors (N=104)

Event Window	Mean CAR	Median CAR	Mean (t-test) *p*-values	Randomization test *p*-values	Sign test *p*-values	Wilcoxon Signed rank test *p*-values
Days (0, 0)	−0.11%	−0.05%	0.619	0.416	0.566	0.247
Days (0, +1)	−0.88%	−0.69%	0.025	0.037	0.112	0.040
Days (0, +2)	−0.91%	−0.71%	0.038	0.048	0.084	0.037
Days (0, +3)	−1.36%	−1.03%	0.002	0.011	0.003	0.001

Panel B: Abnormal returns for matched sample (N=104)

Event Window	Mean CAR	Median CAR	Mean (t-test) *p*-values	Randomization test *p*-values	Sign test *p*-values	Wilcoxon Signed rank test *p*-values
Days (0, 0)	−0.08%	−0.02%	0.762	0.626	0.922	0.990
Days (0, +1)	0.15%	−0.07%	0.714	0.788	0.768	0.870
Days (0, +2)	0.01%	0.13%	0.981	0.574	0.769	0.832
Days (0, +3)	−0.33%	0.03%	0.596	0.379	0.921	0.743

All *p*-values are two-tailed. The event date (day 0) is the day the issuer's auditor filed its annual report for 2010 with PCAOB. The estimation period is 250 days before day −10. Firms must have returns for at least 60 of the 250 trading days to be included in the sample. Market proxy is the CRSP value-weighted index.

TABLE 4

Cross-sectional analysis of market reaction

Panel A: Descriptive statistics for sample issuers

Variable	N	Mean	Std. Dev.	Lower Quartile	Median	Upper Quartile
PRBANKRUPT	86	0.059	0.122	0.000	0.003	0.043
LAGRET	86	0.346	0.487	0.059	0.280	0.540
LNASSET	86	6.558	2.197	4.887	6.378	8.149
BM	86	0.781	0.604	0.398	0.611	0.905
LEV	86	0.175	0.182	0.013	0.131	0.270
GROWTH	86	-0.057	0.390	-0.274	-0.122	0.004
ROA	86	0.058	0.218	-0.052	0.026	0.116
FEERATIO	86	0.143	0.134	0.028	0.114	0.227
NEWAUD	86	0.118	0.324	0.000	0.000	0.000
INSTHOLD	86	0.551	0.293	0.346	0.634	0.805

Panel B: Descriptive statistics for matching issuers

Variable	N	Mean	Std. Dev.	Lower Quartile	Median	Upper Quartile	*p*-value for difference of mean from experimental sample
PRBANKRUPT	86	0.036	0.081	0.000	0.001	0.033	0.152
LAGRET	86	0.390	0.636	0.104	0.343	0.575	0.642
LNASSET	86	6.535	2.143	4.960	6.072	8.121	0.975
BM	86	0.781	0.564	0.390	0.621	0.947	0.988
LEV	86	0.148	0.157	0.002	0.106	0.233	0.287
GROWTH	86	-0.116	0.241	-0.249	-0.121	0.004	0.289
ROA	86	0.039	0.153	-0.038	0.012	0.090	0.509
FEERATIO	86	0.159	0.156	0.036	0.113	0.242	0.466
NEWAUD	86	0.089	0.286	0.000	0.000	0.000	0.534
INSTHOLD	86	0.587	0.401	0.296	0.618	0.804	0.748

TABLE 4

Cross-sectional analysis of market reaction (cont.)

Panel C: Regression. N=172. T statistics in parentheses.

