



# The association between PCAOB-identified audit deficiencies and small audit firms' characteristics

PCAOB-identified  
audit deficiencies

717

## Evidence from PCAOB inspection reports

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### Abstract

**Purpose** – The purpose of this study is to examine the association between certain audit firm characteristics and the number of Public Company Accounting Oversight Board (PCAOB)-identified audit deficiencies.

**Design/methodology/approach** – Using a hand-collected sample of PCAOB inspection reports for small audit firms with 100 or less issuer clients from 2007 through 2010, an ordinary least squares model is applied by regressing the number of deficiencies on a set of audit firm characteristics.

**Findings** – Results show that the number of PCAOB-identified audit deficiencies is positively associated with the number of issuer clients and negatively associated with the number of branch offices, the human capital leverage and the organization structure as Limited Liability Partnership firms. Additional analysis also shows that the PCAOB inspection length is positively associated with the number of deficiencies, the number of branch offices and the number of issuer clients, but negatively associated with the organization structure as limited liability company firms. Moreover, the PCAOB inspection lag is positively associated with the number of deficiencies and the number of issuer clients.

**Research limitations/implications** – Results of this study cannot be generalized beyond public accounting firms with 100 or fewer issuer clients. In addition, there is a possibility that other measurements of firm-level characteristics that impact the number of PCAOB-identified audit deficiencies were not captured in the study.

**Practical implications** – This study explains the association between audit firm characteristics and PCAOB-identified audit deficiencies. Our results caution small audit firms about not having enough professional staff, low human capital leverage and serving too many issuer clients, as those factors may potentially impair audit quality.

**Originality/value** – This study helps to explain the relationship between audit deficiencies and controllable, measurable firm-level characteristics. It is, therefore, differentiated from previous studies, most of which were focused on PCAOB-identified audit deficiencies as measures of audit quality and stakeholder reactions to PCAOB reports.

**Keywords** PCAOB inspection reports, PCAOB-identified audit deficiencies, Small audit firms

**Paper type** Research paper



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## Introduction

Following the corporate accounting scandals of the late twentieth century, such as Enron and WorldCom, the US Congress passed the Sarbanes–Oxley Act of 2002. Among its many provisions was the creation of the Public Company Accounting Oversight Board (PCAOB). Fundamentally, the PCAOB's responsibility is to "audit the auditor", which will arguably reduce the kinds of issues seen in Enron and similar cases. The Board's rules require inspections of large audit firms (i.e. firms with > 100 issuers as clients) annually and of small audit firms (i.e. firms with 100 or fewer issuers as clients) once every three years (PCAOB, 2012).

Given the rigorous requirements to become a licensed Certified Public Accountant in all 54 jurisdictions in the USA, one might expect most financial statement audits to be conducted in compliance with the applicable auditing standards. However, many authors and researchers have expressed concern over the number of deficiencies detected by the PCAOB. There is a growing literature that examines various aspects of the PCAOB's inspection on small audit firms with 100 or fewer issuer clients. Hoffelder (2013) focused on such audit firms and noted that "44 per cent had at least one 'significant audit performance deficiency'". Abbott *et al.* (2013) also examined PCAOB inspection reports on small audit firms and found that, when the PCAOB discovered generally accepted accounting principles (GAAP)-related errors in an audit, the audit firm is more likely to be dismissed by the client.

Prior similar research has centered on three main issues:

- (1) characteristics of firms with deficiencies compared with firms with no deficiencies;
- (2) perceptions of inspected firms regarding the PCAOB process; and
- (3) PCAOB reports as indicators of audit quality (Hermanson *et al.*, 2007; Daugherty and Tervo, 2010; Lennox and Pittman, 2010; Offermanns and Peek, 2011; Gunny and Zhang, 2013).

Using a sample of just over 300 PCAOB inspection reports on public accounting firms with 100 or fewer issuer clients through July 2006, Hermanson *et al.* (2007) provide descriptive statistics showing that audit firms with certain characteristics (smaller, with a larger number of issuer clients, and growing more rapidly) are more likely to have audit deficiencies. As noted by Hermanson *et al.* (2007), the number of audit deficiencies decreased in 2005. Therefore, they call for research on the association between PCAOB-identified audit deficiencies and firm-level characteristics in the later years.

Motivated by the prior research, this paper focuses on PCAOB inspection reports on public accounting firms with 100 or fewer client issuers and examines the relationship between certain firm-level characteristics and the number and type of PCAOB-identified audit deficiencies. Data were hand-collected on US-based public accounting firms with 100 or fewer issuer clients from the PCAOB reports dated January 2007 to December 2010 and then an ordinary least squares (OLS) regression model was developed to test the associations between certain audit firm characteristics and PCAOB-identified audit deficiencies (including both generally accepted auditing standards (GAAS) and GAAP deficiencies). A regression analysis suggests that the number of PCAOB-identified audit deficiencies is positively associated with the number of

issuer clients and negatively associated with the number of offices, the human capital leverage and the organization structure as Limited Liability Partnership (LLP) firms. Additional analysis documents that the PCAOB inspection length is positively associated with the number of deficiencies and the number of offices, but negatively associated with the organization structure as limited liability company (LLC) firms. In addition, empirical evidence is found that the PCAOB inspection lag is positively associated with the number of deficiencies and the number of issuer clients.

This study adds to the current literature and responds to the research call by [Hermanson et al. \(2007\)](#), by examining the relationship between audit deficiencies and controllable, measurable firm-level characteristics. It is therefore differentiated from previous studies, most of which were focused on PCAOB-identified audit deficiencies as measures of audit quality and stakeholder reactions to PCAOB reports. Not only can it serve as a guide for future research but it can also help practicing accounting firms make important choices regarding those variables. For example, if a public accounting firm is considering expanding its practice to more issuer clients, the results will help decision-makers anticipate the impact of the expansion on audit deficiencies. Moreover, the results caution small audit firms about not having enough professional staff and low human capital leverage, as those factors may potentially impair audit quality. This study has both policy and practical implications and thus answers the common criticism that too much accounting research has little or no relevance to accounting practice ([Moehrle et al., 2009](#); [Evans et al., 2011](#)). The remainder of the paper is structured as follows: literature review and development of hypotheses, research design, statistical results and summary.

