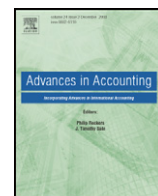




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Does auditor size matter? Evidence from small audit firms[☆]

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ABSTRACT

While prior literature documents that Big 4 auditors provide higher quality audits, recent evidence suggests that these differences are due to client characteristics (Lawrence, Minutti-Meza, & Zang, 2011). Evidence on the audit quality of mid-tier auditors is mixed (Boone, Khurana, & Raman, 2010; Cassell, Giroux, Myers, & Omer, 2013). This study investigates the audit quality of small auditor firms (i.e., those with 100 or fewer). Specifically, we examine the relationship between earnings manipulations and the use of small audit firms, controlling for client characteristics using propensity score matching. We find that small audit firms are less able to constrain managers' opportunistic use of discretionary accruals. However we find no evidence that small audit firms are associated with real activity manipulation. By investigating a specific group of audit firms that are the smallest in the audit market, this study extends our understanding of the role of audit firm size in audit quality.

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1. Introduction

Big 4 auditors have been viewed as a surrogate for higher audit quality in the literature (e.g., Becker, DeFond, Jiambalvo, & Subramanyam, 1998; DeAngelo, 1981; Francis & Krishnan, 1999; Francis, Maydew, & Sparks, 1999; Teoh & Wong, 1993).² However, since audit quality is jointly determined by managers and auditors, the evidence is driven by the clientele effect as well. In a recent study, Lawrence, Minutti-Meza, and Zang (2011) find that differences in audit quality between Big 4 and non-Big 4 auditors are more likely attributable to client characteristics, especially size. They find that after controlling for client characteristics, the difference in audit quality between these two groups disappears.

In addition, some studies have examined the audit quality of mid-tier auditors. However, the evidence on mid-tier auditors is mixed. For example, Boone, Khurana, and Raman (2010) do not find a significant difference in audit quality between Big 4 and mid-tier audit firms (using performance-adjusted abnormal accruals as the proxy). Cassell, Giroux, Myers, and Omer (2013) document that the financial reporting

credibility of mid-tier clients was lower than Big 4 clients in the pre-Anderson period, but was indistinguishable from Big 4 clients in the post-Anderson period (using ex ante cost of equity capital and earnings response coefficients as the proxies). However, Eshleman and Guo (2014) find that Big 4 auditors provide superior audit quality than mid-tier auditors using restatements as a proxy for audit quality. These studies use different definitions of mid-tier auditors, and empirical evidence on the audit quality of small auditors (as opposed to mid-tier auditors) is scant and remains somewhat of a black box.³ The purpose of this paper is to investigate whether there is a quality difference among small auditors after controlling for client characteristics.

This study is also motivated by the recent attention of the Public Company Accounting Oversight Board (PCAOB). The PCAOB was established with the passage of the Sarbanes–Oxley Act of 2002 in response to the cascade of audit failures in the preceding decade. PCAOB inspections accompanied by other strains on the resources of audit firms (e.g., the shortened 8-K filing deadline, SOX section 404, etc.) have dramatically changed the audit market.⁴ Small audit firms are particularly impacted by resource constraints and the increasing regulation

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² DeAngelo (1981) argues that auditors may have incentives of providing lower audit quality to retain their clients due to future client-specific quasi-rents. In this viewpoint, large audit firms provide higher quality because they have more to lose from larger client bases. Literature generally views Big 4 auditors as a surrogate for higher audit quality based on DeAngelo's (1981) argument.

³ Boone et al. (2010) defines the mid-tier audit firms as Grant Thornton and BDO Seidman. The Mid-tier auditors in Cassell et al. (2012) are Grant Thornton, BDO Seidman, and McGladrey & Pullen. Eshleman and Guo (2014) consider Grant Thornton and BDO Seidman as the mid-tier auditors.

⁴ One of the greatest controversies surrounding the establishment of the PCAOB is the shift from self-regulation to government regulation in the U.S. audit market. The Sarbanes–Oxley Act authorizes the PCAOB to inspect registered audit firms either annually or triennially, depending upon whether the audit firm provides audit reports for more than 100 issuers (annual inspection) or 100 or fewer issuers (triennial inspection). This rule has replaced the peer review system promulgated by the American Institute of Certified Public Accountants (AICPA). The debate has thus arisen regarding whether the PCAOB inspections are more effective than the pre-SOX AICPA peer review system.

of audit firms has increased their compliance costs. Consistent with these increased costs, DeFond and Lennox (2011) find that over six hundred small audit firms (i.e., those with 100 or fewer clients) exited the public client market after the adoption of SOX in 2002. DeFond and Lennox (2011) document that exiting small audit firms are of lower quality when compared with non-exiting small audit firms. However, it is an open question whether small audit firms provide lower quality audits than other audit firms in general.

Existing research has focused on differences in the quality of Big 4 and non-Big 4 auditors.⁵ It is generally assumed that larger audit firms provide higher quality audits (e.g., Becker et al., 1998; DeAngelo, 1981; Francis & Krishnan, 1999; Francis et al., 1999; Teoh & Wong, 1993).⁶ It is common in the literature to view non-Big 4 auditors as a homogeneous group, even though they exhibit clear differences in various firm attributes, such as size. There is evidence that smaller auditors provide greater value in certain circumstances. Louis (2005) finds that acquirers audited by non-Big 4 auditors have significantly higher abnormal returns around M&A announcements than do acquirers audited by Big 4 audit firms. The heterogeneity among non-Big 4 auditors, however, has not received much attention until recently, and these studies have primarily examined mid-size auditors with mixed evidence.

In this paper, we examine whether small audit firms are able to constrain managers to conduct earnings manipulations. We target a group of small audit firms with 100 or fewer clients because these auditors are subject to different levels of oversight by the PCAOB. We include two different earnings manipulation proxies because Zang (2012) finds that managers trade off accrual-based earnings management and real earnings management methods based on the relative cost and these two methods serve as substitutes in managing earnings. Therefore, we examine whether the use of small auditors is associated with both accrual-based earnings management and real earnings management.

Earlier findings of differences in audit quality are increasingly attributed to the attributes of the clients who select the auditors. Lawrence et al. (2011) find that the differences in proxies for audit quality between Big 4 and non-Big 4 auditors are more likely attributable to client characteristics, especially client size. To control for client characteristics and potential endogeneity, we employ a propensity-score matched sample to examine the association between earnings management and the use of small audit firms. We estimate the propensity score using an auditor choice model that employs variables identified in prior literature that may affect the selection of auditors (Ashbaugh, LaFond, & Mayhew, 2003; Chaney, Jeter, & Shivakumar, 2004). We then examine the relationship between two earnings manipulation measures and an indicator variable for small audit firms.

In descriptive analysis, we find that firms with higher asset turnover, a lower current asset component of total assets, a higher quick ratio, or lower industry litigation risk are more likely to hire smaller audit firms, while client size (measured by log of assets) is significantly negatively associated with the likelihood of hiring smaller audit firms. We further find that firms using small audit firms are more likely to engage in higher levels of earnings manipulation, as measured by discretionary accruals, but not by real activity manipulations. The result holds when we use different thresholds to define smaller audit firms (e.g., audit

firms with fewer than 30 clients or 50 clients). Finally, when we exclude exiting auditors from our sample, we find that there is still a positive association between the use of small audit firms and accrual-based earnings management.

