Audit Quality of the Integrated Supply Chain – Evidence from Taiwan Electronic Industry

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Many suppliers and their major customers share a common audit firm or even common auditors in endorsing financial statements. Nevertheless, we know little about how an incumbent audit firm differs from an incumbent auditor(s) in supply chain audit (SCA) quality. Taking advantage of data availability in Taiwan, we find an incumbent audit firm by itself is not associated with high audit quality. However, an incumbent audit firm, coupled with firm-level industry expertise, results in low discretionary accruals and lower restatement probability. Conversely, we find either an incumbent lead or concurring auditor significantly depresses the restatement likelihood. Yet, a simultaneous incumbent lead and concurring auditors decreases audit quality. Our study is motivated by recent audit failures divulging along the supply chain, and the initiatives of Public Company Accounting Oversight Board (PCAOB, 2011) regarding mandatory audit rotation and engagement partner's signature.

INTRODUCTION

The integrated supply chain has become a crucial part of today's capricious economy as firms seek to gain competitive advantages. Many suppliers and their major customers share a common audit firm (different auditors of a same audit firm to audit suppliers and customers respectively) or even common auditors (same auditor(s) of a same audit firm to audit both suppliers and customers) in endorsing financial statements. Despite the amount of research on audit quality, little is known when countercontracting business partners share an incumbent audit firm or even auditor(s). An important perspective on enhancing audit quality is to proactively understand an organization's strategy, major stakeholders (e.g., customers, suppliers), risks, and revenue cycles; so that people implementing audit tests can be competent and testing procedures are capable of yielding reliable and relevant evidence (Francis 2011). Nevertheless, accompanying with benefits stemmed from enhanced information collusion and expertise spillover, supply chain audit (SCA) faces the challenge of potential information collusion and fee dependence. More importantly, prior studies suggest audit expertise can be differential at firm – and individual auditor – level. It implies SCA quality could depend on who actually conducts the audit – the incumbent audit firm or the incumbent auditor(s)?

Specifically, extant evidence shows SCA has multiple – dimensional implications for audit quality. On one hand, auditing both the suppliers and their major customers provides the chance to better evaluating risks inherent in the revenue and purchasing cycles, as well as better estimating on the sustainability of profit margin. Thus it could result in deeper engagement-specific expertise and expertise spillover during the joint audit process, which prior studies have identified as key drivers for audit quality (Johnstone et al. 2011; Ferguson et al. 2003; Francis and Yu 2009; Reichelt and Wang 2010). On the other hand, supply chain partners have aligned and conflicting interests at the same time (Baiman and Rajan 2002; Hertzel et al. 2008; Raman and Shahrur 2008; Fee and Thomas 2004). The intricate and related – party transactions could provide motives and convenience to manipulate financial reporting, which increases audit difficulty. For example, Raman and Shahrur (2008) document earnings are used opportunistically by one party to obtain favorable business terms (e.g., price, credit line, contract period, and relationship – specific investment). Fee and Thomas (2004) find business partners could collude with each other on their financial status in order to defeat outside rivals or achieve monopoly privileges.

More critically, SCA could create greater fee dependence for audit firms. Naturally, joint audit fees from two clients (suppliers and their major customers) count more weight in the portfolio of audit incomes for the audit firm. Recent research shows there is negative association between fee dependence and audit quality (Frankel et al. 2002; Srinidhi and Gul 2007). Furthermore, Chi and Chin (2009 and 2011) find individual -level audit expertise distinct from firm-level audit expertise, resulting in differential audit quality. Anecdotal evidence suggests performance evaluation concerns and proficiency of information technology potentially hinder expertise sharing among an audit firm. These prior findings indicate it is an empirical question on whether an incumbent audit firm or auditor(s) could improve audit quality.

To contrast competence and independence of an incumbent audit firm vs. an incumbent auditor(s), we take advantage from a unique hand-collected sample of supply chain partners in electronics industry in Taiwan. We designate them either as SCA firms or non-SCA firms (i.e., whether the suppliers and their major customers share a common audit firm or auditor(s)). Different from audit reports in the U.S. which only bear the audit firm's name, audit reports in Taiwan bear two signing auditors' names (lead and concurring auditor's) as well the audit firm's name. Seminal empirical studies have connected statistical properties of audit reports and audited financial statements with both client characteristics and audit characteristics.¹ Following prior studies, we consider the larger magnitude of discretionary accruals (Krishnan 2003; Leuz et al. 2003; Jaggi et al. 2006; Chi and Chin 2011) and higher likelihood of restatement (Raghunandan et al. 2003; Srinivasan 2005; Chin and Chi 2009; Gao et al. 2009) as proxies for lower audit quality. Because an audit firm's expertise is unobservable, we use its industry dominance (its market share in Taiwan electronic industry) as proxy (Balsam et al. 2003).² We also include alternative measures of firm – level expertise prevailing in the literature in our robustness check. We capture an individual auditor's characteristics by her/his role in the engagement team (i.e., lead or concurring auditor).

Our sample consists of 1664 annual financial statements from the list firms of the electronic industry in Taiwan during the years of 2000-2010, of which, 382 employ SCA. Our empirical results show neither SCA nor firm-level expertise by itself relates to high audit quality. However, supply chain audit, coupled with firm-level audit expertise results in higher audit quality. Specifically, discretionary accruals are significantly reduced when a client hires an incumbent audit firm who is a major player in the audit market of the electronic industry.³ In addition, after we control for the direction of discretionary accruals, supply chain audit with firm-level expertise effectively depresses both positive and negative discretionary accruals. Our findings suggest that audit quality should not only build on understanding clients' businesses but also those of their business partners. Furthermore, we find either an incumbent lead or concurring auditor significantly depresses the restatement likelihood. Conversely, a simultaneous incumbent lead and concurring auditors decreases audit quality. In addition, our analyses suggest SCA contributes more to audit quality for up than for middle and down - stream firms.