	Dependent Variable		
	Two-day CAR (0, 1)	**Three-day CAR (0, 2)**	**Four-day CAR (0, 3)**
Intercept	0.000	0.000	−0.006
	(0.09)	(0.12)	(−0.93)
DISCLOSED	−0.008	−0.010	−0.012
	(−2.76) **	(−2.16)*	(−2.52) **
PRBANKRUPT	−0.075	−0.043	−0.093
	(−1.89) *	(−0.92)	(−2.27) **
LAGRET	−0.025	−0.027	−0.038
	(−2.42) **	(−4.15) ***	(−2.72) **
LNASSET	0.001	0.002	0.004
	(0.61)	(1.01)	(4.59) ***
BM	0.006	−0.001	−0.001
	(1.01)	(−0.09)	(−0.11)
LEV	0.011	−0.004	−0.002
	(1.20)	(−0.20)	(−0.09)
GROWTH	−0.013	−0.014	−0.013
	(−1.20)	(−0.82)	(−0.68)
ROA	−0.060	−0.056	−0.055
	(−6.38) ***	(−2.06) *	(−1.38)
FEERATIO	−0.017	−0.025	−0.029
	(−1.51)	(−1.63)	(−2.66) **
NEWAUD	0.007	0.017	0.007
	(0.73)	(1.22)	(0.41)
INSTHOLD	0.020	0.027	0.018
	(2.84) **	(2.68) **	(1.80) *
Adj. R^2	0.1968	0.1287	0.1551

***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively, two-tailed. 86 pairs of sample and matching firms have the information required to compute all independent variables. *DISCLOSED* equals one for issuers that are disclosed in the participating auditor's FORM 2 (sample firms) and zero otherwise (matching firms). *PRBANKRUPT* equals Zmijewski's [1984] financial distress measure for issuer. *LAGRET* equals issuer's one year cumulative raw returns prior to the participating auditor's Form 2 filing. *LNASSET* equals natural log of issuer's total assets (in million dollars). *BM* equals issuer's book value of equity scaled by market value of equity. *LEV* equals issuer's total debt to total assets. *GROWTH* equals issuer's growth rate in sales. *ROA* equals Issuer's 2-digit SIC code median adjusted ROA. *FEERATIO* equals ratio of non-audit fees to total fees paid by issuer. *NEWAUD* equals one if issuer switched auditor during the year prior to the participating auditor's Form 2 filing and zero otherwise. *INSTHOLD* equals percentage of issuer shares owned by institutional shareholders. In Panel C, all continuous independent variables are demeaned.

TABLE 5

ERC analysis using analyst forecast errors to proxy for unexpected earnings

Panel A: Descriptive statistics, experimental firm-quarters (N=192)

Variable	Mean	Std. Dev.	Lower Quartile	Median	Upper Quartile
size-adjusted CAR (-1,+1)	0.0026	0.082	-0.0426	0.0037	0.0518
risk-adjusted CAR (-1,+1)	0.0023	0.081	-0.0464	0.0019	0.0486
FE	0.0010	0.015	-0.0002	0.0013	0.0050
BM	0.6790	0.546	0.3272	0.5545	0.7862
STDRET	0.0290	0.012	0.0206	0.0274	0.0360
LEV	0.4222	0.208	0.2402	0.4080	0.5750
SIZE	6.9818	2.403	5.0045	6.5695	9.1723
ABSFE	0.0040	0.018	0.0012	0.0032	0.0087
LOSS	0.2222	0.417	0.0000	0.0000	0.0000
FQTR4	0.2500	0.436	0.0000	0.0000	1.0000
RESTR	0.0265	0.161	0.0000	0.0000	0.0000

Panel B: Descriptive statistics, matched firm-quarters (N=192)

Variable	Mean	Std. Dev.	Lower Quartile	Median	Upper Quartile
size-adjusted CAR (-1,+1)	0.0041	0.087	-0.0342	0.0037	0.0514
risk-adjusted CAR (-1,+1)	0.0039	0.089	-0.0402	0.0024	0.0461
FE	0.0016	0.019	-0.0010	0.0020	0.0060
BM	0.7855	0.593	0.3643	0.6248	0.9391
STDRET	0.0292	0.014	0.0197	0.0268	0.0353
LEV	0.3314	0.160	0.2070	0.3163	0.4369
SIZE	6.3956	2.184	4.5986	5.7865	7.5550
ABSFE	0.0104	0.016	0.0020	0.0050	0.0110
LOSS	0.2148	0.412	0.0000	0.0000	0.0000
FQTR4	0.2500	0.437	0.0000	0.0000	1.0000
RESTR	0.0336	0.181	0.0000	0.0000	0.0000

Variables are defined in Panel C

TABLE 5

ERC analysis using analyst forecast errors to proxy for unexpected earnings (cont.)