## Literature review and development of hypotheses

### *The PCAOB inspection report*

The PCAOB inspects all registered public accounting firms that regularly issue audit reports for publicly held companies and other issuers. Public accounting firms that issue audit reports for > 100 issuers are inspected annually. Other registered public accounting firms that regularly issue audit reports for 100 issuers or less are, in general, inspected at least once every three years ([PCAOB, 2012](#)). In this study, the focus is on the latter group of public accounting firms that audit 100 or fewer issuers. The primary subject of interest is whether the number and type of audit deficiencies identified by the PCAOB in the triennial inspection reports are associated with public accounting firm's characteristics.

Several recent studies investigate the PCAOB inspection process and its relationship with different factors. [Abbott et al. \(2013\)](#) examine the potential use of PCAOB inspection reports of inspected auditors as audit quality signals. This is based on the assumption that PCAOB inspection reports may serve as a proxy of perceived audit quality due to the independence and experience of the PCAOB inspectors. They find that clients of inspected public accounting firms react differentially to the PCAOB inspection reports, dependent on their severity. Specifically, they find that GAAP-deficient inspection reports are more likely to cause an auditor dismissal relative to a clean report or a GAAS-deficient report[1]. Moreover, [Gunny and Zhang \(2013\)](#) examine whether PCAOB inspections are able to distinguish actual audit quality. They find both seriously deficient PCAOB inspection reports are associated with lower audit quality measured by higher abnormal current accruals. They, also, find that seriously deficient

reports for inspected auditors are associated with lower audit quality measured by a greater propensity to restate.

Gramling *et al.* (2011) examine whether deficiencies received in PCAOB inspection reports are associated with a change in public accounting firms decisions for going concern reporting. They find that PCAOB-inspected audit public accounting firms receiving a GAAS- or GAAP-deficient report are more likely to issue a going-concern opinion for financially distressed clients after the issuance of the inspection report than before the report. Contrary to one's expectation, Lennox and Pittman (2010) document that audit clients do not perceive that the PCAOB's inspection reports are valuable for signaling audit quality provided by the engaged public accounting firms. However, Offermanns and Peek (2011) show that PCAOB inspection reports are informative to investors. Moreover, they find that the magnitude of the market response to PCAOB inspection reports is significantly higher for reports that disclose GAAP deficiencies and significantly lower for reports that have been preceded by one or more deficiency-related client restatements.

#### *Public accounting firms size*

There are several dimensions for audit firm characteristics. This study is interested in some of these characteristics that might impact the number and type of PCAOB-identified audit deficiencies. One of the obvious characteristics is the size of the public accounting firm. Cheng *et al.* (2013) show that the auditor size has positive direct and indirect effects on performance, where the indirect effect is perceived through auditor quality. Therefore, it is expected that public accounting firms that are large in size have better ability to provide higher-quality audits with minimal number of deficiencies. There are some size proxies that are used in the literature, like the number of offices, number of partners and number of professional staff. Few studies examine these characteristics and their impact on the audit inspection of public accounting firms (Hermanson *et al.*, 2007; Daugherty and Tervo, 2010). Daugherty and Tervo (2010) use these firm characteristics to compare between smaller, medium and larger public accounting firms with respect to PCAOB inspections and the perspective of inspected firms. They document that smaller public accounting firms reported that initial PCAOB inspections resulted in a negative impact on many aspects of their audit practices, while medium and larger firms reported more positive consequences. They also show that levels of satisfaction of PCAOB inspections within public accounting firms appear to increase with firm size. In addition, Hermanson *et al.* (2007) examine PCAOB reports issued to smaller public accounting firms and find that firms with audit deficiencies are smaller as indicated by the number of professionals within the firm.

There are also a number of studies that examine public accounting firms' size and its relationship to public accounting firms' productivity and quality (Niemi, 2004; Choi *et al.*, 2010; Farag and Elias, 2012). Farag and Elias (2012) use the number of partners in comparison to total revenue to proxy for public accounting firms' productivity. They document that the proportion of auditing and attest service revenue is negatively associated with public accounting firms' productivity as measured by revenue per partner. However, the proportion of other services revenue, other than tax and management consulting services is positively associated with revenue per partner. Choi *et al.* (2010) calculate office size using the number of clients of the office to investigate the association between audit office size and audit quality. They show

that the office size has significantly positive relations with audit quality. Niemi (2004) also proxies for public accounting firms' size using the number of audit engagements. He documents a positive association between audit size and audit pricing within small audit firms. He also shows that both size and technical capability have a positive impact on audit fees, which imply that product differentiation takes place among small audit firms.

Based on the above discussion, it is expected that a public accounting firm's size is negatively associated with the number of deficiencies disclosed in PCAOB inspection reports. It is expected that larger public accounting firms may have more resources that assist in reducing the number of deficiencies in their audits. The number of offices in a public accounting firm is used to proxy for the firm's size[2]. Therefore, the first hypothesis is stated in the alternative format as follows:

- H1.* There is a negative association between the number of PCAOB-identified audit deficiencies (*H1a*: GAAS deficiencies and *H1b*: GAAP deficiencies) and the number of offices in a public accounting firm.

#### *Human capital leverage*

While financial and other tangible assets are important to strategic success, it is often the intangible assets that are hard for competitors to imitate (Hitt *et al.*, 2001; Hatch and Dyer, 2004); thus, intangible assets are the most powerful source of competitive advantage (Kaplan and Norton, 2005). Similar to most service industries, human capital in public accounting firms represents the most important asset. According to Chang *et al.* (2011), "professionals with higher education levels and more experience in the field constitute greater human capital for public accounting firms". That definition of human capital is consonant with other skills-based definitions of the concept (Nawakitphaitoon, 2014).