Our findings supplement the previous literature on small audit firms. The previous literature focuses on Big 4 auditors and treats non-Big 4 auditors as a homogeneous group to compare against. Nonetheless, there are differences among non-Big 4 auditors on characteristics such as client size, number of audit partners, resources and operations. Additionally, some non-Big 4 audit firms have national operations while others have only regional or local operations. These differences among non-Big 4 audit firms are actually quite sizeable and should be of interest to researchers. Further, although previous studies indicate that small audit firms have more audit deficiencies or quality control defects (Hermanson & Houston, 2008; Hermanson, Houston, & Rice, 2007), there is little evidence as to why firms choose small audit firms and the incentives behind that choice.

As mentioned previously, DeFond and Lennox (2011) show that small audit firms exiting the audit market for publicly listed firms have lower audit quality than non-exiting small audit firms (measured by the propensity to issue going-concern opinions). In contrast to DeFond and Lennox's (2011) study, we examine whether earnings management associated with small audit firms differs from that associated with non-small audit firms. We focus on earnings management through the use of accruals since reported discretionary accruals are the joint product of managers and auditors and thus represent an important aspect of financial reporting quality. Besides accruals management, managers may conduct earnings manipulation through real activities (Cohen, Dey, & Lys, 2008; Graham, Harvey, & Rajgopal, 2005; Gunny, 2010; Roychowdhury, 2006). By also investigating the effect of small audit firms on real earnings management, this paper contributes to our knowledge of the role of smallest audit firms in constraining managers' opportunistic behavior through multiple channels.

The remainder of this paper is organized as follows. Section 2 reviews related literature and develops the hypotheses. Section 3 presents the research design. Section 4 reports on the data and empirical results. Section 5 concludes.

2. Related literature and hypothesis development

Earnings management is defined by Healy and Wahlen (1999). They state that "earnings management occurs when management uses judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers." Among the various monitoring mechanisms that constrain managers' incentives to manipulate reported earnings, the use of external auditors is regarded as one of the most effective ways to improve the credibility of financial reporting.

Previous literature indicates that the demand for hiring Big 4 auditors is increasing in agency costs (DeFond, 1992; Francis & Wilson, 1988) consistent with the common perception in academic research that large accounting firms provide higher quality audits (e.g., Becker et al., 1998; DeAngelo, 1981; DeFond, 1992; Dye, 1993; Farber, 2005; Francis & Krishnan, 1999; Palmrose, 1988). In a theoretical framework, DeAngelo (1981) illustrates that auditors may compromise their independence due to the economic dependence on their clients, mainly the relative economic importance of the client to the auditor's client portfolio. Large audit firms are more likely to resist the threat because they have "more to lose" compared with small audit firms (i.e., they can bear higher reputation loss), and hence large audit firms may provide better audit quality. In addition to reputational concerns, the literature also indicates that large audit firms have greater wealth at risk from litigation so the audit quality of large audit firms is higher due to

⁵ Throughout the paper, we use the term "Big 4" to refer to the Big 4 audit firms, and the former Big 5, Big 6, or Big 8 audit firms if the period covers previous years when each of these classifications were appropriate.

⁶ DeAngelo (1981) argues that auditors may have incentives of providing lower audit quality to retain their clients due to future client-specific quasi-rents. In this viewpoint, large audit firms provide higher quality because they have more to lose from larger client bases. Literature generally views Big 4 auditors as a surrogate for higher audit quality based on DeAngelo's (1981) argument.

their “deeper pockets” (Dye, 1993). In archival studies, researchers commonly use a dichotomous variable (Big 4/non-Big 4) as a surrogate for audit firm size to test its relation to audit quality. For example, Becker et al. (1998) and Francis et al. (1999) document that Big 6 auditors are associated with lower levels of discretionary accruals. Lennox (1999) finds that the propensity of large audit firms to issue a going-concern opinion is higher for a sample of financially distressed companies in the UK. Teoh and Wong (1993) show that market values are higher for companies with Big 4 auditors (higher audit quality is presumed to be reflected in a higher earnings response coefficient). In addition, other studies suggest that large audit firms supply higher quality audits as evidenced by the higher audit fees they receive (e.g., Beatty, 1989; Simunic & Stein, 1987).⁷

The audit market has dramatically changed after the demise of Arthur Andersen and the adoption of the Sarbanes–Oxley Act. In response to increased demand, the cost of hiring Big 4 auditors has increased, which in turn, has led an increasing number of companies to switch to smaller audit firms.⁸ This raises the issue of whether smaller audit firms provide similar audit quality to Big 4 auditors. Some studies investigate smaller audit firms (usually mid-tier firms) and treat all non-Big 4 auditors as a heterogeneous group (Boone et al., 2010; Chang, Cheng, & Reichelt, 2010; Hogan & Martin, 2009). However, the properties of small audit firms are largely unknown. DeFond and Lennox (2011) indicate that half of small audit firms exit the market in the post-SOX era (possibly driven by the increasing compliance costs imposed on small audit firms). In addition, they find that exiting auditors are lower quality auditors when compared to the successor auditors. We do not know, however, whether all small audit firms provide lower quality audits.

It is unclear why firms choose smaller audit firms. Compared with Big 4 audit firms, small audit firms charge lower audit fees and (hopefully) provide cost-effective audits to their clients. Hogan and Martin (1997) demonstrate that some initial public offering firms may select non-Big 4 auditors because of cost and benefit considerations. However, other than in the IPO setting, we do not have any evidence of why smaller audit firms are chosen. One conjecture is that if small audit firms do not have sufficient ability to detect earnings management, firms with incentives to manipulate reported earnings may choose small audit firms. There is also some controversy in the previous literature on smaller audit firms' quality in various settings. Some claim that small audit firms have better knowledge of local markets and have close connections with their local business communities. For example, Louis (2005) reports that clients of non-Big 4 audit firms have higher abnormal returns around M&A announcements, which implies that smaller audit firms provide higher quality audits for firms involved in M&A events. In contrast, there is also evidence showing that small audit firms (those with fewer than 100 public clients and are triennially inspected by PCAOB) are more likely to have audit deficiencies and quality defects (Hermanson & Houston, 2008; Hermanson et al., 2007). We thus examine whether firms using small audit firms engage in a higher level of earnings manipulation, as measured by discretionary accruals or real earnings manipulations.

3. Research design

To estimate propensity scores and identify a matched sample for the small audit firms, we use the following logit model to estimate the probability of selecting a small audit firm:

$$SMALL_t = \beta_0 + \beta_1 SIZE_t + \beta_2 LEV_t + \beta_3 ROA_t + \beta_4 ATURN_t + \beta_5 CURR_t + \beta_6 QUICK_t + \beta_7 RISKIND_t + Year\ fixed\ effect + Industry\ fixed\ effect + u_t, \quad (1)$$

where

- $SMALL_t$ a dummy variable equal to one if the firm's auditor has fewer than 100 clients and zero otherwise;
- $SIZE_t$ logarithm of total assets;
- LEV_t total debt divided by total assets;
- ROA_t income before extraordinary items divided by the beginning-of-year assets;
- $ATURN_t$ asset turnover, calculated as sales divided by total assets;
- $CURR_t$ current assets divided by total assets;
- $QUICK_t$ current assets minus inventory divided by current liabilities;
- $RISKIND_t$ a dummy variable equal to one if the firm operates within a high-litigation industry and zero otherwise, where high-litigation industries are industries with SIC codes of 2833–2836, 3570–3577, 3600–3674, 5200–5961, 7370–7374.