Panel C: Regression of three-day CAR on unexpected earnings and control variables

Dependent variable	Experimental firm-quarters N=192				Matched firm-quarters N=192			
	Size-adjusted CAR		Risk-adjusted CAR		Size-adjusted CAR		Risk-adjusted CAR	
	Coef.	t stat	Coef.	t stat	Coef.	t stat	Coef.	t stat
Intercept	0.073	2.34**	0.054	2.09*	0.052	1.56	0.043	1.31
POST	−0.013	−0.95	−0.018	−1.31	−0.013	−1.35	−0.010	−1.07
FE	3.302	2.28**	3.232	2.75**	3.092	2.08*	2.423	2.30**
*POST*FE*	−2.146	−3.02***	−1.721	−3.11***	0.014	0.26	0.032	0.69
BM	0.005	0.42	0.014	1.36	0.017	0.92	0.024	1.34
STDRET	−0.682	−1.20	−0.746	−1.45	−1.013	−1.54	−1.037	−1.63
LEV	−0.059	−2.79**	−0.065	−3.05***	−0.015	−0.56	−0.026	−0.97
SIZE	−0.003	−1.24	0.000	−0.02	−0.005	−1.40	−0.003	−0.95
ABSFE	−0.268	−0.69	−0.097	−0.26	−0.047	−0.56	−0.061	−0.79
LOSS	−0.035	−2.22**	−0.030	−1.98*	−0.016	−1.76*	−0.021	−2.17**
FQTR4	−0.007	−0.38	−0.016	−0.79	−0.006	−0.67	−0.002	−0.23
RESTR	0.002	0.12	−0.004	−0.28	−0.007	−0.53	−0.006	−0.44
FE×BM	−0.797	−1.72	−0.646	−1.27	−0.074	−1.49	−0.081	−1.53
FE×STDRET	8.218	0.35	6.244	0.28	1.290	0.65	1.492	0.81
FE×LEV	−3.689	−1.58	−4.012	−2.01*	−0.068	−0.30	−0.085	−0.36
FE×SIZE	0.011	0.03	−0.005	−0.01	0.009	0.65	0.011	0.83
FE×ABSFE	−24.068	−0.85	−22.651	−0.79	−3.817	−0.53	−3.465	−0.92
FE×LOSS	−1.796	−1.75*	−1.632	−1.63	−1.024	−0.57	−1.144	−0.66
FE×FQTR4	−1.981	−2.76**	−1.700	−2.48**	−1.520	−2.17**	−1.087	−2.01*
FE×RESTR	−1.746	−1.19	−0.408	−0.23	−0.165	−1.20	−0.199	−1.52
Adj. R^2	9.88%		10.15%		14.58%		15.54%	

***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively (two-tailed). The standard errors are robust to heteroskedasticity and 2-digit SIC code clustering. CAR_{it} is issuer i's cumulative abnormal return over a 3-day window from one day before to one day after the quarter t earnings announcement, measured in two ways: size-adjusted return and risk-adjusted return. *POST* equals one if the quarterly earnings announcement is after the annual report filing date of the participating auditor and zero otherwise. UE_{it} equals issuer i's unexpected earnings for quarter t, measured in two ways: FE_{it}: actual quarterly earnings per share from I/B/E/S for issuer i in quarter t minus the most recent median consensus analyst forecast, scaled by price or QUE_{it}: issuer i's quarter t earnings minus quarter t-4 earnings scaled by market value of equity. *BM* equals book to market ratio, a growth proxy. *STDRET* is the standard deviation of stock returns, computed using daily returns from 90 days to seven days before the earnings announcement date with a required minimum of 10 non-missing daily returns. *LEV* is measured as the ratio of total debt to total equity. *SIZE* is measured by the natural log of firm market value at the beginning of the quarter. *ABSUE* equals absolute value of abnormal earnings, measured in two ways: *ABSFE*: the absolute value of *FE*, or *ABSQUE*: the absolute value of *QUE*. *LOSS* equals one when quarterly earnings are less than zero, and zero otherwise. *FQTR4* is one when the observation is from the fourth quarter of the company's fiscal year and zero otherwise. *RESTR* is an indicator variable for restructuring, equal to one when the ratio of quarterly special items (Compustat data item SPIQ) to total assets is less than −0.05 and zero otherwise.