Morse (1973) develops a conceptual framework that considers the interrelationship between the value of human assets to the organization and the value of human capital to employees of the organization. He suggests that firms must recognize that changes in human capital values affect human assets values. Chang *et al.* (2011) indicate that public accounting firms that enjoyed higher productivity growth were able to achieve this through human capital accumulation. Because professional services provided by public accounting firms are complex, they require both technical knowledge and tacit managerial knowledge, which is represented in a firm's human capital. This human capital produces high-quality services for clients and thereby contributes to the productivity growth of public accounting firms. Conversely, lower human capital leverage results in increased work pressures which result in an erosion of service quality, adverse organization outcomes (De Meuse *et al.*, 2010) or "cutting corners" (Oliva and Sterman, 2001). In this study, human capital leverage, which is represented by the number of committed professional staff assigned to expert partners, is expected to help complete the audit work of public accounting firms' clients more effectively and efficiently. This will lead to lower number of deficiencies in the work performed. Therefore, the second hypothesis is stated as follows:

- H2.* There is a negative association between the number of PCAOB-identified audit deficiencies (*H2a*: GAAS deficiencies and *H2b*: GAAP deficiencies) and the human capital leverage ratio in a public accounting firm.

*Publicly held clients*

[Hermanson et al. \(2007\)](#), using descriptive analyses, show that firms with audit deficiencies have a greater number of publicly traded clients. They document that public accounting firms with deficiencies have a greater number of their publicly traded clients inspected. However, the percentage of inspected publicly traded clients to the total publicly traded clients for these accounting firms is smaller. This implies that public accounting firms that have more publicly traded clients may have more deficiencies in their PCAOB inspection reports due to the complexity of the audit procedures performed for this type of clients. Therefore, the third hypothesis is stated in the alternative format as follows:

- H3.* There is a positive association between the number of PCAOB-identified audit deficiencies (*H3a*: GAAS deficiencies and *H3b*: GAAP deficiencies) and the number of publicly traded issuer clients in a public accounting firm.

*Organizational structure of public accounting firms*

In this study, it is assumed that public accounting firms' organizational structure is impacted by three main factors. These are first the need for independence from clients, where independence permits auditors to remain objective and unbiased in their clients' audits; second, the need for competence, where competence allows auditors to conduct their audits effectively and efficiently; and finally, litigation risk faced by auditors, which is associated with higher audit fees that reduces the public accounting firm's competitive edge in the audit market ([Barua and Smith, 2013](#)). However, there are some organizational structures that afford a degree of protection to individual firm members. Six organizational structures are available to public accounting firms in the USA: sole proprietorship, partnership, corporation, professional corporation, limited liability company and limited liability partnership. Except for sole proprietorship, all organizational structures result in an entity separate from the auditor personally, which promotes the auditor's independence. In addition, public accounting firms try to be structured in a way that protects the firm from litigation loss. The last four organizational structures from the above listed structures provide some protection from litigation loss.

In this study, the association between the different types of organizational structure of public accounting firms and the number of PCAOB-identified audit deficiencies are investigated. It is expected that some organizational structures will be associated with the number and type of deficiencies in a PCAOB inspection report. For example, [Muzatko et al. \(2004\)](#) argue that under the limited liability partnership structure, partners who are not directly involved in a client's audit are not liable to pay a partnership's liabilities using their personal assets in case of litigation. This reduction in auditor legal liability associated with the limited liability structure can have an impact on audit quality. However, public accounting firms may have other control procedures that ensure a high standard of audit quality despite audit partners' reduced liability. In a contradictory finding, [Lennox and Li \(2012\)](#) show that there is no evidence of lower audit quality or decline in market share after public accounting firms become organized as an LLP. However, the mix of clients in public accounting firms' pool of clients exhibits a significant shift toward riskier clients after the switch to limited liability. Accordingly, the fourth hypothesis is stated in a non-directional format as follows:

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*H4*. There is an association between the number of PCAOB-identified audit deficiencies (*H4a*: GAAS deficiencies and *H4b*: GAAP deficiencies) and the organizational structure of a public accounting firm.

PCAOB-identified  
audit deficiencies

## Research design

### Sample

Aligning with the PCAOB report referenced by Hoffelder (2013), reports dated January 2007 to December 2010 were examined. The sample included US-based public accounting firms with 100 or fewer public clients; in total, 709 PCAOB reports[3]. Of those, 258 (36 per cent) included at least one deficiency, while 451 (64 per cent) identified no deficiencies. As mentioned previously, data were hand-collected from the PCAOB reports.

723

## Methodology

The hypotheses are tested using the following OLS regression equation:

$$\begin{aligned} \text{Number of deficiencies} = & \alpha_0 + \alpha_1 \text{OFC} + \alpha_2 \text{HCL} + \alpha_3 \text{ISS} + \alpha_4 \text{LLC} + \alpha_5 \text{LLP} \\ & + \alpha_6 \text{PC} + \alpha_7 \text{SOLE} + \alpha_8 \text{PSHIP} + \alpha_9 \text{YR}_{2008} \\ & + \alpha_{10} \text{YR}_{2009} + \alpha_{11} \text{YR}_{2010} + \varepsilon \end{aligned} \quad (1)$$

The variables are defined as follows:

- *Number of deficiencies*. The total number of deficiencies cited in the PCAOB report. If a specific deficiency was noted in multiple audits, it was counted multiple times. For example, if the PCAOB report stated that the firm failed, in three audits, to sufficiently test goodwill for impairment, this was counted as three deficiencies. In later analyses, the total number of deficiencies was separated into two groups: GAAS-related and GAAP-related. For example, GAAS-related deficiencies included items such as “failure to perform sufficient audit procedures to test the valuation of debt securities”. GAAP-related deficiencies included items such as “failure to identify, or address appropriately, a departure from GAAP that related to a potentially material misstatement in the audited financial statements concerning the recognition of a gain contingency prior to its realization”.
- *OFC*. The number of offices for the public accounting firm, as specified in the PCAOB report.
- *HCL*. The human capital leverage ratio calculated as the number of professional staff in a public accounting firm divided by the number of partners, as specified in the PCAOB report.
- *ISS*. The number of publicly traded (issuer) clients audited by the public accounting firm, as specified in the PCAOB report. Our research was confined to public accounting firms that audit 100 or fewer such clients.
- *CORP*. We set up a series of dummy variables to represent the organizational structure of the public accounting firm as specified in the PCAOB report. This variable was “1” if the firm was organized as a corporation, and “0” if not.
- *LLC*. This variable was “1” if the firm was organized as a limited liability company (including professional limited liability company), and “0” if not.