The reasoning behind choosing these variables for the model follows. Based on prior literature (Chaney et al., 2004; Francis, 1984; Lawrence et al., 2011), we posit that audit client size affects the choice of the audit firm. Auditors exert more effort on larger firms and thus we include the logarithm of total assets and asset turnover to control for audit client size. We include ROA to measure profitability since profit-making firms and loss-making firms may have different levels of demand for small audit firms. To measure audit risk, we use the quick ratio and leverage to represent the short-term and long-term financial structure of the client. We also include the ratio of current assets to total assets because accounts receivable and inventory are viewed as high-risk assets and require more audit effort and more extensive audit procedures. To measure audit risk among different industries, we include a dummy variable that equals one when the industry is regarded as a high-risk industry (industries with SIC codes of 2833–2836, 3570–3577, 3600–3674, 5200–5961, 7370–7374) based on previous research (Ashbaugh et al., 2003; Gul, Sami, & Zhou, 2009). We also include year and industry fixed effects, where industries are identified using the Fama and French 48 industry classification.

We use accrual-based earnings management to proxy for managers' opportunistic behavior. Abnormal accruals are estimated as the residuals from the cross-sectional modified Jones (1991) model described below:

$$\frac{TAC_{i,t}}{TA_{i,t-1}} = \alpha_{0t} \frac{1}{TA_{i,t-1}} + \alpha_{1t} \frac{\Delta SALES_{i,t} - \Delta AR_{i,t}}{TA_{i,t-1}} + \alpha_{2t} \frac{PPE_{i,t}}{TA_{i,t-1}} + \int_t, \quad (2)$$

where TAC_t is the total accruals, calculated as net income less cash flows from operations, $\Delta SALES_t$ is the change in sales between year t and year $t - 1$, ΔAR_t is the change in accounts receivable between year t and year $t - 1$, PPE_t is the gross amount of property, plant and equipment at the end of year t , and TA_{t-1} is the total assets at the end of year $t - 1$. We estimate Eq. (2) in the cross section in each year for each industry classification with at least fifteen observations. The residuals from Eq. (2) are the measures of abnormal accruals (DA_t). We also compute the performance-adjusted discretionary accrual (PDA_t) similar to Cahan and Zhang (2006). We assign firms in each industry into deciles based on the prior year return on assets (ROA) and then obtain the performance-adjusted discretionary accrual by taking the DA_t

⁷ In addition to studies where auditor reputation is represented by the use of Big 4 auditors, studies also investigate other auditor characteristics that may affect audit quality by constraining managers' deliberately discretionary behavior such as expertise, tenure, and independence (Craswell, Francis, & Taylor, 1995; Krishnan, 2003; Myers, Myers, & Omer, 2003; Lennox and Pittman, 2010; Gul et al., 2009; Reichelt & Wang, 2010). These studies do not control for client characteristics using a propensity score matched sample.

⁸ According to an article released on 10/18/2005, second-tier accounting firms such as Crowe Chizek, Grant Thornton, BDO Siedman, and RSM McGladrey have capitalized on the relative shortcomings of the Big Four and have picked up 417 ex-Big Four clients since 2003. (reference: <http://www.accountingweb.com/item/101381>).

for firm i from Eq. (2) and then subtracting the median unadjusted DA_t for the corresponding industry ROA decile.

We then examine the effect of small audit firms on earnings manipulation using accruals management as a proxy for managers' opportunistic behavior, as follows:

$$DA_t(PDA_t) = \gamma_0 + \gamma_1 SMALL_t + \gamma_2 MVE_{t-1} + \gamma_3 ROA_t + \gamma_4 MTB_{t-1} + \text{Year fixed effect} + \text{Industry fixed effect} + v_t \quad (3)$$

where

DA_t Modified Jones model discretionary accruals estimated from Eq. (2), measured in absolute values ($ABSDA_t$), positive values ($PosDA_t$), and negative values ($NegDA_t$);

PDA_t Modified Jones model discretionary accruals estimated from Eq. (2) and adjusted for prior year performance, measured in absolute values ($ABSPDA_t$), positive values ($PosPDA_t$), and negative values ($NegPDA_t$);

MVE_{t-1} the market value of equity at the beginning of the year t ;

ROA_t return on assets;

MTB_{t-1} market-to-book ratio in year $t - 1$; and

V_t the error term.

The coefficient of interest is γ_1 . We expect γ_1 to be significantly negative if small audit firms do not have the ability to constrain managers' opportunistic behavior either because they do not have sufficient expertise or because they have compromised their independence. Following Roychowdhury (2006) and Cohen et al. (2008), we use the market-to-book ratio (MTB_{t-1}) and the market value of equity (MVE_{t-1}) to control for size and growth opportunities. Further, we include ROA to control for the effect of performance. Finally, we winsorize all of the variables at the 1st and 99th percentiles of their respective distributions in order to mitigate the effect of potential outliers.

4. Data and empirical results

To identify a sample of small audit firms, we choose audit firms with fewer than 100 public clients for the following reasons. First, the frequency of Public Company Accounting Oversight Board (PCAOB) inspections differs for audit firms with more than 100 clients (annual inspections) and audit firms with fewer than 100 clients (triennial inspections). Second, studies investigating small audit firms use this criterion to select their sample (e.g. DeFond & Lennox, 2011; Hermanson et al., 2007). Thus, to make our results comparable with previous literature, we use the same criterion to select our sample. Auditor information is obtained from the Audit Analytics Database and financial information is collected from CRSP and the Compustat annual industry and research files. In our sample period from 2001 to 2009, we obtain 41,305 observations from Audit Analytics. We exclude Arthur Andersen clients in 2002 to avoid any potential confounding effects from the Enron event. We then exclude firms in the financial industry (SIC codes 6000–6999) and regulated industries. We also require at least 15 observations in each two-digit SIC grouping per year to estimate the various earnings management proxies. We further delete observations without available data to calculate various earnings management measures. This yields 26,428 firm-year observations, of which 4267 observations (16.15%) are clients of small audit firms. We then calculate propensity scores using Eq. (1) based on these observations. Similar to Lawrence et al. (2011), we impose a caliper distance of 3% on Eq. (1) to calculate the propensity scores and obtain a propensity score matched sample of 3048 firm-year observations, of which 1524 are clients of small audit firms and 1524 are clients of larger audit firms. We further exclude observations missing data for the additional control variables (e.g., $SIZE$, LEV , ROA , $ATURN$, $CURR$, and $QUICK$) used in Eq. (3) and obtain 2917 observations in the final sample.

Table 1
Descriptive statistics: propensity-score matched samples.

