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Abstract: This study investigates the impact of testing internal control over Financial Reporting (ICFR) under SOX 404(b) on audit and consulting-like (non-audit) service fees changes over the 2000–2016 period, after controlling for factors including risk, operations, governance, gender, finances and firm size. Our findings indicate that ICFR 404(b) accounts for 30% of the increase in audit fees, and that accelerated filers' larger firms pay higher fees compared to non-accelerated filers' smaller firms. Auditors are paid for completing additional tests of internal controls, implying an improvement in the quality of internal audit control. A 19% reduction in non-audit fees was also observed, exerting pressure on external auditors to be less independent. Reduced risks and tightened governance policies indicate that increased audit fees are driven by

gender and operational complexity factors. These are crucial outcomes for regulators to consider when designing policies to enhance transparency, resources allocation and maintaining stakeholders' interests.

Keywords: audit fees; corporate governance; ICFR 404(b); financial reporting; SOX2002; PCAOB.

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1 Introduction

The Sarbanes-Oxley Act (SOX2002) was enacted after the failures of Enron and WorldCom to reduce similar future incidents. The Public Company Accounting Oversight Board (PCAOB) was created to enhance investor protection by reducing

reliance on industry self-regulation. PCAOB inspection reports show that the Center for Audit Quality (CAQ) worked to address external audit faults in internal control over Financial Reporting (ICFR). SOX Sections 302 and 404 require management to disclose and maintain effective internal controls. Section 404(a) requires the SEC to issue rules for assessing ICFR effectiveness, while auditors carry indirect responsibility for 404(a) disclosures. The PCAOB issued Auditing Standard 2 (AS2) to enforce 404(b), which requires external auditors to attest to management's report. This paper focuses on how Section 404(b) impacts audit and non-audit fees. According to the SEC 2009 survey, SOX 404(b) is often associated with higher auditor fees. Some argue it causes costly duplication of effort.

Much of the prior research on Section 404(a) links audit fee premiums with internal control material weaknesses (ICMW), remediation, and adverse opinions (e.g., Kean et al., 2012; Hoitash et al., 2008). However, few studies directly test how auditors' ICFR opinions under 404(b) affect audit fees. Most focus on internal control problems and audit fee levels, especially differences between accelerated and non-accelerated filers (e.g., Kinney and Shepardson, 2011; Ge et al., 2017; Munsif and Singhvi, 2014; Iliev, 2010).

Section 404(b) requires auditors to attest to management's ICFR assessment. Our objective is to determine whether ICFR testing affects audit and non-audit fees during 2000–2016. We contribute to the literature in several ways. First, unlike Ghosh and Pawlewicz (2009), we focus on accelerated filers (83% of our sample). Second, we use a broader sample (2000–2016) with more firm diversity. Third, we test audit committee gender diversity as a proxy for internal control, not just risk behaviour. Fourth, we examine how audit fees respond to regulatory impacts on ICFR, controlling for internal and external drivers. We use accelerated filers as a proxy for internal control risk and audit fees for planned detection risk (PDR), also adding financial performance and non-audit fees as variables. Lastly, we adopt the substitution approach between internal controls and audit fees.

Another innovation of this paper is that we rearrange our chosen variables into six blocks that were not previously tested in a collective manner, with anticipations of shedding additional light on what determines the size of audit fees. Namely, factors such as risk, operational complexity, corporate governance, gender differentiation, financial strength, and firm size. We argue that while prior studies have tested some determinants individually, they were not 'collectively' tested in the presence of each other. Even when tested, the results were inconclusive; particularly concerning the relationship between audit fees and proxies of firm risk, corporate governance, audit committee gender mix, and operations complexity. All these improvements, besides rigorous econometric analysis, represent our main contributions to the literature in this subject area.

Our results resolve most questions on the nature of relationships with the magnitude of audit fees. We report a 19% decrease in independence (due to a decrease in non-audit fees), which means an increase in fraud risk. Some recent scandals prompted KPMG, one of the Big 4 accounting firms to become the first to cease undertaking non-audit work for companies whose accounts it handles owing to the aftermath of scandals surrounding the collapse of Carillion and BHS.[3]

The following section will review previous literature on this subject and position our paper as a filler for uncharted areas. The subsequent section discusses data sampling, hypotheses formulation and testing methodology. The next section discusses results and

findings of our study, while the final section concludes the work and proposes several policy implications.

2 Literature review

Controlling factors such as company size, complexity, internal control and financial reporting quality, competence, objectivity, and risk, prior research explored how changes in internal controls and auditor types impact audit fees. Studies sampled ICFR problems across filer types, financial and non-financial firms, and regions including Europe, the US, MENA, and Asia. The impact of Section 404(a), requiring management attestation, has been widely studied in the US (e.g., Kean et al., 2012; Hogan and Wilkins, 2008, Hoitash et al., 2008), while Section 404(b) was rarely tested. Singh and Newby (2010), using top 300 Australian public companies, found a strong, positive relationship between audit fees and internal audit. Defond and Lennox (2017), using PCAOB inspection reports from 2010–2013, linked higher audit fees to fewer inspection deficiencies, better quality, more audit tests, and more adverse opinions. Knechel et al. (2013a) categorised audit quality into inputs, processes, and outcomes, stressing a broader framework involving professional judgment and firm culture. A proposed reason for higher fees is the increased workload from Section 404 testing, particularly for riskier clients needing more senior attention.

Other studies showed audit fees are adjusted based on problem severity. Under SOX 302, companies must disclose material weaknesses quarterly, though less severe problems are disclosed voluntarily. Classifying severity is challenging. Hogan and Wilkins (2008) found that material weaknesses and severe deficiencies in both accelerated and non-accelerated filers are associated with higher audit fees, even in prior years. Hoitash et al. (2008) similarly observed that only material weaknesses affect fees for accelerated filers. We follow this approach by sampling audit fees for both filer types.

Studies examined whether good governance (e.g., internal auditors' objectivity, competence, and work quality) can influence external auditors' perception of internal audit quality and reduce audit fees. Krishnan and Zhang (2014) studied US firms receiving fee cuts in 2009 (32% financial institutions, 63% S&P 500) and found that Big 4 auditors maintained audit quality and fees, while non-Big 4 auditors saw fee cuts of 25% or more after the 2008 crisis. Thus, we consider firm differences based on auditor size. Guan et al. (2015) showed that school ties between auditors and executives led to favourable audit opinions, higher discretionary accruals, and more earnings restatements, highlighting non-economic influences on audit quality.

Other research suggests individual partners retain autonomy in engagement decisions despite internal quality reviews. Knechel et al. (2013a, 2013b) and Taylor (2011) argued that auditor identity affects audit fees and engagement hours. Gender differences also emerge in governance: Ittonen et al. (2013) found audit fees reduced when female chairs and committee members oversaw internal controls in Finland and Sweden. Conversely, Hardies et al. (2015) reported 7% higher fees when female partners led audits in Belgium, suggesting a premium potentially tied to competencies or diversity demand. Birnberg (2011) linked gender to risk-taking, and Chung and Monroe (2001) found that female auditors produced more accurate reports and better decisions in complex settings. These

studies indicate gender diversity can have either positive or negative impacts on governance, making it a focus in this paper.

Charles et al. (2010) examined the link between financial reporting risk and audit fees for 4,320 Big 4 clients from 2000 to 2003, around the SOX. They found that audit fees rose in 2002 and 2003 due to increased litigation and business risk from new regulations and scandals. This supports Ghosh and Pawlewicz (2009), who observed a 74% audit fee increase and a decline in non-audit fees for Big 4 clients, driven by greater audit effort and expected legal liability. Huang et al. (2009) tested the 'low balling' hypothesis – discounting fees in the first year – but instead found a 16% fee premium, reflecting increased conservatism post-SOX. Mironiuca and Robub (2012) found a positive relationship between non-audit fees and fraud risk, and a negative one with audit fees, implying compromised auditor independence. PCAOB (2014) raised concerns about non-audit services undermining audit quality. Unlike Mironiuca and Robub, we consider non-audit fees a proxy for effects on audit quality and independence. SOX permits certain non-audit services only with audit committee approval.

While ICFR has improved, how auditors handle material weaknesses remains uncertain. Section 404(b) requires auditor attestation. Kinney and Shepardson (2011), studying small firms from 2003–2008, found that 404(b) filers paid double the audit fees, while exempt firms saw only a 10% increase. Ge et al. (2017) confirmed this using 5,305 non-accelerated firms from 2007–2014. Munsif and Singhvi (2014) found lower audit premiums for non-accelerated filers, though their study is limited to the 2008 crisis period. A longer time frame is needed for generalisation.