- *LLP*. This variable was “1” if the firm was organized as a limited liability partnership (including limited liability general partnership and professional limited liability partnership), and “0” if not.
- *PC*. This variable was “1” if the firm was organized as a professional corporation (including professional association and public service corporation), and “0” if not.
- *SOLE*. This variable was “1” if the firm was organized as a sole proprietorship, and “0” if not.
- *PSHIP*. This variable was “1” if the firm was organized as a partnership (including general partnership), and “0” if not.
- *Year dummies*. Prior research has shown some evidence of improving inspection results over time (Hermanson *et al.*, 2007). Therefore, we set up a series of three dummy variables based on the year of the PCAOB report to control for potential time effects: YR\_2008, YR\_2009 and YR\_2010.

## Empirical results

### *Descriptive statistics*

Tables I and II present the summary statistics of the variables for the full sample (709 observations) and subsamples of firms with deficiencies (258 observations) and those without (451 observations). It was found that 36 per cent of the inspected firms have audit deficiencies, which is consistent with Hermanson *et al.*'s (2007) argument that there has been a decreasing trend in the number of PCAOB-identified audit deficiencies (60 per cent by July 2006). As shown in the table, the mean values of *DEF\_TOT*, *DEF\_GAAS* and *DEF\_GAAP* are 0.890, 0.788 and 0.102, respectively, which indicates that the audit firms in the sample are more likely to have GAAS deficiencies than GAAP deficiencies. Table I and II also shows that, on average, each audit firm has 2.568 offices (*OFC*), 14.189 partners (*PTN*), 69.035 staff (*STF*) and 12.346 issuer clients (*ISS*). *LLP* is the most favorable organizational structure adopted by the audit firms in our sample. In addition, the average inspection period (*INS\_DAY*) is 5.557 days, and the average inspection report lag (*INS\_LAG*) is 204.818 days.

Furthermore, Table I and II documents that, compared to audit firms without deficiencies, audit firms with deficiencies tend to have lower human capital leverage (*HCL*), more issuer clients, longer inspection periods and longer inspection lags.

Table III provides the Pearson correlation matrix. The number of deficiencies (total, GAAS and GAAP) is positively correlated with the number of issuer clients, the inspection period and the inspection lag.

### *Regression analysis for deficiencies*

In this section, there is a discussion of the results for testing the effects of audit firm-level characteristics on the numbers of total deficiencies, GAAS deficiencies and GAAP deficiencies. Columns 1, 2 and 3 in Table IV present the results for the OLS regressions of the numbers of deficiencies (total, GAAS and GAAP) on firm-level characteristics. All regressions are statistically significant with adjusted  $R^2$ 's ranging from 0.062 to 0.198[4].

As shown in the table, the coefficients on *OFC* are significant and negative in all the three columns, suggesting that firms with more offices (larger in size), on average, have fewer GAAS and GAAP deficiencies. This may be because larger firms tend to invest



Variable	Full Sample (N = 709)		DEF_TOT > 0 (N = 258)		DEF_TOT = 0 (N = 451)		Comparison between two groups	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Difference in mean	p-value
<i>DEF_TOT</i>	0.890	1.742	2.446	2.132	0.000	0.000	2.446	0.000
<i>DEF_GAAS</i>	0.788	1.571	2.167	1.949	0.000	0.000	2.167	0.000
<i>DEF_GAAP</i>	0.102	0.392	0.279	0.611	0.000	0.000	0.279	0.000
<i>OFC</i>	2.568	4.214	2.729	4.550	2.477	4.011	0.252	0.460
<i>PTN</i>	14.189	28.697	15.934	36.031	13.191	23.485	2.743	0.273
<i>STF</i>	69.035	155.952	73.360	174.311	66.561	144.552	6.799	0.596
<i>HCL</i>	4.157	3.187	3.750	2.918	4.390	3.312	-0.640	0.008
<i>ISS</i>	12.346	18.281	19.337	22.763	8.346	13.631	10.991	0.000
<i>CORP</i>	0.203	0.403	0.190	0.393	0.211	0.408	-0.021	0.506
<i>LLC</i>	0.152	0.360	0.159	0.366	0.149	0.356	0.010	0.715
<i>LLP</i>	0.340	0.474	0.314	0.465	0.355	0.479	-0.041	0.267
<i>PC</i>	0.230	0.421	0.244	0.430	0.222	0.416	0.022	0.499
<i>SOLE</i>	0.039	0.195	0.050	0.219	0.033	0.180	0.017	0.287
<i>PSHIP</i>	0.034	0.181	0.039	0.193	0.031	0.174	0.008	0.596
<i>INS_LAG</i>	204.818	144.685	347.841	122.155	123.000	77.310	224.841	0.000
<i>INS_DAY</i>	5.557	10.448	8.159	16.262	4.069	3.823	4.090	0.000