TABLE 6

ERC analysis using quarterly earnings change as proxy for unexpected earnings

Panel A: Descriptive statistics, experimental firm-quarters (N=416)

Variable	Mean	Std. Dev.	Lower Quartile	Median	Upper Quartile
size-adjusted CAR (-1,+1)	0.0028	0.076	-0.0359	0.0017	0.0429
risk-adjusted CAR (-1,+1)	0.0026	0.075	-0.0382	0.0011	0.0404
QUE	0.0279	0.118	-0.0042	0.0075	0.0345
BM	0.7941	0.586	0.4144	0.6506	0.9619
STDRET	0.0318	0.016	0.0215	0.0286	0.0377
LEV	0.4435	0.227	0.2489	0.4379	0.5986
SIZE	6.2627	2.405	4.5432	5.8945	7.9715
ABSQUE	0.0571	0.132	0.0069	0.0181	0.0501
LOSS	0.2869	0.453	0.0000	0.0000	1.0000
FQTR4	0.2500	0.431	0.0000	0.0000	0.0000
RESTR	0.0385	0.193	0.0000	0.0000	0.0000

Panel B: Descriptive statistics, matched firm-quarters (N=416)

Variable	Mean	Std. Dev.	Lower Quartile	Median	Upper Quartile
size-adjusted CAR (-1,+1)	0.0022	0.076	-0.0395	0.0013	0.0410
risk-adjusted CAR (-1,+1)	0.0024	0.078	-0.0443	0.0014	0.0457
QUE	0.0350	0.125	-0.0017	0.0062	0.0238
BM	0.7460	0.539	0.4019	0.6243	0.8866
STDRET	0.0292	0.014	0.0197	0.0259	0.0357
LEV	0.4106	0.204	0.2458	0.3943	0.5429
SIZE	6.3482	2.287	4.5633	6.1025	7.8060
ABSQUE	0.0551	0.126	0.0048	0.0128	0.0391
LOSS	0.2861	0.452	0.0000	0.0000	1.0000
FQTR4	0.2500	0.431	0.0000	0.0000	0.0000
RESTR	0.0408	0.239	0.0000	0.0000	0.0000

TABLE 6

ERC analysis using quarterly earnings change as proxy for unexpected earnings (cont.)