Iliev (2010) analysed SOX 404's effects on earnings quality, stock price, and audit fees, finding that optional compliance reduced earnings, lowered stock value, and increased audit costs, especially for small firms. However, his data only covered fiscal year 2004, limiting broader conclusions.

In brief, literature shows that internal control problem disclosure and auditor attestation under ICFR 404(b) drive audit fee increases. However, it is less clear if repeated disclosures lead to fee changes, as auditors may adopt a non-reliance approach. If problems are re-mediated, auditors may rely more on controls and fees may decrease. Still, Hoag and Hollingsworth (2011) found that firms re-mediating ICFR issues paid higher fees during severe ICMW years, and less afterward. Kean et al. (2012) compared newly disclosed, re-mediated, and continuing problems to firms without issues but found no conclusive trend. Prior research also shows large audit firms, particularly Big 4, charge higher fees, while those shifting away tend to pay less (Bedard et al., 2008).

In conclusion, this paper aims to resolve earlier inconclusive findings and expand the literature by studying audit and non-audit fees in relation to internal controls under SOX 404(b). Given heavier auditor involvement with ICFR reporting, we expect a fee premium relative to reliance on substantive tests. Prudence may prompt more audit work, justifying higher fees.

3 Research design, hypotheses and sample selection

We contend that the ICFR 404(b) is a better proxy than the measures for internal control report quality tested by others such as Singh and Newby (2010) and Defond and Lennox (2017) who did not consider Section 404(a) or 404(b). Our methodology is superior to earlier literature because although some of these variables have been individually tested

in prior literature, they were not collectively tested. Towards this end, we re-test 18 firm-specific and external corporate variables already tested in the literature but not collectively in one model, many of which reported opposing statistical results. Furthermore, we add four new variables, besides Impact of Regulations on Internal Audit Control that were not tested before; namely, total assets growth, total revenues growth, the size of the audit committee, and the effect of the 2008 global financial crisis. We also group these variables into six blocks: risk (e.g., Singh and Newby, 2010), financial strength and financial growth potential, operations complexity (e.g., Chung and Monroe, 2001), corporate governance mechanism (e.g., Goodwin-Stewart and Kent, 2006), gender composition differentials effect (e.g., Taylor, 2011; Ittonen et al., 2013; Hardies et al., 2015) and firm size (e.g., Ge et al., 2017) and then test them.

We ran regression on the proposed set of variables in two ways – one for the transformed audit fees LNAUDFEE as the dependent variable, and one for the transformed non-audit fees LNNOAUDFEE on our proposed set of independent variables. For ease of testing our hypotheses, and in consistency with our literature review, we test 18 individual variables that are regrouped into six blocks, according to the testable theme effect. The IRICFR is proxied by a dummy variable for internal audit report over financial reporting accelerated filers (1 when ICFR is required; 0 otherwise).[4]

Testing variables were collected mainly from two sources: Audit Analytics database, and complemented by data retrieved from COMPUSTAT. The sampling period (2000–2016) was chosen to reflect the period before and after SOX 404(a) and 404(b) were implemented.[5] As such, we were able to retrieve auditing related data for the 16-year sampling period. Data on financial statements, however, was lacking in certain cases from Audit Analytics. All missing accounting data are collected from WRDS COMPUSAT. The initial sample included 410 companies listed within the S&P 500 Index firms that are common with Audit Analytics, and another 535 companies listed with NASDAQ. The NASDAQ companies were chosen based on two filters: non-financial companies and audited by non-Big 4 auditing companies. The trimmed Audit Analytics sample contained all the listed firms except those related to the heavily regulated financial services and insurance companies. However, after we dropped all missing values and outliers from the ratios, the final number of sampled companies went down from 945 to 697 (363 from S&P 500 list and 334 from NASDAQ) and down to 5,195 observations (2,962 for S&P 500 companies and 2,233 for our NASDAQ companies) from the initial 8,339 observations.[6]

Audit Analytics offered the necessary data by enabling us access to the firms' downloadable financials and auditor reports assessing financial reporting and effectiveness. Namely from eight lies: overview of create report file, auditor fees file, auditor changes file, auditor and management internal control file, auditor report – financial statement file, company governance – committee – audit file, the balance sheet file, and the income statement file. For each company, we originally collected annual data on the following variables: company name, ticker, sector, sub industry, CIK code, auditor name, number of employees, SIC code, fiscal year end, total assets, inventories, accounts receivables, total liabilities, total revenues/net sales, total equity, market capitalisation, earnings, book value, shares outstanding, audit fees, non-audit fees, auditor opinion, management internal control report (which indicates whether the management found the registrant's disclosure controls to be effective), auditor final report, number of audit

committee members, gender of the audit committee chair, and number of females on the committee.[7,8]

Using the above data, we tested the relationship between the amount of audit fees (as well as non-audit fees) and the impact of regulations on internal control reports proxied by ICFR 404(b) for accelerated filers.[9] Auditing Standards require an auditor to increase the number of substantive tests (of balances and transactions) whenever a company has ineffective internal controls, which increases audit fees. However, in an integrated audit of both the financial statements and internal controls (ICFR), the auditor might be able to reduce testing if the company has adequate internal controls, which would reduce the amount of fees charged.

To explore the effect of audit fees, we have developed the following testable hypotheses:

H1 There is no significant relationship between audit fees and the impact of regulations on a firm's internal control over financial reporting for accelerated filers, after controlling for firm-specific and external factors.

H2 There is no significant relationship between non-audit fees and the impact of regulations on a firm's internal control over financial reporting for accelerated filers, after controlling for firm-specific and external factors.

The theoretical justifications for choosing specific internal and external factors tested under the two hypotheses are displayed in Table A1. Rejection of these hypotheses implies that there is an association between the dependent variable and the independent variables. We argue that the tendency to be prudent implies that audit fees are expected to be 'net' positively related to IRICFR. As for non-audit fees, we expect a similar association justified by the auditor's dependence on the client for other services. According to Hogan and Wilkins (2008), audit fees are increased with firm size, complexity, and leverage, and decreased with liquidity. Our expectations are similar in that firm leverage is positively related to audit fees, while operations complexity (LIQ) is expected to be inversely proportional to audit fees. Prior studies, such as the one conducted by Chung and Monroe (2001), also showed that audit risk judgments and related fees are impacted by gender. We expect that audit fees be positively related to gender and governance. We postulate that these fees are affected by the level of internal controls' effectiveness proxied by the following blocks of testable variables:

- *Risk block:* Two proxies for risk are used here. We argue that management internal control report (MGTRPT) is associated with lower audit fees as earlier findings have shown (Kinney and Shepardson, 2011; Ge et al., 2017). On the other hand, Hogan and Wilkins (2008) reported evidence of higher audit fees for both accelerated and non-accelerated filers [see also Hoitash et al. (2008) for the years 2003–2004, for accelerated filers only]. Thus, we hereby test MGTRPT (1 for effective controls, 0 for ineffective controls) to verify this association.[10] The second proxy is total debt ratio TDR (= TL / TA). We postulate that risk is an important element in determining the level of audit fees because of the increasing number of lawsuits against auditors worldwide. The literature is inconclusive in this regard. Francis and Simon (1987) found the gearing variable (i.e., leverage) to be insignificant with audit fees.
- *Financial strength and financial growth potential block:* Five proxies include ROA (= NI / TA), ROE (= NI / equity), total assets growth rate TAGTH (percentage

change in TA), growth in total revenues TRGTH (percentage change in sales) and the effect of the world financial crisis in 2008 FINCRISIS (1 for the years 2009–2016, 0 for the years 2000–2008). Highly profitable firms, in terms of ROA and ROE, usually pay more fees (see Goodwin-Stewart and Kent, 2006) since higher profits may require more rigorous, time consuming and expensive auditing and testing of the validity to recognise revenue and expenses. Griffin et al. argue the opposite; necessitating our drive to resolve these conflicting results. We also introduce other new proxies for financial growth potential variables (i.e., TAGTH, TRGTH and FINCRISIS).