**Notes:** Statistical test for differences in mean is based on a two-tailed *t*-test; All variables are defined as follows: *DEF\_TOT*. The total number of deficiencies cited in the PCAOB report. If a specific deficiency was noted in multiple audits, it was counted multiple times. For example, if the PCAOB report stated that the firm failed, in three audits, to sufficiently test goodwill for impairment, we counted that as three deficiencies; *DEF\_GAAS*. The total number of GAAS-related deficiencies cited in the PCAOB report. For example, GAAS-related deficiencies included items such as “failure to perform sufficient audit procedures to test the valuation of debt securities”; *DEF\_GAAP*. The total number of GAAP-related deficiencies cited in the PCAOB report. For example, GAAP-related deficiencies included items such as “failure to identify, or address appropriately, a departure from GAAP that related to a potentially material misstatement in the audited financial statements concerning the recognition of a gain contingency prior to its realization”; *OFC*. The number of offices for the public accounting firm, as specified in the PCAOB report; *PTN*. The number of partners for the public accounting firm, as specified in the PCAOB report; *STF*. The number of professional staff in the public accounting firm, as specified in the PCAOB report; *HCL*. The human capital leverage ratio calculated as the number of professional staff in a public accounting firm divided by the number of partners, as specified in the PCAOB report; *ISS*. The number of publicly traded (issuer) clients audited by the public accounting firm, as specified in the PCAOB report. Our research was confined to public accounting firms that audit 100 or fewer such clients; *CORP*. This variable is “1” if the firm was organized as a corporation, and “0” if not; *LLC*. This variable is “1” if the firm was organized as an LLC (including professional LLC), and “0” if not; *LLP*. This variable is “1” if the firm was organized as a LLP (including limited liability general partnership and professional limited liability partnership), and “0” if not; *PC*. This variable is “1” if the firm was organized as a professional corporation (including professional association and public service corporation), and “0” if not; *SOLE*. This variable is “1” if the firm was organized as a sole proprietorship, and “0” if not; *PSHIP*. This variable is “1” if the firm was organized as a partnership (including general partnership), and “0” if not; *INS\_LAG*. The number of weekdays between the end of the PCAOB inspection and the date the PCAOB report; *INS\_DAY*. The number of inspection weekdays, as specified in the PCAOB report

**Table I.**  
Descriptive statistics

Variable	Frequency				Total
	1	2	3	4 and above	
<i>OFC</i>	420	123	56	110	709
	1 to 5	6 to 10	11 to 15	16 and above	Total
<i>PTN</i>	340	148	73	148	709
	1 to 10	11 to 50	51 to 100	101 and above	Total
<i>STF</i>	235	253	110	111	709
	0 to 5	6 to 10	11 to 20	21 and above	Total
<i>ISS</i>	380	109	81	139	709

**Notes:** Statistical test for differences in mean is based on a two-tailed *t*-test; All variables are defined as follows: DEF\_TOT. The total number of deficiencies cited in the PCAOB report. If a specific deficiency was noted in multiple audits, it was counted multiple times. For example, if the PCAOB report stated that the firm failed, in three audits, to sufficiently test goodwill for impairment, we counted that as three deficiencies; DEF\_GAAS. The total number of GAAS-related deficiencies cited in the PCAOB report. For example, GAAS-related deficiencies included items such as “failure to perform sufficient audit procedures to test the valuation of debt securities”; DEF\_GAAP. The total number of GAAP-related deficiencies cited in the PCAOB report. For example, GAAP-related deficiencies included items such as “failure to identify, or address appropriately, a departure from GAAP that related to a potentially material misstatement in the audited financial statements concerning the recognition of a gain contingency prior to its realization;” OFC. The number of offices for the public accounting firm, as specified in the PCAOB report; PTN. The number of partners for the public accounting firm, as specified in the PCAOB report; STF. The number of professional staff in the public accounting firm, as specified in the PCAOB report; HCL. The human capital leverage ratio calculated as the number of professional staff in a public accounting firm divided by the number of partners, as specified in the PCAOB report; ISS. The number of publicly traded (issuer) clients audited by the public accounting firm, as specified in the PCAOB report. Our research was confined to public accounting firms that audit 100 or fewer such clients; CORP. This variable is “1” if the firm was organized as a corporation, and “0” if not; LLC. This variable is “1” if the firm was organized as a limited liability company (including professional limited liability company), and “0” if not; LLP. This variable is “1” if the firm was organized as a LLP (including limited liability general partnership and professional limited liability partnership), and “0” if not; PC. This variable is “1” if the firm was organized as a professional corporation (including professional association and public service corporation), and “0” if not; SOLE. This variable is “1” if the firm was organized as a sole proprietorship, and “0” if not; PSHIP. This variable is “1” if the firm was organized as a partnership (including general partnership), and “0” if not; INS\_LAG. The number of weekdays between the end of the PCAOB inspection and the date the PCAOB report; INS\_DAY. The number of inspection weekdays, as specified in the PCAOB report

**Table II.**  
Frequency distributions

more in technologies, physical facilities, personnel and organizational control systems that enable them to perform audit more efficiently and effectively. This finding provides support for *H1*. Moreover, [Table IV](#) shows that the coefficients on *HCL* are significant and negative in Columns 1 and 2, which supports *H2* that firms with lower human capital leverage tend to have more GAAS deficiencies. In addition, [Table IV](#) reports that the coefficients on *ISS* across the three columns are all significant and positive, while the ones on *LLP* are all significant and negative. These findings provide support for *H3* and *H4* that LLP firms and firms with fewer issuer clients, on average, have fewer GAAS and GAAP deficiencies.