Panel C: Regression of CAR on unexpected earnings and control variables

| Dependent variable | Experimental observations N=416 | | | | Matched observations N=416 | | | |
| | Size-adjusted CAR | | Risk-adjusted CAR | | Size-adjusted CAR | | Risk-adjusted CAR | |
	Coef.	*t* stat	Coef.	*t* stat	Coef.	*t* stat	Coef.	*t* stat
Intercept	0.055	2.55**	0.054	2.45**	0.017	0.82	0.012	0.56
POST	−0.001	−0.05	−0.006	−0.58	−0.006	−0.80	−0.009	−1.12
QUE	0.575	2.89***	0.576	2.70**	0.556	2.50**	0.468	2.32**
POST×QUE	−0.384	−1.82*	−0.316	−1.86*	0.054	0.44	0.015	0.13
BM	−0.006	−1.59	−0.003	−0.81	−0.011	−1.30	−0.013	−1.70*
STDRET	−0.144	−0.49	−0.263	−0.75	−0.992	−2.41**	−0.982	−2.18**
LEV	−0.025	−1.99*	−0.027	−2.11**	−0.025	−1.08	−0.024	−1.08
SIZE	−0.004	−2.29**	−0.003	−1.99*	−0.003	−1.87*	−0.004	−1.93*
ABSQUE	0.029	0.42	0.043	0.56	0.079	1.12	0.074	1.02
LOSS	−0.028	−4.51***	−0.024	−3.65***	−0.015	−1.49	−0.017	−1.76*
FQTR4	−0.002	−0.25	−0.010	−1.04	−0.004	−0.43	−0.005	−0.58
RESTR	0.009	0.49	0.019	0.94	0.017	1.57	0.007	0.61
QUE×BM	−0.115	−2.59**	−0.079	−1.60	−0.044	−0.75	−0.055	−0.88
QUE×STDRET	1.447	0.43	0.245	0.06	4.804	1.48	4.728	1.50
QUE×LEV	−0.136	−0.94	−0.133	−0.97	−0.055	−0.42	−0.147	−1.17
QUE×SIZE	0.006	0.95	0.006	0.72	0.031	1.28	0.038	1.38
QUE×ABSQUE	−0.783	−4.78***	−0.674	−4.25***	−0.463	−2.78***	−0.392	−1.95*
QUE×LOSS	−0.148	−1.48	−0.168	−1.73*	−0.296	−5.60***	−0.274	−5.83***
QUE×FQTR4	−0.033	−0.30	−0.017	−0.17	−0.093	−1.01	−0.080	−0.91
QUE×RESTR	−0.024	−0.08	−0.075	−0.26	−0.057	−0.33	−0.064	−0.35
Adj. R^2	11.79%		9.83%		8.57%		8.30%	

The standard errors are robust to heteroskedasticity and 2-digit SIC code clustering. Variable definitions are presented in Table 5.

TABLE 7

ERC analysis for pooled sample using analyst forecast errors to proxy for unexpected earnings

Panel A: Descriptive statistics for pooled sample (N=384)

Variable	Mean	Std. Dev.	Lower Quartile	Median	Upper Quartile
size-adjusted CAR (-1,+1)	0.0034	0.085	-0.0384	0.0037	0.0516
risk-adjusted CAR (-1,+1)	0.0031	0.085	-0.0433	0.0022	0.0474
FE	0.0013	0.017	-0.0006	0.0017	0.0055
BM	0.7323	0.570	0.3458	0.5897	0.8627
STDRET	0.0291	0.013	0.0202	0.0271	0.0357
LEV	0.3768	0.184	0.2236	0.3622	0.5060
SIZE	6.6887	2.294	4.8016	6.1780	8.3637
ABSFE	0.0072	0.017	0.0016	0.0041	0.0099
LOSS	0.2185	0.415	0.0000	0.0000	0.0000
FQTR4	0.2500	0.437	0.0000	0.0000	1.0000
RESTR	0.0301	0.171	0.0000	0.0000	0.0000

TABLE 7

ERC analysis for pooled sample using analyst forecast errors to proxy for unexpected earnings (cont.)

Panel B: Pooled Regression of CAR on unexpected earnings and control variables, N=384

	Size-adjusted CAR		Risk-adjusted CAR	
	Coef.	*t* stat	Coef.	*t* stat
Intercept	0.053	2.24**	0.041	1.77*
DISCLOSED	0.013	0.97	0.013	1.02
POST	−0.002	−0.25	−0.007	−0.90
FE	3.096	2.39**	2.711	2.13**
POST×FE	0.098	0.89	0.127	0.99
DISCLOSED×POST	−0.016	−1.22	−0.014	−1.17
DISCLOSED×FE	0.154	0.91	0.711	1.58
DISCLOSED×POST×FE	−1.394	−1.88*	−1.174	−1.95*
BM	0.015	1.43	0.022	2.25**
STDRET	−0.906	−2.43**	−1.136	−3.23***
LEV	−0.040	−1.93*	−0.046	−2.16**
SIZE	−0.002	−0.96	0.000	0.10
ABSFE	−0.099	−0.87	−0.059	−0.48
LOSS	−0.026	−2.08**	−0.023	−1.84*
FQTR4	−0.009	−0.98	−0.014	−1.40
RESTR	−0.030	−1.04	−0.040	−1.51
FE×BM	0.016	0.15	0.002	0.02
FE×STDRET	0.543	0.09	1.956	0.37
FE×LEV	0.375	0.65	0.290	0.52
FE×SIZE	0.003	0.08	−0.005	−0.11
FE×ABSFE	−0.676	−2.01*	−0.578	−1.73*
FE×LOSS	−0.198	−0.93	−0.115	−0.55
FE×FQTR4	−0.225	−2.47**	−0.172	−2.10**
FE×RESTR	−1.428	−0.72	−2.966	−1.49
Adj. R^2	11.15%		11.47%	