	All obs. mean std. dev. (n = 2917)	Small audit firms mean std. dev. (n = 1466)	Other audit firms mean std. dev. (n = 1451)	Difference in means (t-statistic)
$ABSDA_t$	0.144 (0.185)	0.158 (0.203)	0.129 (0.164)	0.029*** (4.239)
$ABSPDA_t$	0.137 (0.201)	0.150 (0.223)	0.125 (0.175)	0.025*** (3.405)
$SIZE_t$	4.062 (1.302)	4.055 (1.249)	4.069 (1.354)	-0.014 (-0.287)
$ATURN_t$	1.271 (1.016)	1.267 (1.037)	1.275 (0.995)	-0.008 (-0.218)
LEV_t	0.214 (0.338)	0.223 (0.308)	0.205 (0.366)	0.018 (1.437)
$CURR_t$	0.599 (0.246)	0.600 (0.249)	0.599 (0.243)	0.001 (0.116)
$QUICK_t$	2.645 (3.085)	2.668 (3.193)	2.622 (2.973)	0.046 (0.401)
ROA_t	-0.220 (2.677)	-0.274 (3.715)	-0.164 (0.678)	0.110 (1.107)
$RISKIND_t$	0.419 (0.493)	0.431 (0.495)	0.407 (0.491)	0.024 (1.340)
MVE_{t-1}	1.572 (3.377)	1.214 (1.941)	1.934 (4.344)	-0.720 (-5.787)***
ROA_t	-0.220 (2.677)	-0.274 (3.715)	-0.164 (0.678)	-0.110 (-1.107)
MTB_{t-1}	2.732 (5.959)	2.621 (6.182)	2.843 (5.725)	-0.221 (-1.003)

*, ** and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-sided), respectively.

Variable definitions

$ABSDA_t$	absolute values of discretionary accruals estimated from Eq. (2);
$ABSPDA_t$	absolute values of discretionary accruals adjusted for prior year performance;
$SIZE_t$	logarithm of total assets;
$ATURN_t$	asset turnover, calculated as sales divided by total sales;
LEV_t	total debt divided by total assets;
$CURR_t$	current assets divided by total assets;
$QUICK_t$	current assets minus inventory divided by current liabilities;
ROA_t	income before extraordinary items divided by beginning-of-year assets;
$RISKIND_t$	a dummy variable equal to one if the firm operates within a high-litigation industry and 0 otherwise, where high-litigation industries are industries with SIC codes of 2833–2836, 3570–3577, 3600–3674, 5200–5961, 7370–7374.
MVE_{t-1}	the market value of equity at the beginning of year t ;
ROA_t	income before extraordinary items divided by beginning-of-year assets; and
MTB_{t-1}	market-to-book ratio at the beginning of year.

Table 1 presents the descriptive statistics for the propensity matched sample. We match small audit firms with other auditors based on size, asset turnover, leverage, current ratio, quick ratio, ROA , and high-litigation industry because prior studies document that those factors are associated with the selection of Big 4 auditors (Ashbaugh et al., 2003; Chaney et al., 2004). The mean log of total assets ($SIZE$) is 4.062 for the full sample. Asset turnover ($ATURN$) is an average of 1.271 times per year and leverage (LEV) has a mean value of 0.214. Current assets represent 59.9% of total assets ($CURR$) and the average quick ratio ($QUICK$) is 2.645. The average return on assets (ROA) is -22% and 41.9% of the firms in the sample are in high-litigation risk industries ($RISKIND$). We further present each of these variables for the small auditors and for the control group. The tests on the differences in means for the various variables show that there is no significant difference in firm characteristics (used in the selection model) between clients of the small audit firms and larger audit firms in the propensity-score matched sample. However, we find that small audit firms have significantly larger absolute value of abnormal accruals ($ABSDA$ or $ABSPDA$) than other audit firms do in the matched sample.

We report the correlation between all variables in Table 2 (values at the 1% significance level are in bold). $Big4$ is negatively correlated with $ABSDA$, which suggests that large accounting firms have higher ability

Table 2
Correlation matrix.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. <i>ABSDA_t</i>	1											
2. <i>ABSPDA_t</i>	0.904	1										
3. <i>SMALL_t</i>	0.078	0.063	1									
4. <i>Big4_t</i>	− 0.087	− 0.069	− 0.744	1								
5. <i>SIZE_t</i>	− 0.250	− 0.242	−0.005	0.086	1							
6. <i>ATURN_t</i>	0.036	0.032	−0.004	−0.041	0.026	1						
7. <i>LEV_t</i>	0.215	0.183	0.027	− 0.071	− 0.128	−0.002	1					
8. <i>CURR_t</i>	0.027	0.034	0.002	0.007	− 0.291	0.145	− 0.215	1				
9. <i>QUICK_t</i>	− 0.095	− 0.070	0.007	0.028	0.002	− 0.290	− 0.292	0.354	1			
10. <i>ROA_t</i>	− 0.256	− 0.277	−0.021	0.016	0.097	0.033	−0.045	−0.005	0.022	1		
11. <i>RISKIND_t</i>	0.081	0.096	0.025	−0.023	− 0.210	− 0.130	−0.045	0.185	0.125	− 0.064	1	
12. <i>MVE_{t−1}</i>	− 0.090	− 0.092	− 0.107	0.155	0.491	− 0.059	− 0.064	− 0.103	0.055	0.029	− 0.054	1
13. <i>MTB_{t−1}</i>	−0.020	−0.020	−0.019	0.001	−0.017	−0.038	− 0.114	0.058	0.113	0.019	0.025	0.125

The statistics reported in this Table are based on Pearson correlations. Values displayed in bold are significant at the 0.01 significance level. All variables are winsorized at 1st and 99th percentiles of their distributions. Variable definitions are in Table 2.

to constrain managers' opportunistic behavior. In contrast, the univariate results show that the small audit firms indicator, *SMALL*, is positively correlated with *ABSDA* (*ABSPDA*). This suggests that firms hiring the smallest audit firms are more likely to engage in accrual-based earnings management. The correlation between *Big4* and *SMALL* is less than one since not all non-Big 4 auditors are small. *ABSDA* is also significantly positively correlated with leverage (*LEV*), and the high-litigation industry dummy variable (*RISKIND*). *ABSDA* is significantly negatively correlated with firm size (*SIZE*), *ROA*, the quick ratio, and the market value of equity (*MVE*). The correlation between *ABSDA* and the ratio of current assets to total assets (*CURR*) and the market-to-book ratio (*MTB*) is positive, but is not significant. Finally, *SMALL* is negatively correlated with the market value of equity at the beginning of the year. The rest of the correlations are insignificantly correlated with *SMALL* (with the exception of *ABSDA*, which was mentioned above).

Table 3 reports the result from the audit choice model described in Eq. (1). As expected, the coefficient on *SIZE* is significantly negative (−0.649, *P*-value < 1%), which suggests that smaller companies tend to choose small audit firms. In addition, we find that firms with higher asset turnover, lower current ratios, or higher quick ratios are more likely to hire the small audit firms. However, leverage (*LEV*) and firm performance (*ROA*) are not significantly correlated with the probability of hiring small audit firms. Finally, the probability of choosing a small audit firm is significantly lower for firms in riskier industries.