Independent variables	DEF_TOT	DEF_GAAS	DEF_GAAP	OFC	PTN	STF	ISS	CORP	LLC	LLP	PC	SOLE	PSHIP	INS_LAG
DEF_GAAS	0.977													
DEF_GAAP	0.000													
OFC	0.529	0.338												
PTN	0.000	0.000												
STF	-0.021	-0.019	-0.021											
ISS	0.568	0.623	0.571											
CORP	-0.030	-0.025	-0.032	0.841										
LLC	0.431	0.511	0.388	0.000										
LLP	-0.039	-0.036	-0.032	0.850	0.950									
PC	0.298	0.345	0.400	0.000	0.000									
SOLE	0.384	0.378	0.190	0.306	0.403	0.398								
PSHIP	0.000	0.000	0.000	0.000	0.000	0.000								
INS_LAG	0.010	0.006	0.021	-0.106	-0.112	-0.097	-0.064							
INS_DAY	0.796	0.884	0.572	0.005	0.003	0.010	0.088							
	0.061	0.052	0.060	0.087	0.053	0.035	0.071	-0.214						
	0.107	0.166	0.108	0.020	0.162	0.347	0.059	0.000						
	-0.102	-0.087	-0.102	0.144	0.188	0.175	0.080	-0.362	-0.304					
	0.007	0.020	0.006	0.000	0.000	0.000	0.033	0.000	0.000					
	0.021	0.018	0.021	-0.094	-0.095	-0.085	-0.064	-0.276	-0.232	-0.392				
	0.576	0.630	0.578	0.012	0.011	0.024	0.086	0.000	0.000	0.000				
	0.054	0.050	0.040	-0.074	-0.093	-0.088	-0.054	-0.102	-0.086	-0.146	-0.111			
	0.148	0.180	0.289	0.050	0.013	0.020	0.150	0.006	0.022	0.000	0.003			
	0.012	0.020	-0.029	-0.010	-0.022	-0.019	-0.010	-0.095	-0.079	-0.134	-0.102	-0.038		
	0.753	0.590	0.447	0.781	0.560	0.607	0.783	0.012	0.035	0.000	0.006	0.313		
	0.575	0.561	0.310	0.053	0.071	0.074	0.316	-0.024	0.040	-0.012	-0.001	0.004	-0.003	
	0.000	0.000	0.000	0.158	0.058	0.049	0.000	0.528	0.286	0.747	0.981	0.911	0.946	
	0.231	0.243	0.054	0.068	0.073	0.068	0.131	0.027	-0.037	-0.017	0.038	-0.008	-0.023	0.140
	0.000	0.000	0.150	0.069	0.052	0.070	0.001	0.465	0.331	0.653	0.317	0.831	0.533	0.000

Notes: *p*-values are in *Italic*; variable definitions appear in Tables I and II

Table III. Correlation matrix

Independent variables	Expected sign	Column 1 Dependent variable = <i>DEF_TOT</i>		Column 2 Dependent variable = <i>DEF_GAAS</i>		Column 3 Dependent variable = <i>DEF_GAAP</i>	
		Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
Intercept	?	0.694	0.000	0.643	0.000	0.050	0.285
<i>OFC</i>	–	–0.052	0.001	–0.046	0.001	–0.007	0.078
<i>HCL</i>	–	–0.054	0.005	–0.050	0.004	–0.004	0.424
<i>ISS</i>	+	0.042	0.000	0.037	0.000	0.005	0.000
<i>LLC</i>	?	0.057	0.776	0.050	0.784	0.007	0.882
<i>LLP</i>	?	–0.348	0.037	–0.260	0.085	–0.087	0.032
<i>PC</i>	?	0.024	0.894	0.038	0.815	–0.014	0.744
<i>SOLE</i>	?	0.453	0.165	0.391	0.187	0.062	0.433
<i>PSHIP</i>	?	0.027	0.937	0.123	0.695	–0.095	0.256
Year dummies	?	Included					
Adjusted <i>R</i> <sup>2</sup>		0.198		0.188		0.062	
Observations				709			

**Table IV.**  
Regression analysis for  
deficiencies

**Notes:** The *p*-values are two-tailed; variable definitions appear in [Tables I and II](#)

#### *Additional analysis*

To provide further evidence on the effect of audit firm characteristics on the PCAOB inspection process, the associations between inspection period, the number of deficiencies and audit firm characteristics are examined. Positing a relationship between characteristics of the PCAOB inspection itself and combinations of the previously elucidated variables, a regression is made against the number of inspection weekdays (*INS\_DAY*). The resulting regression was:

$$\begin{aligned}
 INS\_DAY = & \alpha_0 + \alpha_1 DEF\_TOT + \alpha_2 OFC + \alpha_3 HCL + \alpha_4 ISS + \alpha_5 LLC \\
 & + \alpha_6 LLP + \alpha_7 PC + \alpha_8 SOLE + \alpha_9 PSHIP + \alpha_{10} YR\_2008 \\
 & + \alpha_{11} YR\_2009 + \alpha_{12} YR\_2010 + \varepsilon
 \end{aligned} \quad (2)$$

As with the main equations, further analysis broke down the total number of deficiencies into GAAS-related and GAAP-related.

Column 1 of [Table V](#) presents the results of regressing the number of inspection weekdays on the number of total deficiencies and other firm-level characteristics. It was found that the coefficients on *DEF\_TOT* and *OFC* are significant and positive, while the one on *LLC* is significant and negative, suggesting that LLC firms and firms with fewer deficiencies and fewer offices, on average, have shorter inspection periods. In Column 2, the research further regresses the number of inspection days on the number of GAAS and GAAP deficiencies and other firm-level characteristics, and finds that the positive effect of the number of deficiencies on the inspection period is driven by the number of GAAS deficiencies, as shown by the significant and positive coefficient on *DEF\_GAAS* and insignificant coefficient on *DEF\_GAAP*. The insignificant coefficient indicates that the relationship between the inspection days and the number of GAAP deficiencies is not significant. This could possibly be due to that the identification of GAAS