- *Operations complexity block:* Two proxies include liquidity LIQ (= inventory + AR / TA) and INTL, a dummy variable for geographical business scope (1 for being a multinational co., 0 for operating in US/Canada). We propose that if the business operations of the client are more complex and having foreign operations, the audit work is more extensive and expensive (e.g., Hogan and Wilkins, 2008). On the other hand, liquidity would have a negative impact on audit fees, as argued by Hogan and Wilkins (2008). Thus, operations complexity can drive fees up or down depending on what aspect is dominating for complexity.
- *Gender composition differentials effect block:* Two proxies include dummy variables for audit committee chair gender AUDCHGDR (1 for female chair, 0 for male chair), and for female dominance in the audit committee membership PERFEM (percentage of female membership on the committee). The literature remains inconclusive about whether gender may improve internal controls by contributing to either a negative relationship between audit fees and both audit committee female chairs and audit committee gender composition (Ittonen et al., 2013) or a positive relationship as argued by Hardies et al. (2015) and Chung and Monroe (2001). Hence, there is a need to resolve this controversy.
- *Corporate governance mechanism block:* Four proxies include a dummy variable for the introduction of the SOX in 2002 SOX2002 (1 for the years 2003–2016, and 0 for the year 2000–2001, and 2002), and three dummy variables for the size of the audit firm: a dummy variable for the size of audit firm AUDLARGE (1 for Big 4, 0 for small audit firm), a dummy variable for change in audit firm size AUDCHG (1 for change in audit firm size, 0 for no change), and a dummy variable for the size of audit committee membership ACSIZE (1 for committee size >=4, 0 for <4 committee members).[11] Governance risks may require higher fees (Chung and Wynn, 2014) or lower fees if associated with higher profitability and improved audit quality (Griffin et al., 2008). Conversely, Goodwin-Stewart and Kent (2006) contended that firms that adhere to good governance are considered more profitable and are safer for investors, and hence pay higher fees. Another factor is changing the auditor, which is found to reduce fees at least in the earlier years (Köhler and Ratzinger-Sakel, 2012). On the other hand, Krishnan and Zhang (2014) argued that large auditing firms (e.g., Big 4) charge more fees. Therefore, corporate governance (SOX, AUDLARGE, AUDCHG, and ACSIZE) were selected as control variables.
- *Firm size block:* It has been argued that auditors in large-sized companies must spend a lot of time and effort in reviewing their clients' operations, and that size is important (Collier and Gregory, 1996).While Kanagaretnam et al. (2010) find that

small banks paying higher-than-expected auditor fees engage more in earnings management via loan loss provisions (LLP), whereas large banks show no such relationship due to stricter regulations. Two proxies employed in this study include transformed market capitalisation LNMKTCAP and total number of employees NOEMPL. Like Evans (2010), we use market capitalisation instead of the nonlinear total assets. This is beneficial because it measures the market worth of the company. The number of employees is an alternative proxy of firm size tested herewith.

4 Testing results and interpretations

We conducted descriptive statistics for our sample. Audit fees were on average close to $4.5 million and non-audit fees were around $1.3 million.[12] Non-audit observations constituted 10.91% of our sample (166 firms) implying audit quality was maintained for these firms. Our sample is dominated by large firms (the average market capitalisation about $16.5 billion, between $626 billion and a few hundred-thousand dollars). As expected, the vast majority of 'required' ICFR filers [83% as per SOX 404(b)], incurred incremental audit fees, while the qualified management internal control report firms [97% as per SOX 404(a)], observed a reduction in audit fees. The sampled companies were somehow risky (47% mean debt ratio), had strong short-term liquidity (26%), and were overwhelmingly non-international firms (96%). Our sampled firms were mostly audited by the Big 4 auditing firms (57%). During our sampling period, most changes from one auditing to another was from one Big 4 to another Big 4 or from a small auditing firm to another small one.

Controlling for various econometric problems was necessary to immune our analysis, so we tested and controlled for various econometric challenges such as multi-collinearity measured by VIF and Tolerance tests, normality using Kolmogorov-Smirnov F Statistics, skewness and kurtosis showing their t-test statistics, heteroscedasticity using Bruesch-Pagan and Koenker chi-square statistics, serial autocorrelation using Durbin-Watson statistics and the Breusch-Godfrey test, and model specification error using Ramsey regression equation specification error test F-statistics.[13] We ran the weighted least square (WLS) regression analysis to treat heteroscedasticity.[14] WLS can often maximise the efficiency of coefficient parameter estimation and reduce issues with autocorrelation.[15] Finally, we ran nested block regression analysis to test the collective significance of the six blocks (i.e., risk, financial strength and growth potential, operations complexity, corporate governance mechanism, gender composition differentials and firm size). The nested regression model creates and tests subsets of the set of individual predictor variables to determine if there is a statistically significant difference between the full model and the subset of collective variables.

4.1 Results of audit fees regression

Table 1 panel A presents the significance results of our independent variables power in the full regression model, while panel B presents the overall explanatory power of our six blocks using the nested block regression analysis. Our explanatory model results were robust and supported our alternative first hypothesis in that 85.10% of audit fees, and the impact of regulations on a firm's internal controls, a requirement under SOX2002-404(b), had a significant positive reflection on audit fees.

Our results show that accelerated filers firms (proxied by IFICR) and larger firms (proxied by LNMKTCAP) pay higher fees than non-accelerated filers firms and smaller firms. Obviously, there is a difference in charged fees between accelerated and non-accelerated filer firms. The finding concerning non-accelerated filers is consistent with Iliev (2010) and Munsif and Singhvi (2014) and supports the findings of Kinney and Shepardson (2011) and Ge et al. (2017) on smaller firms. In fact, IRICFR and the constant term, contributed to over 32% of the significance of the model R^2.[16] The 404(b) rule, requiring attestation to the effectiveness of internal control reports, earns the auditor higher fees for the additional work. The incremental significance R^2 of our risk measures block was 15.9%, the second highest, as shown in panel B of Table 1.

More specifically, there was a negative relationship between management internal control reports (MGTRPT), a requirement under 404(a), and audit fees. Apparently, an 'effective' management internal control reduces company risk and reduces fees ($p < 0.05$). The total debt ratio (TDR) showed that higher leverage (i.e., higher risk) was significantly associated with higher audit fees. The five financial control variables (i.e., total assets growth – TAGTH, total sales growth – TRGTH, return on assets – ROA, return on equity – ROE and following the financial crisis – FINCRISIS) were all negatively associated with audit fees (i.e., lower fees). These results were $p < 0.05$ for TAGTH, TRGTH and ROA and $p < 0.10$ for ROE. Yet, the financial crisis appeared to offer no significant effect on the magnitude of audit fees. The negative association of both TAGTH and TRGTH with audit fees could be explained by reduction in business risk and/or auditors preferential treatment granted to larger clients. Business risk is incorporated into audit fees either explicitly or implicitly. It involves clients' risk of litigation, regulation sanctions and loss of auditors' reputation due to client association. These results are consistent with Bell et al. (2001).

The two operational complexity risk variables, the liquidity ratio (LIQ = inventory + A / R divided by TA) and whether the company is multinational, were both positively associated with audit fees ($p < 0.05$), but this relationship contributed to only 1.4% of the overall significance of the regression model. Yet, the increase in profitability measures (i.e., ROA and ROE) improved the auditors' reflected improved tolerance of audit risk that eventually led to a reduction in audit fees. However, the block regression analysis in panel B shows that when all five financial control variables were combined, they did not contribute much to the significance of the regression model (negligible with only 0.06% contribution to R^2).

With regards to the four corporate governance variables, the introduction of the SOX in 2002 (SOX2002) and the size of the audit committee (ACSIZE) had a positive relationship with audit fees ($p < 0.05$), which is not surprising. The SOX2002 regulation positive relationship is due to the additional audit effort associated with implementing augmented requirements. In turn, the client's management must establish an expanded and accountable audit committee; the size of which increases audit fees. Being among the Big 4 (AUDLARGE), however, was found insignificant. It appears that the size or reputation of the audit firm is less relevant or that large audit firms compete efficiently with smaller ones.