Table 4 reports the result of tests using the propensity-score matched sample. In the univariate result, the coefficient on *SMALL* is significantly positive (*P*-value < 1%) when the absolute value of discretionary accruals is the dependent variable, which suggests that firms hiring small audit firms engage in a higher level of accruals management. When we partition the sample into positive and negative discretionary accruals separately, the coefficient on *SMALL* is still significant for either the positive accruals or the negative accruals. In the multivariate analysis, the result is qualitatively the same. The coefficient on *SMALL* is significantly positive (*P*-value < 1%) when the absolute value of modified Jones model discretionary accruals or performance-matched discretionary accruals is the dependent variable. The coefficient on *SMALL* is still significant on positive or negative accruals when we partition the sample into positive vs. negative accruals, either for modified Jones model discretionary accruals or for performance-matched discretionary accruals. Overall, the results suggest that small audit firms are less likely to constrain managers' ability to engage in accruals management.

For the control variables, we find that the coefficient on *MVE_{t−1}* is significantly negative when the dependent variable is the absolute value of modified Jones model abnormal accruals (performance-adjusted abnormal accruals). When the results are broken down for positive and negative discretionary accruals, we find that the coefficient on

MVE_{t−1} is significantly negatively (positively) associated with positive (negative) discretionary accruals. All of these results are consistent with firms having lower levels of discretionary accruals as firm size increases

Table 3
Auditor choice of small audit firms.

	<i>SMALL_t</i>
Intercept	2.503*** (22.08)
<i>SIZE_t</i>	−0.649*** (−64.71)
<i>ATURN_t</i>	0.120*** (8.32)
<i>LEV_t</i>	−0.035 (−0.98)
<i>CURR_t</i>	−0.951*** (−13.40)
<i>QUICK_t</i>	0.011** (2.06)
<i>ROA_t</i>	−0.001 (−0.22)
<i>RISKIND_t</i>	−0.204*** (−4.63)
Year dummies	Included
Industry dummies	Included
<i>N</i>	26,428
Pseudo R ²	0.420

The table presents the results of a probit regression of the determinants of small auditor choice based on the pooled sample from 2001 to 2009. *SIZE*, *ATURN*, *LEV*, *CURR*, *QUICK*, and *ROA* are winsorized at the top and bottom 1st and 99th percentiles of their distributions to mitigate the influence of outlying observations. *, ** and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-sided), respectively. The *z*-values are shown in parentheses.

Variable definitions

<i>SMALL_t</i>	a dummy variable equal to one if the audit firm has fewer than 100 clients and zero otherwise;
<i>SIZE_t</i>	logarithm of total assets;
<i>ATURN_t</i>	asset turnover, calculated as sales divided by total sales;
<i>LEV_t</i>	total debt divided by total assets;
<i>CURR_t</i>	current assets divided by total assets;
<i>QUICK_t</i>	current assets minus inventory divided by current liabilities;
<i>ROA_t</i>	income before extraordinary items divided by beginning-of-year assets; and
<i>RISKIND_t</i>	a dummy variable equal to one if the firm operates within a high-litigation industry and 0 otherwise, where high-litigation industries are industries with SIC codes of 2833–2836, 3570–3577, 3600–3674, 5200–5961, 7370–7374.

Table 4
The association between the small audit firms and discretionary accruals: propensity-score matched sample.

	$ABSDA_t$	Pos_DA_t	Neg_DA_t	$ABSDA_t$	$PosDA_t$	$NegDA_t$	$ABSPDA_t$	$PosPDA_t$	$NegPDA_t$
<i>Intercept</i>	0.073*** (4.96)	0.087*** (3.63)	-0.054** (-2.43)	0.080*** (6.24)	0.091*** (3.79)	-0.073*** (-3.71)	0.085*** (7.27)	0.116*** (3.50)	-0.056*** (-3.18)
$SMALL_t$	0.028*** (7.38)	0.025*** (3.32)	-0.034*** (-4.73)	0.023*** (5.61)	0.020** (2.20)	-0.023*** (-3.78)	0.019*** (3.54)	0.014* (1.75)	-0.023*** (-3.36)
MVE_{t-1}				-0.004*** (-3.02)	-0.003*** (-2.70)	0.009*** (5.74)	-0.005*** (-2.81)	-0.007*** (-4.89)	0.005** (2.18)
ROA_t				-0.017* (-1.89)	0.053 (0.97)	0.017* (1.82)	-0.020** (-2.15)	0.035 (0.62)	0.020** (2.03)
MTB_{t-1}				-0.000 (-0.39)	0.000 (0.10)	0.001 (0.48)	-0.000 (-0.48)	-0.000 (-0.33)	-0.000 (-0.18)
<i>Year fixed effect</i>	Included	Included	Included	Included	Included	Included	Included	Included	Included
<i>Industry fixed effect</i>	Included	Included	Included	Included	Included	Included	Included	Included	Included
<i>N</i>	2917	1503	1414	2917	1503	1414	2917	1484	1433
<i>Adj. R²</i>	0.047	0.048	0.069	0.114	0.075	0.157	0.118	0.055	0.167

MVE , ROA , MTB , and all dependent variables are winsorized at the top and bottom 1st and 99th percentiles of their distributions to mitigate the influence of outlying observations. *, ** and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-sided), respectively. Reported t -statistics in the parentheses are based on robust standard errors clustered by firm. Variable definitions

$ABSDA_t$ absolute values of discretionary accruals estimated from Eq. (2);
 $PosDA_t$ positive values of discretionary accruals estimated from Eq. (2);
 $NegDA_t$ negative values of discretionary accruals estimated from Eq. (2);
 $ABSPDA_t$ absolute values of discretionary accruals adjusted for prior year performance;
 $PosPDA_t$ positive values of discretionary accruals adjusted for prior year performance;
 $NegPDA_t$ negative values of discretionary accruals adjusted for prior year performance;
 $SMALL_t$ a dummy variable equal to one if the audit firm has fewer than 100 clients and zero otherwise;
 MVE_{t-1} the market value of equity at the beginning of year t ;
 ROA_t income before extraordinary items divided by beginning-of-year assets; and
 MTB_{t-1} market-to-book ratio at the beginning of year t .

(consistent with prior research, e.g., Cohen et al., 2008). We also find that ROA_t is significantly and negatively associated with the absolute value of abnormal accruals (either $ABSDA_t$ or $ABSPDA_t$). This result appears to be driven by significantly positive coefficients on ROA_t when the dependent variable is negative abnormal accruals (either $ABSDA_t$ or $ABSPDA_t$). Finally, the market-to-book ratio is not significant in our results.⁹

4.1. Threshold of small audit firms

To ensure that our results are not affected by our definition of smaller audit firms, we use different thresholds to define smaller audit firms: that is, audit firms with fewer than 30 clients or 50 clients. We first identify these audit firms and then perform the propensity-score matching procedure to collect their respective control firms. The result is reported in Table 5. In panel A, the coefficients for $SMALL$ for both absolute abnormal accruals and absolute performance-adjusted accruals are significantly positive, which suggests that the positive association between accruals management and using smaller audit firms holds for audit firms with fewer than 30 clients. When we split the sample into positive accruals and negative accruals, only the coefficient of $SMALL$ for negative performance-adjusted accruals is insignificant ($SMALL$ remains significant for positive and negative abnormal accruals and for positive performance-adjusted accruals). In Panel B, the coefficients for $SMALL$ for absolute accruals, using either the modified Jones model abnormal accruals or performance-adjusted abnormal accruals, are all significantly positive. This shows that clients of smaller audit firms with fewer than 50 clients engage in a higher level of earnings management than the control

⁹ In a sensitivity analysis, we include cash flows from operation as a control variable because cash flows are negatively associated with accruals. We find that the results are qualitatively the same except for the negative accruals.

group. In addition, the results are not sensitive to the direction of accruals management when we decompose the sample into income-increasing and income-decreasing accruals. Specifically, the coefficients for $SMALL$ are significant in the expected direction in both cases.