Independent variables	Column 1 Dependent variable = <i>INS_DAY</i>		Column 2 Dependent variable = <i>INS_DAY</i>	
	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
Intercept	4.577	0.000	4.496	0.000
<i>DEF_TOT</i>	1.273	0.000		
<i>DEF_GAAS</i>			1.577	0.000
<i>DEF_GAAP</i>			-0.981	0.349
<i>OFC</i>	0.173	0.078	0.173	0.078
<i>HCL</i>	0.017	0.889	0.024	0.845
<i>ISS</i>	0.022	0.358	0.022	0.374
<i>LLC</i>	-2.277	0.081	-2.276	0.081
<i>LLP</i>	-0.931	0.391	-1.049	0.334
<i>PC</i>	0.012	0.991	-0.032	0.978
<i>SOLE</i>	-0.992	0.641	-0.971	0.647
<i>PSHIP</i>	-2.205	0.325	-2.457	0.272
Year Dummies	Included			
Adjusted <i>R</i> -square		0.073		0.079
Observations		709		

**Table V.**  
Regression analysis for inspection days

**Notes:** The *p*-values are two-tailed; variable definitions appear in Tables I and II

deficiencies requires more subjectivity and judgment than that of GAAP deficiencies. All the other results remain consistent with those reported in Column 1.

The associations between inspection lag, the number of deficiencies and firm-level characteristics are also examined, and relationships between the inspection lag and other variables are considered. Inspection lag (*INS\_LAG*) was measured as the number of weekdays between the end of the PCAOB inspection and the date of the PCAOB report[5]. The following regression analysis was performed:

$$\begin{aligned}
 INS\_LAG = & \alpha_0 + \alpha_1 DEF\_TOT + \alpha_2 OFC + \alpha_3 HCL + \alpha_4 ISS + \alpha_5 LLC \\
 & + \alpha_6 LLP + \alpha_7 PC + \alpha_8 SOLE + \alpha_9 PSHIP + \alpha_{10} YR\_2008 \\
 & + \alpha_{11} YR\_2009 + \alpha_{12} YR\_2010 + \varepsilon
 \end{aligned}
 \tag{3}$$

As with the main equations, further analysis broke down the total number of deficiencies into GAAS-related and GAAP-related.

Column 1 of Table VI presents the results of regressing inspection lag on the number of total deficiencies and other firm-level characteristics. It was found that the coefficients on *DEF\_TOT* and *ISS* are significant and positive, which suggests that firms with more deficiencies and more issuer clients tend to have longer inspection lags. In Column 2, the number of inspection lags on the number of GAAS and GAAP deficiencies and other firm-level characteristics is regressed, and it is found a higher number of GAAS and GAAP deficiencies, and more issuer clients extend the inspection lag, as indicated by the significant and positive coefficients on *DEF\_GAAS*, *DEF\_GAAP* and *ISS*.

In addition, how PCAOB inspectors' characteristics/attitudes affect the inspection process is examined. Additional data on the number of issuer clients inspected from the

Independent variables	Column 1 Dependent variable = <i>INS_LAG</i>		Column 2 Dependent variable = <i>INS_LAG</i>	
	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
Intercept	116.258	0.000	116.267	0.000
<i>DEF_TOT</i>	45.212	0.000		
<i>DEF_GAAS</i>			45.176	0.000
<i>DEF_GAAP</i>			45.479	0.000
<i>OFC</i>	0.909	0.424	0.909	0.424
<i>HCL</i>	1.425	0.320	1.425	0.320
<i>ISS</i>	0.704	0.013	0.704	0.013
<i>LLC</i>	6.133	0.685	6.133	0.685
<i>LLP</i>	13.819	0.272	13.833	0.272
<i>PC</i>	5.981	0.656	5.986	0.656
<i>SOLE</i>	-4.592	0.852	-4.594	0.852
<i>PSHIP</i>	-2.553	0.922	-2.524	0.923
Year Dummies	Included			
Adjusted <i>R</i> -square		0.342		0.341
Observations			709	

**Table VI.**  
Regression analysis for  
inspection lag

**Notes:** The *p*-values are two-tailed; variable definitions appear in [Tables I and II](#)

PCAOB inspection reports are collected and included in the main regression [Model (1)], and the percentage of the number of issuer clients inspected/the number of issuer clients (the firms with 0 issuer clients) is eliminated. The results in [Table VII](#) show that the coefficients on *Per cent INS* (the percentage of the number of issuer clients inspected/the number of issuer clients) are significant and negative across all the three columns, indicating that firms that have a smaller proportion of their issuer clients inspected tend to have more audit deficiencies identified by the PCAOB inspectors. This is probably because if PCAOB inspectors decide only to inspect a smaller proportion of firms' issuer clients, they tend to be more diligent and skeptical, and therefore, likely to identify more audit deficiencies. The results suggest that the characteristics/attitudes of PCAOB inspectors may affect the inspection process, and therefore the number of audit deficiencies, identified.

### Conclusion

This study examines the association between certain firm-level characteristics and the number of PCAOB-identified audit deficiencies. Using a hand-collected sample of PCAOB inspection reports for small audit firms with 100 or less issuer clients from 2007 through 2010, the study documents that the number of PCAOB-identified audit deficiencies is positively associated with the number of issuer clients and negatively associated with the number of offices, the human capital leverage and the organization structure as LLP firms.

Additional analysis provides empirical evidence that the PCAOB inspection length is positively associated with the number of deficiencies and the number of offices, but negatively associated with the organization structure as LLC firms. In addition, it is found that the PCAOB inspection lag is positively associated with the number of deficiencies and the number of issuer clients.