Table 1 Multiple regression analysis using audit fees on US data (full sampling period 2000–2016)

Panel A: multiple regression model – full sampling period						
*LNAUDFEE = 2.233 + 0.166 IRICFR – 0.427 MGTRPT + 1.010 TDR – 1.709 ROA – 0.184 ROE – 0.081 TAGTH – 0.005 TRGTH – 0.023 FINCRISIS + 0.480 LIQ + 0.038 INTL +0.904 SOX2002 + 0.019 AUDLARGE – 0.156 AUDCHG + 0.026 ACSIZE + 0.024 AUDCHGDR + 0.002 PERFEM + 0.507 LNMKTCAP + 5.243 * E-07 NOEMPL*						
Tested variable	*Coefficients*	*Std. error*	*Coefficient significance*		*Collinearity significance*	
			T-statistics	*p-value*	*Tolerance*	*VIF*
Constant	2.233	0.191	11.716**	0.000		
IRICFR	0.166	0.030	5.590**	0.000	0.568	1.762
MGTRPT	–0.427	0.053	–8.106**	0.000	0.968	1.033
TDR	1.010	0.057	17.729**	0.000	0.499	2.002
ROA	–1.709	0.205	–8.317**	0.000	0.220	4.548
ROE	–0.184	0.107	–1.716*	0.086	0.217	4.606
TAGTH	–0.081	0.024	–3.392**	0.001	0.840	1.191
TRGTH	–0.005	0.000	–9.878**	0.000	0.805	1.243
FINCRISIS	–0.023	0.019	–1.176	0.240	0.892	1.120
LIQ	0.480	0.054	8.854**	0.000	0.824	1.213

Notes: ** and * denote rejection significance at the 5% level and 10% level, respectively. Regressing transformed audit fees LNAUDFEE for the sampling period between 2000 and 2016 on the impact of regulations on internal control (proxied by the internal control financial reporting accelerated filers being required IRICFR), in presence of a set of dependent control variables grouped into six blocks: company risk (proxied by dummy variable for unqualified management internal control report MGTRPT, and total debt ratio TDR), financial strength and financial growth potential (proxied by ROA, ROE, total assets growth TAGTH, total revenue growth TRGTH, the year SOX was introduced SOX2002, and the year following the financial crisis FINCRISIS), company operations complexity (proxied by liquidity LIQ and dummy variable for geographical business scope INTL), corporate governance mechanism (proxied by dummy variable for the year following SOX2002, dummy variable large audit firm size AUDLARGE, dummy variable for changing audit firm during sampling period AUDCHG, and dummy variable for the size of audit committee membership ACSIZE), gender composition differentials effect (proxied by dummy variable for female chairing audit committee AUDCHGDR and dummy variable for female membership dominance in audit committee PERFEM), and firm size (proxied by LN of market capitalisation LNMKTCAP and total number of employees NOEMPL). Panel A report for each variable its beta coefficient and standard error, t-statistics, p-value, and collinearity statistics (tolerance and variance inflation factor VIF), and the results for the regression model significance represented by F-statistics, p-value, and coefficient of determination R^2 and adjusted R^2, as well as the results for serial auto-correlation test (i.e., Durbin-Watson and Breusch-Godfrey χ^2 statistics and p-value), heteroscedasticity significance tests (i.e., Breusch-Pagan and Koenker F and p-values), normality tests (i.e., Skewness and Kurtosis and their t-values, Kolmogorov-Smirnov F and p-values), and test of model specification error (i.e., Ramsey RESET F-value). Panel B shows the block results for the nested regression, namely F-value, p-value, R^2 and change in R^2 for each added block of variables. Asterisks refer to statistical significance level.

Table 1 Multiple regression analysis using audit fees on US data (full sampling period 2000–2016) (continued)

Panel A: multiple regression model – full sampling period						
*LNAUDFEE = 2.233 + 0.166 IRICFR – 0.427 MGTRPT + 1.010 TDR – 1.709 ROA – 0.184 ROE – 0.081 TAGTH – 0.005 TRGTH – 0.023 FINCRISIS + 0.480 LIQ + 0.038 INTL +0.904 SOX2002 + 0.019 AUDLARGE – 0.156 AUDCHG + 0.026 ACSIZE + 0.024 AUDCHGDR + 0.002 PERFEM + 0.507 LNMKTCAP + 5.243 * E-07 NOEMPL*						
Tested variable	*Coefficients*	*Std. error*	*Coefficient significance*		*Collinearity significance*	
			T-statistics	*p-value*	*Tolerance*	*VIF*
INTL	0.038	0.045	0.838	0.402	0.973	1.028
SOX2002	0.904	0.082	10.926**	0.000	0.926	1.080
AUDLARGE	0.019	0.038	0.494	0.622	0.193	5.178
AUDCHG	–0.156	0.022	–7.101**	0.000	0.713	1.403
ACSIZE	0.026	0.007	3.441**	0.001	0.667	1.500
AUDCHGDR	0.024	0.028	0.850	0.395	0.788	1.268
PERFEM	0.002	0.001	3.740**	0.000	0.725	1.380
LNMKTCAP	0.507	0.009	56.808**	0.000	0.143	6.970
NOEMPL	5.243E-07	0.000	3.854**	0.000	0.770	1.298

Notes: ** and * denote rejection significance at the 5% level and 10% level, respectively. Regressing transformed audit fees LNAUDFEE for the sampling period between 2000 and 2016 on the impact of regulations on internal control (proxied by the internal control financial reporting accelerated filers being required IRICFR), in presence of a set of dependent control variables grouped into six blocks: company risk (proxied by dummy variable for unqualified management internal control report MGTRPT, and total debt ratio TDR), financial strength and financial growth potential (proxied by ROA, ROE, total assets growth TAGTH, total revenue growth TRGTH, the year SOX was introduced SOX2002, and the year following the financial crisis FINCRISIS), company operations complexity (proxied by liquidity LIQ and dummy variable for geographical business scope INTL), corporate governance mechanism (proxied by dummy variable for the year following SOX2002, dummy variable large audit firm size AUDLARGE, dummy variable for changing audit firm during sampling period AUDCHG, and dummy variable for the size of audit committee membership ACSIZE), gender composition differentials effect (proxied by dummy variable for female chairing audit committee AUDCHGDR and dummy variable for female membership dominance in audit committee PERFEM), and firm size (proxied by LN of market capitalisation LNMKTCAP and total number of employees NOEMPL). Panel A report for each variable its beta coefficient and standard error, t-statistics, p-value, and collinearity statistics (tolerance and variance inflation factor VIF), and the results for the regression model significance represented by F-statistics, p-value, and coefficient of determination R^2 and adjusted R^2, as well as the results for serial auto-correlation test (i.e., Durbin-Watson and Breusch-Godfrey χ^2 statistics and p-value), heteroscedasticity significance tests (i.e., Breusch-Pagan and Koenker F and p-values), normality tests (i.e., Skewness and Kurtosis and their t-values, Kolmogorov-Smirnov F and p-values), and test of model specification error (i.e., Ramsey RESET F-value). Panel B shows the block results for the nested regression, namely F-value, p-value, R^2 and change in R^2 for each added block of variables. Asterisks refer to statistical significance level.

Table 1 Multiple regression analysis using audit fees on US data (full sampling period 2000–2016) (continued)

Panel A: multiple regression model – full sampling period		
*LNAUDFEE = 2.233 + 0.166 IRICFR – 0.427 MGTRPT + 1.010 TDR – 1.709 ROA – 0.184 ROE – 0.081 TAGTH – 0.005 TRGTH – 0.023 FINCRISIS + 0.480 LIQ + 0.038 INTL +0.904 SOX2002 + 0.019 AUDLARGE – 0.156 AUDCHG + 0.026 ACSIZE + 0.024 AUDCHGDR + 0.002 PERFEM + 0.507 LNMKTCAP + 5.243 * E-07 NOEMPL*		
Model significance	F-statistics (p-value)	1,648.330** (0.000)
	R^2	0.851
	Adj. R^2	0.851
Model specifications	Durbin-Watson test of auto-correlation	0.583
	Breusch-Godfrey test of auto-correlation χ^2 (p-value)	1440.9 ** (2.2e-16)
	Breusch-Pagan test of heteroscedasticity χ^2 (p-value)	127.04** (2.2e-16)
	Koenker test of heteroscedasticity χ^2 (p-value)	96.062** 1.159e-12
	Skewness (t-value)	4.06 (119.55**)
	Kurtosis (t-value)	29.69 (437.06**)
	Kolmogorov-Smirnov test of normality F-value (p-value)	0.026 ** (0.000)
	Ramsey regression equation specification error test F-value (F critical)	34.95946 (2.99)

Notes: ** and * denote rejection significance at the 5% level and 10% level, respectively. Regressing transformed audit fees LNAUDFEE for the sampling period between 2000 and 2016 on the impact of regulations on internal control (proxied by the internal control financial reporting accelerated filers being required IRICFR), in presence of a set of dependent control variables grouped into six blocks: company risk (proxied by dummy variable for unqualified management internal control report MGTRPT, and total debt ratio TDR), financial strength and financial growth potential (proxied by ROA, ROE, total assets growth TAGTH, total revenue growth TRGTH, the year SOX was introduced SOX2002, and the year following the financial crisis FINCRISIS), company operations complexity (proxied by liquidity LIQ and dummy variable for geographical business scope INTL), corporate governance mechanism (proxied by dummy variable for the year following SOX2002, dummy variable large audit firm size AUDLARGE, dummy variable for changing audit firm during sampling period AUDCHG, and dummy variable for the size of audit committee membership ACSIZE), gender composition differentials effect (proxied by dummy variable for female chairing audit committee AUDCHGDR and dummy variable for female membership dominance in audit committee PERFEM), and firm size (proxied by LN of market capitalisation LNMKTCAP and total number of employees NOEMPL). Panel A report for each variable its beta coefficient and standard error, t-statistics, p-value, and collinearity statistics (tolerance and variance inflation factor VIF), and the results for the regression model significance represented by F-statistics, p-value, and coefficient of determination R^2 and adjusted R^2, as well as the results for serial auto-correlation test (i.e., Durbin-Watson and Breusch-Godfrey χ^2 statistics and p-value), heteroscedasticity significance tests (i.e., Breusch-Pagan and Koenker F and p-values), normality tests (i.e., Skewness and Kurtosis and their t-values, Kolmogorov-Smirnov F and p-values), and test of model specification error (i.e., Ramsey RESET F-value). Panel B shows the block results for the nested regression, namely F-value, p-value, R^2 and change in R^2 for each added block of variables. Asterisks refer to statistical significance level.