4.2. Real earnings management

Managers may take real economic actions to affect reported earnings if the sacrifices are not too large (Bruns & Merchant, 1990; Graham et al., 2005). Such real earnings management, however, is potentially more costly to shareholders in the long run. Roychowdhury (2006) indicates that managers cannot rely on accrual management alone if the gap between the actual unmanaged earnings and targeted reported earnings is too large. In addition, the manipulation of accruals is more likely to draw scrutiny by auditors and regulators than real actions such as changes in pricing and production. Therefore, managers may conduct earnings management in the form of real activity manipulation in order to lower the probability of being detected. Consistent with this view, Zang (2012) documents that managers engage in real activities manipulation before accrual-based earnings management, and that these two types of earnings management are substitutes.

Firms may also switch from accrual-based earnings management to real earnings management when opportunities to manage accruals are constrained. Ewert and Wagenhofer (2005) analytically demonstrate that the level of real earnings management increases with tightening accounting standards. Cohen et al. (2008) present evidence that managers switch from accrual management to real earnings management after the passage of the Sarbanes–Oxley Act, suggesting that managers tend to engage in real earnings management when the legal environment becomes increasingly strict. Chi, Lisic, and Pevzner (2011) document that firms resort to higher levels of real earnings management when they have strong incentives to manage earnings in the presence of higher quality auditors, where audit quality is measured by city level auditor industry expertise or the use of Big 4 auditors.

In this section, we analyze whether the level of real earnings management is associated with the use of small audit firms. Following

Table 5
Sensitivity test based on size of small audit firms.

	ABSDA _t	PosDA _t	NegDA _t	ABSPDA _t	PosPDA _t	NegPDA _t
<i>Panel A: small = audit firms with fewer than 30 clients</i>						
Intercept	0.069*** (6.30)	0.068*** (5.67)	-0.071*** (-4.31)	0.074*** (7.15)	0.052*** (3.87)	-0.097*** (-3.57)
SMALL _t	0.023*** (4.23)	0.024*** (3.17)	-0.017** (-2.28)	0.016** (2.27)	0.017** (2.18)	-0.009 (-1.01)
MVE _{t-1}	-0.002** (-2.50)	-0.003** (-2.03)	0.002 (1.33)	-0.002** (-2.43)	-0.003** (-2.21)	0.001 (0.98)
ROA _t	-0.082*** (-5.09)	-0.012 (-0.77)	0.109*** (4.24)	-0.092*** (-5.68)	-0.034** (-2.23)	0.120*** (4.97)
MTB _{t-1}	-0.000 (-0.18)	0.001** (2.39)	0.002 (1.44)	-0.001 (-1.21)	0.000 (0.21)	0.002 (1.34)
Year fixed effect	Included	Included	Included	Included	Included	Included
Industry fixed effect	Included	Included	Included	Included	Included	Included
N	2048	1052	996	2048	1051	997
Adj. R ²	0.201	0.080	0.321	0.206	0.089	0.326
<i>Panel B: small = audit firms with fewer than 50 clients</i>						
Intercept	0.071*** (5.33)	0.062*** (21.41)	-0.075*** (-2.61)	0.068*** (5.17)	0.065*** (9.43)	-0.068*** (-3.45)
SMALL _t	0.032*** (4.29)	0.029*** (3.21)	-0.033*** (-3.56)	0.029*** (3.04)	0.025*** (2.67)	-0.031*** (-2.88)
MVE _{t-1}	-0.004*** (-3.63)	-0.004** (-2.45)	0.005*** (3.75)	-0.004*** (-3.14)	-0.004** (-2.13)	0.004*** (2.87)
ROA _t	-0.072*** (-4.83)	0.014 (0.83)	0.089*** (5.75)	-0.082*** (-4.90)	0.005 (0.36)	0.105*** (5.85)
MTB _{t-1}	-0.001** (-2.04)	-0.001** (-2.24)	0.002 (1.35)	-0.002*** (-2.59)	-0.003*** (-4.64)	0.001 (0.73)
Year fixed effect	Included	Included	Included	Included	Included	Included
Industry fixed effect	Included	Included	Included	Included	Included	Included
N	2800	1399	1401	2800	1415	1385
Adj. R ²	0.229	0.076	0.355	0.232	0.067	0.390

MVE, ROA, MTB, and all dependent variables are winsorized at the top and bottom 1st and 99th percentiles of their distributions to mitigate the influence of outlying observations. *, ** and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-sided), respectively. Reported *t*-statistics in the parentheses are based on robust standard errors clustered by firm. Variable definitions

- ABSDA_t absolute values of discretionary accruals estimated from Eq. (2);
- PosDA_t positive values of discretionary accruals estimated from Eq. (2);
- NegDA_t negative values of discretionary accruals estimated from Eq. (2);
- ABSPDA_t absolute values of discretionary accruals adjusted for prior year performance;
- PosPDA_t positive values of discretionary accruals adjusted for prior year performance;
- NegPDA_t negative values of discretionary accruals adjusted for prior year performance;
- SMALL_t a dummy variable equal to one if the audit firm has fewer than 100 clients and zero otherwise;
- MVE_{t-1} the market value of equity at the beginning of year *t*;
- ROA_t income before extraordinary items divided by beginning-of-year assets; and
- MTB_{t-1} market-to-book ratio at the beginning of year *t*.

prior literature on real earnings management (Cohen et al., 2008; Gunny, 2010; Roychowdhury, 2006), we compute three types of real earnings management: sales manipulation, overproduction, and a reduction of discretionary expenditures. Sales manipulation refers to managers' attempts to increase sales volumes temporarily by offering increased price discounts or more lenient credit terms. This type of manipulation can boost current period earnings, but it produces lower current period cash flows. Overproduction occurs when managers produce more goods than necessary in order to meet expected demand. Producing more units decreases fixed overhead costs per unit, and hence reduces the cost of goods sold as long as the marginal cost per unit does not exceed the reduction in fixed costs per unit. Therefore, this type of manipulation leads to higher operating margins. Finally, the reduction of discretionary expenditures includes advertising, R&D, and SG&A expenses. This type of manipulation can boost earnings in the current period.

Based on Roychowdhury (2006), we use the abnormal levels of cash flow from operations (CFO), production costs, and discretionary expenses as proxies for real earnings management. To estimate abnormal levels of CFO, production costs, and discretionary expenses, we first estimate their normal levels using the model developed by Dechow, Kothari, and Watts (1998), as implemented by Roychowdhury (2006).