The standard errors are robust to heteroskedasticity and 2-digit SIC code clustering. Variable definitions are presented in Table 5.

TABLE 8
ERC analysis for pooled sample using quarterly earnings change as proxy for unexpected earnings

Panel A: Descriptive statistics for pooled sample (N=832)

Variable	Mean	Std. Dev.	Lower Quartile	Median	Upper Quartile
size-adjusted CAR (-1,+1)	0.0025	0.076	-0.0377	0.0015	0.0420
risk-adjusted CAR (-1,+1)	0.0025	0.077	-0.0413	0.0013	0.0431
QUE	0.0315	0.122	-0.0030	0.0069	0.0292
BM	0.7701	0.563	0.4082	0.6375	0.9243
STDRET	0.0305	0.015	0.0206	0.0273	0.0367
LEV	0.4271	0.216	0.2474	0.4161	0.5708
SIZE	6.3055	2.346	4.5533	5.9985	7.8888
ABSQUE	0.0561	0.129	0.0059	0.0155	0.0446
LOSS	0.2865	0.453	0.0000	0.0000	1.0000
FQTR4	0.2500	0.431	0.0000	0.0000	0.0000
RESTR	0.0397	0.216	0.0000	0.0000	0.0000

TABLE 8

ERC analysis for pooled sample using quarterly earnings change as proxy for unexpected earnings (cont.)

Panel B: Regression of CAR on unexpected earnings and control variables. N = 832 firm-quarters

	Size-adjusted CAR		Risk-adjusted CAR	
	Coef.	t stat	Coef.	t stat
Intercept	0.043	2.97***	0.038	2.39**
DISCLOSED	0.004	0.62	0.006	0.87
POST	−0.006	−0.74	−0.009	−1.19
QUE	0.469	2.30**	0.442	2.04**
POST×QUE	−0.125	−1.00	−0.083	−0.69
DISCLOSED×POST	0.005	0.61	0.004	0.48
DISCLOSED×QUE	−0.033	−0.22	−0.020	−0.74
DISCLOSED×POST×QUE	−0.363	−1.86*	−0.338	−1.70*
BM	−0.003	−0.59	0.000	0.02
STDRET	−0.534	−1.95*	−0.615	−1.97*
LEV	−0.019	−1.41	−0.019	−1.43
SIZE	−0.002	−1.38	−0.001	−0.86
ABSQUE	0.020	0.49	0.020	0.41
LOSS	−0.024	−4.15***	−0.022	−4.16***
FQTR4	−0.003	−0.37	−0.008	−1.10
RESTR	−0.002	−0.18	0.009	0.96
QUE×BM	−0.112	−2.29**	−0.095	−1.96*
QUE×STDRET	2.689	1.26	1.835	0.78
QUE×LEV	−0.128	−1.21	−0.170	−1.63
QUE×SIZE	0.038	1.85*	0.030	1.47
QUE×ABSQUE	−0.545	−3.30***	−0.473	−2.67**
QUE×LOSS	−0.193	−4.33***	−0.192	−4.24***
QUE×FQTR4	0.016	0.19	0.018	0.22
QUE×RESTR	−0.324	−1.77*	−0.319	−1.78*
Adj. R^2	6.74%		6.22%	

The standard errors are robust to heteroskedasticity and 2-digit SIC code clustering. Variables are defined in Table 5.