Table 1 Multiple regression analysis using audit fees on US data (full sampling period 2000–2016) (continued)

Panel B: nested regression block analysis – full sampling period					
LNAUDFEE = 0.323 block 1 + 0.159 block 2 + 0.006 block 3 + 0.014 block 4 + 0.241 block 5 + 0.002 block 6 + 0.107 block 7					
Block	*F-statistics*	*Block significance*		R^2	*Change in* R^2
		F change	*p-value*		
1 IRICFR, constant	2,479.561**	2,479.561**	0.000	0.323	0.323
2 Risk: MGTRPT, TDR	1,612.404**	798.235**	0.000	0.482	0.159
3 Financial: ROA, ROE, TAGTH, TRGTH, FINCRISIS	617.931**	11.482**	0.000	0.488	0.006
4 Operations complexity: LIQ, INTL	521.799**	72.772**	0.000	0.708	0.014
5 Corporate governance: SOX2002, AUDLARGE, AUDCHG, ACSIZE	1,069.604**	1,216.193**	0.000	0.743	0.241
6 Gender: AUDCHGDR, PERFEM	943.969**	17.328**	0.000	0.745	0.002
7 Firm size: LNMKTCAP, NOEMPL	1,648.330**	1,860.467**	0.000	0.851	0.107

Notes: ** and * denote rejection significance at the 5% level and 10% level, respectively. Regressing transformed audit fees LNAUDFEE for the sampling period between 2000 and 2016 on the impact of regulations on internal control (proxied by the internal control financial reporting accelerated filers being required IRICFR), in presence of a set of dependent control variables grouped into six blocks: company risk (proxied by dummy variable for unqualified management internal control report MGTRPT, and total debt ratio TDR), financial strength and financial growth potential (proxied by ROA, ROE, total assets growth TAGTH, total revenue growth TRGTH, the year SOX was introduced SOX2002, and the year following the financial crisis FINCRISIS), company operations complexity (proxied by liquidity LIQ and dummy variable for geographical business scope INTL), corporate governance mechanism (proxied by dummy variable for the year following SOX2002, dummy variable large audit firm size AUDLARGE, dummy variable for changing audit firm during sampling period AUDCHG, and dummy variable for the size of audit committee membership ACSIZE), gender composition differentials effect (proxied by dummy variable for female chairing audit committee AUDCHGDR and dummy variable for female membership dominance in audit committee PERFEM), and firm size (proxied by LN of market capitalisation LNMKTCAP and total number of employees NOEMPL). Panel A report for each variable its beta coefficient and standard error, t-statistics, p-value, and collinearity statistics (tolerance and variance inflation factor VIF), and the results for the regression model significance represented by F-statistics, p-value, and coefficient of determination R^2 and adjusted R^2, as well as the results for serial auto-correlation test (i.e., Durbin-Watson and Breusch-Godfrey χ^2 statistics and p-value), heteroscedasticity significance tests (i.e., Breusch-Pagan and Koenker F and p-values), normality tests (i.e., Skewness and Kurtosis and their t-values, Kolmogorov-Smirnov F and p-values), and test of model specification error (i.e., Ramsey RESET F-value). Panel B shows the block results for the nested regression, namely F-value, p-value, R^2 and change in R^2 for each added block of variables. Asterisks refer to statistical significance level.

Table 2 Multiple regression analysis using non-audit fees on US data (full sampling period 2000–2016)

Panel A: multiple regression model – full sampling period

LNNOAUDFEE = –1.113 – 0.497 IRICFR – 0.204 MGTRPT + 1.169 TDR – 1.611 ROA + 0.172 ROE + 0.096 TAGTH – 0.009 TRGTH – 0.248 FINCRISIS + 0.662 LIQ – 0.097 INTL – 0.441 SOX2002 + 0.053 AUDLARGE – 0.160 AUDCHG – 0.015 ACSIZE + 0.308 AUDCHGDR – 5.391E-05 PERFEM + 0.657 LNMKTCAP + 5.522E-07 NOEMPL

Tested variable	*Coefficients*	*Std. error*	*Coefficient significance*		*Collinearity significance*	
			T-statistics	*p-value*	*Tolerance*	*VIF*
Constant	–1.113	0.404	–2.754**	0.006		
IRICFR	–0.497	0.068	–7.343**	0.000	0.526	1.903
MGTRPT	–0.204	0.115	–1.765*	0.078	0.967	1.034
TDR	1.169	0.132	8.888**	0.000	0.497	2.013
ROA	–1.611	0.471	–3.425**	0.001	0.250	3.998
ROE	0.172	0.216	0.797	0.425	0.244	4.091
TAGTH	0.096	0.056	1.699*	0.089	0.843	1.187
TRGTH	–0.009	0.001	–8.070**	0.000	0.809	1.237
FINCRISIS	–0.248	0.041	–6.112**	0.000	0.877	1.141
LIQ	0.662	0.119	5.580**	0.000	0.806	1.240

Notes: ** and * denote rejection significance at the 5% level and 10% level, respectively. Regressing transformed non-audit fees LNNOAUDFEE for the sampling period between 2000 and 2016 on the impact of regulations on internal control (proxied by the internal control financial reporting accelerated filers being required IRICFR), in presence of a set of dependent control variables grouped into six blocks company risk (proxied by dummy variable for unqualified management internal control report MGTRPT, and total debt ratio TDR), financial strength and financial growth potential (proxied by ROA, ROE, total assets growth TAGTH, total revenue growth TRGTH, the year SOX was introduced SOX2002, and the year following the financial crisis FINCRISIS), company operations complexity (proxied by liquidity LIQ and dummy variable for geographical business scope INTL), corporate governance mechanism (proxied by dummy variable for the year following SOX2002, dummy variable large audit firm size AUDLARGE, dummy variable for changing audit firm during sampling period AUDCHG, and dummy variable for the size of audit committee membership ACSIZE), gender composition differentials effect (proxied by dummy variable for female chairing audit committee AUDCHGDR and dummy variable for female membership dominance in audit committee PERFEM), and firm size (proxied by LN of market capitalisation LNMKTCAP and total number of employees NOEMPL). Panel A report for each variable its beta coefficient and standard error, t-statistics, p-value, and collinearity statistics (tolerance and variance inflation factor VIF), and the results for the regression model significance represented by F-statistics, p-value, and coefficient of determination R^2 and adjusted R^2, as well as the results for serial auto-correlation test (i.e., Durbin-Watson and Breusch-Godfrey χ^2 statistics and p-value), heteroscedasticity significance tests (i.e., Breusch-Pagan and Koenker F and p-values), normality tests (i.e., Skewness and Kurtosis and their t-values, Kolmogorov-Smirnov F and p-values), and test of model specification error (i.e., Ramsey RESET F-value). Panel B shows the block results for the nested regression, namely F-value, p-value, R^2 and change in R^2 for each added block of variables. Asterisks refer to statistical significance level.