Specifically, we run the following three regressions for each industry and year¹⁰:

$$\frac{CFO_{it}}{TA_{i,t-1}} = a_{1t} \frac{1}{TA_{i,t-1}} + a_{2t} \frac{Sales_{i,t}}{TA_{i,t-1}} + a_{3t} \frac{\Delta Sales_{i,t}}{TA_{i,t-1}} + \varepsilon_{it}, \quad (7)$$

$$\frac{PROD_{it}}{TA_{i,t-1}} = b_{1t} \frac{1}{TA_{i,t-1}} + b_{2t} \frac{Sales_{i,t}}{TA_{i,t-1}} + b_{3t} \frac{\Delta Sales_{i,t}}{TA_{i,t-1}} + b_{4t} \frac{\Delta Sales_{i,t-1}}{TA_{i,t-1}} + e_{it}, \quad (8)$$

$$\frac{DISX_{it}}{TA_{i,t-1}} = c_{1t} \frac{1}{TA_{i,t-1}} + c_{2t} \frac{Sales_{i,t-1}}{TA_{i,t-1}} + v_{it} \quad (9)$$

where CFO is cash flows from operating activities, PROD is sum of the cost of goods sold and the change in inventory in year *t*, and DISX is the sum of advertising expenses, R&D expenses, and SG&A expenses. Then we calculate the abnormal level of CFO (ABN_CFO) as the residuals from regression (Eq. (7)), the abnormal level of production costs

¹⁰ Industry-years with fewer than 15 observations are eliminated from the sample. All variables are winsorized at the top and bottom 1st and 99th percentiles of their respective distributions before the estimation to mitigate the influence of outlying observations.

(*ABN_PROD*) as the residuals from regression (Eq. (8)), and the abnormal level of discretionary expenses (*ABN_DISX*) as the residuals from regression (Eq. (9)). We then create a comprehensive measure of real earnings management by combining the three individual measures based on Cohen et al.'s (2008) methodology. Specifically, we compute *RM* as the sum of the three standardized individual components, that is, $-\text{standardized } ABN_CFO + \text{standardized } ABN_PROD - \text{standardized } ABN_DISX$. Higher levels of *RM* indicate higher levels of overall real earnings management.

Table 6 presents the results of the effect of small audit firms on real earnings management. The coefficients on *SMALL* are insignificantly different from zero for the matched sample both with and without additional controls in the model, which suggests that firms hiring small audit firms do not engage in a higher level of real earnings management. Put together, these findings suggest that small audit firms either may have sufficient ability to constrain managers' ability to engage in real earnings management or that the clients of small audit firms prefer to engage in accrual-based accruals management (which is presumably less costly).

4.3. Exiting auditors

DeFond and Lennox (2011) document that compared to non-exiting auditors, auditors who exited the market following SOX are lower quality auditors. To examine whether our results are driven by exiting small auditors, we exclude all exiting auditors and re-run our tests. We define exiting small auditors as those who were not registered with PCAOB in 2010 and we use the PCAOB's list of audit firm name changes as a supplement in case that an audit firm is classified as an exiting auditor if it has changed its name only. In our final sample of small audit firms

Table 6
The association between the small audit firms and real earnings management.

	RM_t	RM_t
Intercept	−0.167 (−1.00)	−0.094 (−0.53)
<i>SMALL</i> _{<i>t</i>}	0.170 (1.35)	0.138 (1.05)
<i>MVE</i> _{<i>t</i>−1}		−0.006 (−0.51)
<i>ROA</i> _{<i>t</i>}		−0.311*** (−2.70)
<i>MTB</i> _{<i>t</i>−1}		−0.015* (−1.71)
Year fixed effect	Included	Included
Industry fixed effect	Included	Included
<i>N</i>	2168	2083
Adj. <i>R</i> ²	0.084	0.109

MVE, *ROA*, *MTB*, and all dependent variables are winsorized at the top and bottom 1st and 99th percentiles to mitigate the influence of outlying observations. *, ** and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-sided), respectively. Reported *t*-statistics in parentheses are based on robust standard errors clustered by firm.

Variable definitions

<i>SMALL</i> _{<i>t</i>}	a dummy variable equal to one if the audit firm has fewer than 100 clients and zero otherwise;
<i>REM</i>	real earnings management measures based on Roychowdhury (2006) and Cohen et al. (2008), which includes <i>ABN_CFO</i> , <i>ABN_PROD</i> , <i>ABN_DISX</i> , and <i>RM</i> defined below;
<i>ABN_CFO</i> _{<i>t</i>}	abnormal cash flows (negative measure of real earnings management);
<i>ABN_PROD</i> _{<i>t</i>}	abnormal inventory over-production (positive measure of real earnings management);
<i>ABN_DISX</i> _{<i>t</i>}	abnormal discretionary expenses (negative measure of real earnings management);
<i>RM</i> _{<i>t</i>}	$-\text{standardized } ABN_CFO + \text{standardized } ABN_PROD - \text{standardized } ABN_DISX$ (positive composite score of real earnings management).
Standardized	measure for each variable $[\text{variable} - \text{mean}(\text{variable})] / \text{standard deviation}(\text{variable})$;
<i>MVE</i> _{<i>t</i>−1}	the market value of equity at the beginning of year <i>t</i> ;
<i>ROA</i> _{<i>t</i>}	income before extraordinary items divided by beginning-of-year assets; and
<i>MTB</i> _{<i>t</i>−1}	market-to-book ratio at the beginning of year <i>t</i> .

(1524 firm-year observations), there are 254 small audit firms (1158 firm-year observations) and 92 of them are exiting auditors as defined above (366 firm-year observations). We examine the relation between the use of small audit firms and earnings management after including a dummy variable for these 92 exiting audit firms and report the result in Table 7.

In Table 7, the coefficients on *SMALL* are all significantly different from zero across the different earnings management measures (absolute or raw values of accruals and real earnings management measure), which suggests that firms using the small audit firms engage in a higher level of accruals or real earnings management. The coefficients on the dummy variable for exiting auditors are not significant. In addition, the significance of the coefficients on the control variables is consistent with that observed in prior tests. All in all, the result shows that our conclusion of a higher level of earnings management with the use of small audit firms is not sensitive to firms that exited the market following SOX.

4.4. Upward switches from small auditors

For firms that switch from small auditors to larger auditors (Big 4 auditors or other non-Big 4 auditors), we examine the effect on the mean change in the absolute value of abnormal accruals, the mean change in the absolute value of performance-matched discretionary accruals, and the mean change in real earnings management. The results are reported in Table 8. Since there are few instances where firms in our sample switch up from the smallest audit firms, we report the results for tests using only 56 observations in Table 8, which means that the tests reported in Table 8 lack power. Even with the small number of observations, we find that the mean difference for *ABSDA*_{*t*} is significantly negative (−0.040, *P*-value = 0.0342) when firms switch from the smallest auditors to larger auditors using a one-sided test. In addition, the mean difference for *ABSPDA*_{*t*} is negative (−0.032, *P*-value = 0.1188) and the mean difference for *RM*_{*t*} is also negative (−0.373, *P*-value = 0.0547). Although the mean differences for *ABSPDA*_{*t*} and *RM*_{*t*} are not significant at conventional levels, they are near the cut-offs for significance.