Independent variables	Expected sign	Column 1 Dependent variable = <i>DEF_TOT</i>		Column 2 Dependent variable = <i>DEF_GAAS</i>		Column 3 Dependent variable = <i>DEF_GAAP</i>	
		Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value	Coefficient	<i>p</i> -value
Intercept	?	1.762	0.000	1.621	0.000	0.141	0.016
<i>OFC</i>	–	–0.017	0.098	–0.015	0.081	–0.002	0.060
<i>HCL</i>	–	–0.060	0.005	–0.056	0.003	–0.004	0.395
<i>%INS</i>	?	–0.010	0.000	–0.010	0.000	–0.001	0.063
<i>LLC</i>	?	0.058	0.797	0.049	0.809	0.008	0.867
<i>LLP</i>	?	–0.388	0.039	–0.299	0.078	–0.088	0.042
<i>PC</i>	?	–0.009	0.965	0.008	0.967	–0.016	0.728
<i>SOLE</i>	?	0.437	0.254	0.369	0.285	0.068	0.443
<i>PSHIP</i>	?	–0.041	0.917	0.068	0.847	–0.108	0.228
Year	?	Included					
Dummies							
Adjusted <i>R</i> <sup>2</sup>		0.083		0.081		0.040	
Observations				675			

**Table VII.**

Regression analysis for  
inspector characteristics

**Notes:** The *p*-values are two-tailed; variable definitions appear in [Tables I and II](#)

This study adds to a growing stream of research that examines the PCAOB inspections on small audit firms with 100 or fewer issuer clients. It contributes to the body of knowledge by explaining the association between audit firm characteristics and PCAOB-identified deficiencies, and therefore, has both policy and practical implications.

The results caution small audit firms about not having enough professional staff, low human capital leverage and serving too many issuer clients, as those factors may potentially impair audit quality. Research suggests that as the level of human capital is increased, employees develop more efficient means of accomplishing task requirements, therefore, becoming more productive (Blokdijsk *et al.*, 2006; Roca-Puig *et al.*, 2012). Blokdijsk *et al.* (2006) suggest that the reason large firms often are more productive is because their employees spend more time in the contextual (thinking) phases of audits and less time in the procedural (doing) phases of auditing, which results in a higher quality audit.

The findings with respect to human capital leverage have other implications for practice as well. Lajili (2012, p. 22) proposed that “firms investing in firm-specific human, social and organizational capital should have [...] a competitive advantage” and that “firms having a better alignment between individual and organizational goals will be able to realize higher economic rents from investments in firm-specific human, social, and organizational capital”. Given the serious fiduciary responsibility CPA firms have to various stakeholder groups, mere investment in human capital is insufficient; the firms must ensure, to the extent possible, that their human capital is effectively developed and deployed to realize the benefits Lajili (2012) has discussed. Because the results demonstrate that higher human capital leverage is associated with reduced audit deficiencies, CPA firms should focus not only on having a “sufficient number of bodies” to conduct audits but also on ensuring that their human assets are appropriately leveraged. In other words, recruiting efforts in CPA firms must consider the relationship

between the numbers of professional staff and professional partners to mitigate audit deficiencies.

The level of human capital leverage is an important element of an organization's overall human resource practices. Using a structural equations modeling approach, Obeidat *et al.* (2014) discovered that "human resource practices [...] [...] have a significant influence on organizational commitment". Without a strong commitment to the public accounting firm, professional staff may not take their work seriously, potentially leading to higher levels of audit deficiencies. Combining that assertion with the ideas of Blokdiik *et al.* (2006) reinforces the need for higher human capital leverage. Considering the matter through the lens of classic expectancy theory (Vroom, 1964), higher human capital leverage is likely to increase expectancy (the belief that effort leads to achievement), instrumentality (achievement leads to reward) and valence (value placed on the reward). In public accounting firms with higher human capital leverage, professional staff are more (but not completely) autonomous, which can lead to greater satisfaction and commitment to the firm. Further, when employees are more satisfied and committed, they are less likely to make errors associated with audit deficiencies.

In summary, then, the results demonstrate that higher levels of human capital leverage are associated with fewer deficiencies identified in PCAOB inspections. From a practice perspective, those results lead to the following conclusions and implications:

- higher human capital leverage can lead to improved employee productivity as employees develop more efficient processes for accomplishing assigned tasks;
- the need for higher human capital leverage requires balancing the number of professional staff and the number of partners in the firm; and
- higher human capital leverage increases motivation and commitment to the public accounting firm and may therefore yield fewer audit deficiencies in PCAOB inspections.

Overall, the findings of this study increase our understanding about PCAOB inspection reports. However, these findings are subject to some limitations. First, results of this study cannot be generalized beyond US public accounting firms with 100 or fewer issuer clients that received their PCAOB inspection reports between January 2007 and December 2010. Future research can further investigate whether public accounting firms have learned from previous inspections and whether there have been any changes in the associations between firm-level characteristics and audit deficiencies in later years. Second, there is a possibility that other measurements that can impact the number of deficiencies in PCAOB reports are not captured in the study. Future research can examine the impact of auditor tenure on the number of identified deficiencies in PCAOB reports. Third, our additional analysis sheds some light on the impact of PCAOB inspectors' characteristics/attitudes on the inspection process, which is also an area that warrants future research. Finally, quality control inspection deficiencies announced by the PCAOB can impact the number of deficiencies or inspection lags. We invite future research to investigate the relationship between PCAOB quality control criticism and the number of PCAOB-identified deficiencies.



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**Notes**

1. In a GAAP-deficient report, the PCAOB states that the auditor failed to identify a material departure from GAAP or that the audited company restated one or more of its financial statements to make changes relating to matters uncovered by the PCAOB inspection. However, in a GAAS-deficient report, the PCAOB states that the financial statements audited by the auditor are free of material error, but that the audit process did not follow GAAS-audit procedures (PCAOB, 2005).
2. As a robustness check, we used the number of professional staff as an alternative proxy for firm size in the regressions and found qualitatively similar results to those reported in Table IV.
3. There are 101 firms that had two inspection reports in the sample period, and we include both inspection reports in the main regression analysis. In addition, we perform a robustness check by including only the latest inspection reports in the regressions and find qualitatively similar results.
4. We ran diagnostic tests for the presence of multicollinearity in the models. The variance inflation factors range from 1.05 to 1.81, indicating that multicollinearity is not a serious concern.
5. Some inspection lags may be overstated due to the fact that the PCAOB's inspection report dates are based on a batch approval process, where the number of approved reports is limited to the time available during the PCAOB's meeting.

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