Table 2 Multiple regression analysis using non-audit fees on US data (full sampling period 2000–2016) (continued)

Panel A: multiple regression model – full sampling period						
LNNOAUDFEE = –1.113 – 0.497 IRICFR – 0.204 MGTRPT + 1.169 TDR – 1.611 ROA + 0.172 ROE + 0.096 TAGTH – 0.009 TRGTH – 0.248 FINCRISIS + 0.662 LIQ – 0.097 INTL – 0.441 SOX2002 + 0.053 AUDLARGE – 0.160 AUDCHG – 0.015 ACSIZE + 0.308 AUDCHGDR – 5.391E-05 PERFEM + 0.657 LNMKTCAP + 5.522E-07 NOEMPL						
Tested variable	*Coefficients*	*Std. error*	*Coefficient significance*		*Collinearity significance*	
			T-statistics	*p-value*	*Tolerance*	*VIF*
INTL	–0.097	0.109	–0.895	0.371	0.978	1.023
SOX2002	–0.441	0.147	–3.004**	0.003	0.878	1.139
AUDLARGE	0.053	0.085	0.624	0.533	0.204	4.907
AUDCHG	–0.160	0.054	–2.959**	0.003	0.731	1.368
ACSIZE	–0.015	0.015	–1.007	0.314	0.669	1.495
AUDCHGDR	0.308	0.060	5.123**	0.000	0.795	1.258
PERFEM	–5.391E-05	0.001	–0.042	0.967	0.735	1.361
LNMKTCAP	0.657	0.019	34.418**	0.000	0.152	6.586
NOEMPL	5.522E-07	0.000	2.256**	0.024	0.778	1.285

Notes: ** and * denote rejection significance at the 5% level and 10% level, respectively. Regressing transformed non-audit fees LNNOAUDFEE for the sampling period between 2000 and 2016 on the impact of regulations on internal control (proxied by the internal control financial reporting accelerated filers being required IRICFR), in presence of a set of dependent control variables grouped into six blocks company risk (proxied by dummy variable for unqualified management internal control report MGTRPT, and total debt ratio TDR), financial strength and financial growth potential (proxied by ROA, ROE, total assets growth TAGTH, total revenue growth TRGTH, the year SOX was introduced SOX2002, and the year following the financial crisis FINCRISIS), company operations complexity (proxied by liquidity LIQ and dummy variable for geographical business scope INTL), corporate governance mechanism (proxied by dummy variable for the year following SOX2002, dummy variable large audit firm size AUDLARGE, dummy variable for changing audit firm during sampling period AUDCHG, and dummy variable for the size of audit committee membership ACSIZE), gender composition differentials effect (proxied by dummy variable for female chairing audit committee AUDCHGDR and dummy variable for female membership dominance in audit committee PERFEM), and firm size (proxied by LN of market capitalisation LNMKTCAP and total number of employees NOEMPL). Panel A report for each variable its beta coefficient and standard error, t-statistics, p-value, and collinearity statistics (tolerance and variance inflation factor VIF), and the results for the regression model significance represented by F-statistics, p-value, and coefficient of determination R^2 and adjusted R^2, as well as the results for serial auto-correlation test (i.e., Durbin-Watson and Breusch-Godfrey χ^2 statistics and p-value), heteroscedasticity significance tests (i.e., Breusch-Pagan and Koenker F and p-values), normality tests (i.e., Skewness and Kurtosis and their t-values, Kolmogorov-Smirnov F and p-values), and test of model specification error (i.e., Ramsey RESET F-value). Panel B shows the block results for the nested regression, namely F-value, p-value, R^2 and change in R^2 for each added block of variables. Asterisks refer to statistical significance level.

Table 2 Multiple regression analysis using non-audit fees on US data (full sampling period 2000–2016) (continued)

Panel A: multiple regression model – full sampling period		
LNNOAUDFEE = –1.113 – 0.497 IRICFR – 0.204 MGTRPT + 1.169 TDR – 1.611 ROA + 0.172 ROE + 0.096 TAGTH – 0.009 TRGTH – 0.248 FINCRISIS + 0.662 LIQ – 0.097 INTL – 0.441 SOX2002 + 0.053 AUDLARGE – 0.160 AUDCHG – 0.015 ACSIZE + 0.308 AUDCHGDR – 5.391E-05 PERFEM + 0.657 LNMKTCAP + 5.522E-07 NOEMPL		
Model significance	F-statistics (p-value)	435.466** (0.000)
	R^2	0.630
	Adj. R^2	0.628
Model specifications	Durbin-Watson test of auto-correlation	0.744
	Breusch-Godfrey test of auto-correlation χ^2 (p-value)	1,078.6** (2.2e-16)
	Breusch-Pagan test of heteroscedasticity χ^2 (p-value)	79.611** (1.002e-09)
	Koenker test of heteroscedasticity χ^2 (p-value)	53.309** (2.35e-05)
	Skewness (t-value)	6.99 (205.875**)
	Kurtosis (t-value)	76.99 (1,133.249**)
	Kolmogorov-Smirnov test of normality F-value (p-value)	0.052** (0.000)
	Ramsey regression equation specification error test F-value (F critical)	0 (2.99)

Notes: ** and * denote rejection significance at the 5% level and 10% level, respectively. Regressing transformed non-audit fees LNNOAUDFEE for the sampling period between 2000 and 2016 on the impact of regulations on internal control (proxied by the internal control financial reporting accelerated filers being required IRICFR), in presence of a set of dependent control variables grouped into six blocks company risk (proxied by dummy variable for unqualified management internal control report MGTRPT, and total debt ratio TDR), financial strength and financial growth potential (proxied by ROA, ROE, total assets growth TAGTH, total revenue growth TRGTH, the year SOX was introduced SOX2002, and the year following the financial crisis FINCRISIS), company operations complexity (proxied by liquidity LIQ and dummy variable for geographical business scope INTL), corporate governance mechanism (proxied by dummy variable for the year following SOX2002, dummy variable large audit firm size AUDLARGE, dummy variable for changing audit firm during sampling period AUDCHG, and dummy variable for the size of audit committee membership ACSIZE), gender composition differentials effect (proxied by dummy variable for female chairing audit committee AUDCHGDR and dummy variable for female membership dominance in audit committee PERFEM), and firm size (proxied by LN of market capitalisation LNMKTCAP and total number of employees NOEMPL). Panel A report for each variable its beta coefficient and standard error, t-statistics, p-value, and collinearity statistics (tolerance and variance inflation factor VIF), and the results for the regression model significance represented by F-statistics, p-value, and coefficient of determination R^2 and adjusted R^2, as well as the results for serial auto-correlation test (i.e., Durbin-Watson and Breusch-Godfrey χ^2 statistics and p-value), heteroscedasticity significance tests (i.e., Breusch-Pagan and Koenker F and p-values), normality tests (i.e., Skewness and Kurtosis and their t-values, Kolmogorov-Smirnov F and p-values), and test of model specification error (i.e., Ramsey RESET F-value). Panel B shows the block results for the nested regression, namely F-value, p-value, R^2 and change in R^2 for each added block of variables. Asterisks refer to statistical significance level.

Table 2 Multiple regression analysis using non-audit fees on US data (full sampling period 2000–2016) (continued)

Panel B: nested regression block analysis – full sampling period						
LNNOAUDFEE = 0.193 block 1 + 0.104 block 2 + 0.016 block 3 + 0.012 block 4 + 0.192 block 5 + 0.001 block 6 + 0.111 block 7						
Block		*F-statistics*	*Block significance*		*R^2*	*Change in R^2*
			F change	*p-value*		
1	IRICFR, constant	1,104.369**	1,104.369**	(0.000)	0.193	0.193
2	Risk: MGTRPT, TDR	651.743**	343.647**	(0.000)	0.297	0.104
3	Financial: ROA, ROE, TAGTH, TRGTH, FINCRISIS	263.825**	22.139**	(0.000)	0.314	0.016
4	Operations complexity: LIQ, INTL	223.404**	42.678**	(0.000)	0.326	0.012
5	Corporate governance: SOX2002, AUDLARGE, AUDCHG, ACSIZE	353.796**	458.467**	(0.000)	0.518	0.192
6	Gender: AUDCHGDR, PERFEM	310.72**	4.949**	(0.007)	0.519	0.001
7	Firm size: LNMKTCAP, NOEMPL	435.466**	690.35**	(0.000)	0.630	0.111