Overall, the results reported in Table 8 suggest that switches from the smallest auditors to larger auditors are associated with reductions in earnings management (although our tests lack power due to the small number of upward switches). These results are consistent with larger auditors having a stronger monitoring effect on earnings management, and thus, the switch causing a decrease in accrual-based and real earnings management. The strongest impact of moving up to a larger auditor appears to be when earnings management is accomplished through discretionary accruals, but we do find evidence of reduction in real earnings management as well (although it is weaker).

5. Conclusion

Smaller audit firms have attracted limited attention both in practice and in academic research since PCAOB inspections were implemented. This paper investigates the role of small audit firms on earnings management. Specifically, this paper examines what types of clients choose small audit firms, and whether small audit firms have less ability to constrain managers' opportunistic behavior. We find that the choice of small audit firms is associated with a higher level of earnings manipulation, when measured by accruals management. However, we find no evidence that the use of small audit firms is associated with a higher level of real activity manipulations.

DeAngelo (1981) argues that larger audit firms have "more to lose" if they fail to report a breach. Since DeAngelo (1981) provides theoretical support for audit firm size as a proxy for auditor quality, a large body of research uses larger audit firm size as a surrogate for better audit quality (e.g., Becker et al., 1998; Francis & Krishnan, 1999; Francis et al., 1999; Lennox & Pittman, 2010; Teoh & Wong, 1993; Weber & Willenborg, 2003). Nonetheless, some recent studies show that there is no actual difference in audit quality between Big 4 auditors and non-Big 4

Table 7
Sensitivity test: controlling for exiting auditors.

	<i>ABSDA_t</i>	<i>PosDA_t</i>	<i>NegDA_t</i>	<i>ABSPDA_t</i>	<i>PosPDA_t</i>	<i>NegPDA_t</i>	<i>RM</i>
<i>Intercept</i>	0.079*** (6.40)	0.092*** (3.84)	-0.071*** (-3.38)	0.084*** (7.57)	0.116*** (3.48)	-0.053*** (-2.84)	0.262** (2.08)
<i>SMALL_t</i>	0.021*** (4.52)	0.020** (2.30)	-0.018*** (-2.74)	0.017*** (2.69)	0.015* (1.93)	-0.018** (-2.08)	0.192* (1.78)
<i>EXITAUD_t</i>	0.018 (1.12)	-0.006 (-0.42)	-0.032 (-1.61)	0.011 (0.50)	-0.012 (-0.98)	-0.030 (-0.89)	-0.161 (-1.15)
<i>MVE_{t-1}</i>	-0.004*** (-3.04)	-0.003*** (-2.74)	0.009*** (5.82)	-0.005*** (-2.82)	-0.007*** (-4.87)	0.005*** (2.20)	-0.050*** (-3.84)
<i>ROA_t</i>	-0.017* (-1.87)	0.053 (0.97)	0.016* (1.79)	-0.020** (-2.14)	0.035 (0.62)	0.020** (2.01)	-0.066** (-2.02)
<i>MTB_{t-1}</i>	-0.000 (-0.36)	0.000 (0.08)	0.001 (0.47)	-0.000 (-0.46)	-0.000 (-0.35)	-0.000 (-0.20)	-0.007 (-0.58)
<i>Year fixed effect</i>	Included	Included	Included	Included	Included	Included	Included
<i>Industry fixed effect</i>	Included	Included	Included	Included	Included	Included	Included
<i>N</i>	2917	1503	1414	2917	1484	1433	2850
<i>Adj. R²</i>	0.114	0.075	0.158	0.118	0.056	0.168	0.068

MVE, *ROA*, *MTB*, and all dependent variables are winsorized at the top and bottom 1st and 99th percentiles of their distributions to mitigate the influence of outlying observations. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (two-sided), respectively. Reported *t*-statistics in the parentheses are based on robust standard errors clustered by firm. Variable definitions

- ABSDA_t* absolute values of discretionary accruals estimated from Eq. (2);
- Pos_DA_t* positive values of discretionary accruals estimated from Eq. (2);
- Neg_DA* negative values of discretionary accruals estimated from Eq. (2);
- ABSPDA_t* absolute values of discretionary accruals adjusted for prior year performance;
- PosPDA_t* positive values of discretionary accruals adjusted for prior year performance;
- NegPDA_t* negative values of discretionary accruals adjusted for prior year performance;
- SMALL_t* a dummy variable equal to one if the audit firm has fewer than 100 clients and zero otherwise;
- EXITAUD* a dummy variable equal to one if the audit firm's name does not appear on the PCAOB's list of registered audit firms in 2010;
- MVE_{t-1}* the market value of equity at the beginning of year *t*;
- ROA_t* income before extraordinary items divided by beginning-of-year assets; and
- MTB_{t-1}* market-to-book ratio at the beginning of year *t*.

auditors. Specifically, Lawrence et al. (2011) show that the differences in proxies for audit quality between Big 4 and non-Big 4 auditors are more likely attributable to client characteristics. Further, Boone et al. (2010) show that little evidence exists of a difference in audit quality between Big 4 and second-tier audit firms (using abnormal accruals as a proxy for audit quality). By investigating a specific group of auditors that are the smallest audit firms, this study extends our understanding of the role of audit firm size in audit quality. We acknowledge that our conclusions may be sensitive to different measures of earnings management.

Table 8
Mean differences for firms switching auditors from small to larger auditors.

Change in mean values from -1 to +1 (<i>t</i> -value)	Switches up (n = 56)
<i>ABSDA_t</i>	-0.040* (-1.86)
<i>ABSPDA_t</i>	-0.032 (-1.19)
<i>RM_t</i>	-0.373 (-1.63)

t-Statistics for the differences in means are from one-tailed *t*-tests of the null hypothesis that the mean difference equals zero. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels (one-sided), respectively. Variable definitions

- ABSDA_t* absolute values of discretionary accruals estimated from Eq. (2);
- ABSPDA_t* absolute values of discretionary accruals adjusted for prior year performance;
- MTB_{t-1}* market-to-book ratio at the beginning of year *t*;
- REM_t* real earnings management measures based on Roychowdhury (2006) and Cohen et al. (2008), which includes *ABN_CFO*, *ABN_PROD*, *ABN_DISX*, and *RM* defined below;
- ABN_CFO_t* abnormal cash flows (negative measure of real earnings management);
- ABN_PROD_t* abnormal inventory over-production (positive measure of real earnings management);
- ABN_DISX_t* abnormal discretionary expenses (negative measure of real earnings management); and
- RM_t* - standardized *ABN_CFO* + standardized *ABN_PROD* - standardized *ABN_DISX* (positive composite score of real earnings management). Standardized measure for each variable = [variable - mean(variable)] / standard deviation(variable).

Moreover, we do not know whether this phenomenon is driven by auditor independence issues or a lack of expertise among small audit firms. Nevertheless, the use of small audit firms deserves more attention given the changes currently reshaping the auditing profession.

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