Notes: ** and * denote rejection significance at the 5% level and 10% level, respectively. Regressing transformed non-audit fees LNNOAUDFEE for the sampling period between 2000 and 2016 on the impact of regulations on internal control (proxied by the internal control financial reporting accelerated filers being required IRICFR), in presence of a set of dependent control variables grouped into six blocks company risk (proxied by dummy variable for unqualified management internal control report MGTRPT, and total debt ratio TDR), financial strength and financial growth potential (proxied by ROA, ROE, total assets growth TAGTH, total revenue growth TRGTH, the year SOX was introduced SOX2002, and the year following the financial crisis FINCRISIS), company operations complexity (proxied by liquidity LIQ and dummy variable for geographical business scope INTL), corporate governance mechanism (proxied by dummy variable for the year following SOX2002, dummy variable large audit firm size AUDLARGE, dummy variable for changing audit firm during sampling period AUDCHG, and dummy variable for the size of audit committee membership ACSIZE), gender composition differentials effect (proxied by dummy variable for female chairing audit committee AUDCHGDR and dummy variable for female membership dominance in audit committee PERFEM), and firm size (proxied by LN of market capitalisation LNMKTCAP and total number of employees NOEMPL). Panel A report for each variable its beta coefficient and standard error, t-statistics, p-value, and collinearity statistics (tolerance and variance inflation factor VIF), and the results for the regression model significance represented by F-statistics, p-value, and coefficient of determination R^2 and adjusted R^2, as well as the results for serial auto-correlation test (i.e., Durbin-Watson and Breusch-Godfrey χ^2 statistics and p-value), heteroscedasticity significance tests (i.e., Breusch-Pagan and Koenker F and p-values), normality tests (i.e., Skewness and Kurtosis and their t-values, Kolmogorov-Smirnov F and p-values), and test of model specification error (i.e., Ramsey RESET F-value). Panel B shows the block results for the nested regression, namely F-value, p-value, R^2 and change in R^2 for each added block of variables. Asterisks refer to statistical significance level.

On the other hand, we found that the fourth corporate governance variable, change in auditing firm (AUDCHG), is associated with lower audit fees ($p < 0.05$). After examining our dataset, we found that most changes in our sample were due to movement from one Big 4 auditing firm into another one from the same Big 4, implying a voluntary change, but likely to be adjusted in subsequent years assuming a sustainable relationship with the client (as in Collier and Gregory, 1996). More importantly, the block regression analysis for corporate governance revealed a strong contribution to the overall regression R^2 (24.1%).

Table 1 shows that having a female chair to the audit committee (AUDCHGDR) had no significant effect on audit fees; rather it was the strong female presence on the committee that enhanced audit coverage and accountability, which is expected to increase the fee premium. The gender block, however, had a positive impact on audit fees ($p < 0.05$). This is contrary to Ittonen et al. (2013) findings of a negative link between gender and audit fees, but they had a limited sampling period (2006–2008) compared to our comprehensive one (2000–2016).

Finally, firm size represented by transformed market capitalisation (LNMKTCAP) and number of employees (NOEMPL) each had a significant positive effect on audit fees ($p < 0.05$), and an almost 11% incremental R^2 significance. The larger the firm size, the larger the number of stakeholders, and consequently the higher the auditor's risk and audit fee charges.

4.2 Results of non-audit fees regression

To test the second hypothesis, we regress non-auditing services fees and the same set of 18 explanatory variables. We find that the more effective the client's IRICFR compliant internal control is, as reflected in additional audit reports, audit quality, and independence, the lower the non-audit fees and this relationship is statistically significant. Concerning block regression analysis shown in Table 2 panel B, the same pattern was observed for audit fees in Table 1, but with less explanatory power of the impact of regulations on internal controls denoted by IRICFR (19.30%), followed closely by corporate governance (19.20%), firm size (11.10%) and risk (10.04%). Overall, the model explains 63% of non-audit fees variations.

Interestingly, we found that the most significant control variables for non-audit fees changed signs. It is notable that the ICFR reduced non-audit fees, which may be explained by the auditor's dependence on the firm reports. The coefficient of return on equity (ROE) was now positive but insignificant. International companies (INTL), size of audit committee membership (ACSIZE) and percentage of audit committee female membership all changed signs but were statistically insignificant. Total assets growth (TAGTH) had a positive ($p < 0.09$) association with non-audit fees, indicating that business expansion requires additional internal governance and other non-audit services. The remaining variables' explanatory power was the same in terms of direction and significance. The impact of new regulation, namely SOX2002, and later the addition of Section 404(b), resulted in a financial burden on clients driving down auditors' fees for other non-audit services. Indeed, this was evident during the economic crisis in 2008, as non-audit fees were significantly reduced. The impact of the financial crisis was significant ($p < 0.05$). This could possibly be explained by the reduced non-audit fees component due to tough economic conditions and as a gesture to sustain their audit relationship.

Finally, our econometric tests present statistical evidence that the error terms were positively autocorrelated in all three regressions (supported by the Breusch-Godfrey results in Table 1). With positive first-order autocorrelation, the OLS parameter estimates would have been no longer the best linear unbiased estimators leading to incorrect statistical tests and biased confidence intervals, but they are still unbiased and consistent. In addition, the standard errors tend to be underestimated. Autocorrelation is, however, common in time-series analyses.

The Breusch-Pagan and Koenker tests ratified the estimators were not BLUE, suggesting the presence of heteroscedasticity. Biased standard errors lead to biased inference, so the results of the hypotheses tests were possibly incorrect. Thus, using a robust heteroscedasticity-controlled regression model, such as WLS which we did use, would reduce the effect of both heteroscedasticity and autocorrelation problems.

The Ramsey regression equation specification error test rejection of our assumption of a correct specification, suggest the omission of one or more variables that may have association with one or more of the dependent or independent variables. This can weaken our results. This was not the case, however, for the non-audit fees regression model in Table 2. Furthermore, our normality tests showed positively skewed data with a significance level of less than 5%, implying a violation of normality condition. This is evident from our Kolmogorov, skewness and kurtosis test results. Nevertheless, we transformed our dependent variables and hence we decided to ignore this assumption. According to Box (1976), researchers know that straight lines do not exist, and that the normal and linear assumptions are not true, but we can still generate results that approximate the real world. Finally, our VIF and tolerance test results showed no multi-collinearity problem, rendering our results more conclusive.[17]

5 Concluding remarks and policy implications

This paper investigated whether the enforcement of the required SOX2002-404(b), a regulation concerning the effectiveness of the client's ICFR, impacts audit fees in an upward manner. The literature argues that by enforcing Section 404(a) alone, management internal control reports can be cost effective (Kinney and Shepardson, 2011; Ge et al., 2017), while others observed higher fees associated with non-accelerated filers (Munsif and Singhvi, 2014); especially for smaller compliant firms (Iliev, 2010). Our paper differs in setting as it attempts to resolve the controversy regarding the direction of audit fees and non-audit fees charges using a larger sample size over an extended period (2000–2016) with a specific focus on 'accelerated filers'. We gauge the relationship between the two types of fees and the Impact of Regulations on Internal Audit Control, a consequence of 404(b), after controlling for the effect of six blocks of explanatory variables (risk, financial strength and growth potential, operations complexity, potency of corporate governance measures, audit committee gender composition and firm size) and five new variables.[18]

The most important part of our results is that as the auditor exerts more work, they charge higher fees when auditing the internal audit report over financial reporting of 'accelerated filers firms', especially larger firms, than reported for 'accelerated filers' firms. Apparently, IRICFR expands the auditor task to go beyond the impact of regulations on a firm's internal controls to cover more substantive tests (R^2 is 30%). On

the other hand, our results show that there is a 19% cut in non-audit fees. Not surprisingly, audit fees increase as the size of the audit committee becomes larger. Growth in total assets and total revenues were found to reduce audit fees, which could possibly be explained by the reduction in business risk and/or auditors' preferential treatment to larger clients.

Our block regression analysis tests indicate that the enforcement of tighter internal controls resulted in statistically significant firm risk reduction for both audit and non-audit fees regressions, and stricter corporate governance measures especially for large sized firms in the non-audit fees regression (R^2 is 52%). On the other hand, operations complexity (i.e., liquidity and being a multinational company) was significant for only the audit fees regression. Furthermore, there is a negative relationship between the effectiveness of the management report [required by SOX2002-404(a)] and audit fees, implying that auditors conduct a lower number of substantive tests, thus reducing audit fees. On another front, there is evidence of increasing audit fees with increasing leverage risk [found insignificant by Francis and Simon (1987)] and more liquidity [contrary to evidence by Hogan and Wilkins (2008)]. The latter finding is not surprising since these authors showed evidence prior to the introduction of SOX Section 302. Our sample, however, is more relevant to the period before and after the implementation of section 302. Having female presence in the audit committee relates to more expensive auditing, opposite to what was found by Ittonen et al. (2013) for the years 2006–2008, but consistent with Hardies et al. (2015), Knechel et al. (2013a, 2013b) and others. In addition, increases in profitability measures (i.e., ROA and ROE) improved the auditors' confidence in clients' businesses, leading to reduced audit risk and audit fees.

Although this study controls for econometric problems, our regression models suffered from a misspecification issue, suggesting the omission of one or more variables. Thus, further studies may consider adding new metrics (such as delayed effect of financial crises, audit rotation, and legislation changes, among others) to better explain the relationship between audit fees and ICFR and/or select a longer sampling period than ours.

Finally, despite the advances made in recent years in the audit market, the disclosure of opinion and internal control reports and fees remain non-mandatory for companies not listed, therefore our findings cannot be generalised. Given the importance of audit to society, it is expected that, in the future, regulated and strategic sectors such as the electrical, financial, telecommunication, and transport industries will require the disclosure of fees and internal control reports. This opens a new front of research in the determinants of audit fees among all companies.

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Declarations

All authors declare that they have no conflicts of interest.

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Notes

1 All PCAOB rules and standards covering auditing companies' registration, inspection, standard setting and enforcement must be approved by the US Securities and Exchange Commission (SEC). Its members are also appointed and overseen by the SEC.

2 Non-accelerated filers are generally firms with common equity public float of less than $75 million, while accelerated filers are higher than $75 million. More importantly, accelerated filers firms are subjected to stiffer regulatory requirements. For instance, the SOX of 2002 (SOX) and other rulings by the Securities and Exchange Commission (SEC) have applied higher standards and expect more extensive reporting from 'accelerated' filers compared to 'non-accelerated' filers. The SEC revised the definition of non-accelerated filers to expand the number of firms that could make use of scaled disclosure requirements that exempts them from certain requirements that apply to accelerated filers (Knight, 2018).

3 See https://news.sky.com/story/accounting-scandals-prompt-kpmg-ban-on-non-audit-work-11547932.

4 Use of a dummy variable for categorical data is common practice in economics and finance.

5 We could focus only on the years when ICFR was first launched and do a difference-in-difference analysis comparing before to after. We opted, however, to capture the long-term effect of launching ICFR beyond the years 2001, 2002, and 2003. We also think that by extending the sampling period, we would smooth out other intervening effects.

6 We used the following filter to clean out outliers from ratios as follows: for ROA, ROE, revenues growth, assets growth, total debt, and liquidity (Inv + AR / TA) ratios that are <=–0.51 or >1 were dropped.

7 Audit Analytics database reports whether the 'final auditor opinion' agrees with the 'management report' that the registrant's disclosure controls are effective; if yes, then we assign a value of one for the management report dummy variable; o.w., it is a zero (i.e., not disclosed or dropped).

8 The source of audit committee and composition gender is Audit Analytics database. A female chair/member name was categorised as Mrs. Initially there were six other variables considered that were later dropped from our regressions either because data was not found or was clustered with no material variation in the sample. These are:

   a the imposition of internal control over the period of remediation (dropped due to unavailable data)

   b the effectiveness of internal control via disclosure of weaknesses (dropped due to unavailable data)

   c auditor opinion (it was clarified by Audit Analytics, that they do not have any unclean audit reports because companies usually correct and resubmit their financials to their auditor or change the auditor; they rarely accept and declare a non-clean opinion; at some point we considered substituting auditor opinion by the 'unqualified or significant going concern uncertainty' variable, but again there was only 0.02% variation so we dropped it too)

   d final auditor opinion agreeing with management report (available for less than 80% of cases)

   e the PCAOB report on the quality of the auditing firm (available only in 10% of cases and the PCAOB variable was related only to audit companies, not to the audited company itself)

   f the internal control report shows whether or not the auditor or management found the registrant's internal controls over financial reporting to be effective (over 20% of the values were missing and there was a lack of variation within the remaining sample with only 105 observations showing ineffectiveness).

9 To our knowledge, only few papers examined the impact of Section 404(b) but for specific cases. Munsif and Singhvi (2014) inspected non-accelerated filers under 404(b), and only for a limited period.

10 The majority of audit committees (93.36% of our sample) have five members or less. About two third (67.05%) have two or three members. So we opted to use the median 4 (or higher) as our cut-off for considering the committee size large. Our goal was to find if large size of audit committee matters. With such a highly clustered sample, using continuous data may have little value to serve our testing objective.

11 Our sample includes firms that belong to 218 sectors and 329 sub-industry category as coded by 'Audit Analytics Database'. Obviously, it would be meaningless to test by sector or industry.

12 Descriptive results are available upon request.

13 We also used HUBER regression on SPSS and the results were very similar to WLS on SPSS.

14 The same can be said about the number of employees in our sample with a mean of almost 33,000 employees, as high as over 2.2 million and as low as 5.

15 We use R software to generate Breusch-Godfrey test of auto-correlation, Bruesch-Pagan and Koenker F Statistics of heteroscedasticity. Skewness and Kurtosis statistics were calculated manually. The remaining econometric tests results (i.e., tolerance, VIF, DW, and Kolmogorov-Smirnov statistics) are generated from WLS regression using SPSS. RAMSEY tests were calculated.

16 The intercept is statistically significant, which is almost always the case in any regression analysis. Yet, we consider this generally not a problem.

17 The rule of thumb is that if VIF is greater than 10 then multicollinearity is high. Tolerance, which is just the reciprocal of the VIF, so if tolerance is higher than 0.1, then multicollinearity is high.

18 We also test total audit fees on the same tested explanatory variables using the total audit fees (i.e., audit fees + non-audit fees) as our dependent variable. Results are available upon request. We found that all control variables had the same impact on total audit fees as they did on audit fees except for INTL, which was non-significant but interestingly changed signs between auditing and total audit fees.

Appendix

Table A1 List of variables with their expected sign of the relationship with audit fees

Block	*Variable*	*Sign of the relationship with audit fees*
	IRICFR	*Positive:* for compliant firms (Iliev, 2010), accelerated or non-accelerated filers under Section 404(b) [e.g., Munsif and Singhvi (2014) for the years 2008–2009].
		No increase in audit fees related to ICFR audit reports (e.g., Defond and Lennox, 2017).
		We argue that the tendency to be prudent implies that audit fees are expected to be 'net' positively related to IRICFR.
Risk	MGTRPT	*Positive* for both accelerated and non-accelerated filers (e.g., Hogan and Wilkins, 2008), for accelerated filers [Hoitash et al. (2008) for the years 2003–2004].
		Negative: effective management report reduces audit fees [Ge et al. (2017) and Kinney and Shepardson (2011) for exempted firms].
	TDR	*Positive* (e.g., Hogan and Wilkins, 2008); insignificant (e.g., Francis and Simon, 1987).
Financial performance and growth	ROA	*Positive:* profitable firms can afford higher fees but is safe (e.g., Goodwin-Stewart and Kent, 2006) vs. negative (e.g., Griffin et al., 2008).
	ROE	*Positive:* profitable firms can afford higher fees but is safe (e.g., Goodwin-Stewart and Kent, 2006) vs. negative (e.g., Griffin et al., 2008).
	TAGTH	*NEW: positive* – larger total assets growth is associated with higher fees (e.g., Hogan and Wilkins, 2008).
	TRGTH	*NEW: positive* – larger total revenues growth is associated with larger TA and hence higher fees (e.g., Chan et al., 1993).
	FINCRISIS	*NEW: negative* – cannot afford high fees.
Operations complexity	LIQ	*Negative* (e.g., Hogan and Wilkins, 2008).
	INTL	*Positive* [e.g., complexity increase fees as per Hogan and Wilkins (2008) and Sandra and Patrick (1996)].
Corporate governance	SOX2002	*Positive:* imposing more audit work (e.g., Chung and Wynn, 2014).
		Negative: good governance can lower audit fees (Krishnan and Zhang, 2014).
	AUDLARGE	*Positive* (e.g., Krishnan and Zhang, 2014).
	AUDCHG	*Negative* (e.g., Köhler and Ratzinger-Sakel, 2012),
	ACSIZE	*NEW:* positive (as larger committee expect higher fees).
Gender	AUDCHGDR	*Positive* (e.g., Hardies et al., 2015; Chung and Monroe, 2001) vs. negative (e.g., Ittonen et al., 2013).
	PERFEM	*Positive* (e.g., Hardies et al., 2015; Chung and Monroe, 2001) vs. negative (e.g., Ittonen et al., 2013).
Firm size	LNMKTCAP	*Positive:* larger size is positively associated with higher fees (e.g., Hogan and Wilkins, 2008).
	NOEMPL	*Positive:* larger size is positively associated with higher fees (e.g., Hogan and Wilkins, 2008).