Our study makes several contributions. First, an important but under-study topic is the role of an incumbent audit firm or auditor(s) in audit quality. The recent audit failures highlight audit deficiencies

along the supply chain. For example, an audit on financial statements of Diamond Foods reveals accounting loopholes including unusual timing of payments to growers, a leap in profit margins, and volatile inventories and cash flows. As a result, the company would have to restate its earnings for fiscal years 2010 and 2011. A simple survey on its major suppliers' financials (i.e., nuts providers) would have exposed these loopholes two years early; therefore avoided the capital market disaster of Diamond Foods when its accounting scandal spotlighted (Byrnes, Huffstutter, and Dalal, Reuters, March 19, 2012). Another accounting scandal involves Groupon company, which did not disclose its accounting practice of including revenue it had to turn back over to merchants running their deals; it had to revise its fourth-quarter results which also represented the first quarter it ever had to report earnings since it had went to public on November 4th, 2011 (April 3, 2012, Forbes.com). These audit failures underline the imperatives of confirming account receivables, payables, inventories, and operating cash flows when auditing intricate/related-party transactions among business partners. Given about 35 percent of Big 4 clients covered in Audit Analytics having major customer relationship in the Compustat customer segment filing (Johnstone et al. 2011), we believe documenting audit quality in the context of supply chain relationship is timely and important.

Second, we contribute to the initiative of mandatory audit rotation by Public Company Accounting Oversight Board (PCAOB). In a recent concept release, the PCAOB solicits public comments within and beyond the U.S. on advantages and disadvantages of mandatory audit rotation ⁴ (PCAOB, August 16, 2011). Concerns include whether the Board should only consider rotation requirement for audit tenures of more than 10 years, or whether the Board should allow rotating personnel within a same audit firm in order to reduce the loss of engagement – specific knowledge; as it would happen when audit rotating is across audit firms. Our findings that retaining either a lead or concurring auditor would reduce the likelihood of restatement provide direct evidence. While we cannot unequivocally claim that the effects we observe on supply chain audit in Taiwan will apply to all public firms in the U.S., our results do suggest rotating personnel of same audit firm with an incumbent member has merit in enhancing audit quality for our sample. Another implication of our results is the importance of communications between the predecessor and successor auditor. If audit rotation can only be carried across audit firms, then procedures should be in place to make sure the predecessor and successor auditor can communicate effectively. This arrangement might minimize the loss of engagement-specific knowledge where rotating personnel of same audit firm is not appropriate.

Lastly, our study contributes to the literature that links audit quality to characteristics of an individual auditor. In an effort to improve the transparency of audit process, the PCAOB is debating on its standards regarding disclosures of the identity of engagement partner and/or members in the audit report (PCAOB, October 11, 2011). Few studies focus on the role of an individual auditor because of data constraint. A few exceptions document that a partner's engagement tenure (Carey and Simnett 2006), an auditor's expertise, and his/her role in the engagement team (i.e., lead vs. concurring, Chin and Chi 2009; Chi and Chin 2011) influence audit quality. Our findings that either an incumbent lead or concurring auditor can reduce the restatement propensity but no difference between an incumbent lead and a concurring auditor in audit quality extends our knowledge on auditor's characteristics. Our findings should also help mangers to make more informative decisions when conduct employee training or delegate engagement team.

The remainder of our paper is organized as follows. In section 2, we discuss background and related literature. In section 3, we describe our sample, research design and empirical proxies. In section 4, we report our empirical results. We conclude in section 5.

BACKGROUND

Institutional Background & Audit Reports in the U.S., and Taiwan

In the U.S., an audit report serves as a primary source to inform investors the audit results, which include the audit firm's opinion on the financial statements of the client firm, and comments on its internal control over financial reporting. It bears the signature of the audit firm but not an individual

auditor's name. On July 28, 2009, the PCAOB issued a concept release seeking comments on whether the Board should require that the audit report bears the engagement partner's or member's name⁵; followed by the issuance of amendments to reconsider its previous release on October 11, 2011. Since no official provisions have been formed yet, financial statements users in the U.S. know little about who actually conducts the audit. In contrast, in some foreign countries and regions, there are statutory requirements regarding disclosure of the names of the practicing auditors in the audit report. For instance, the Taiwanese Securities and Futures Bureau (TSFB) ⁶ mandates in 1982 that all audit reports for public companies must be signed off by a practicing auditor. In addition, it requires in 1983 that the financial statements of a list company must be jointly audited and signed by at least two practicing auditors as well as by the audit firm. This unique regulation provides a chance to investigate the characteristics of an individual auditor in audit quality, which few studies have explored except for Carey and Simnett (2006), Chin and Chi (2009), and Chi and Chin (2011).

Audit Firms and Restatements in Taiwan

The audit market in Taiwan is actually dominated by local affiliations of the remaining large international audit firms – "Big 4" after the collapse of Arthur Anderson (i.e., Deloitte Touche, Ernst & Young, KPMG, and PricewaterhouseCoopers). 84.16% of listed companies in Taiwan are audited by local offices of one of the Big 4; the market share of "Big 4" in the Taiwan electronic industry, which is a major player in global electronic businesses reaches 89.22%.⁷ The national headquarters of the Big 4 determine firm-wide policies and provide technical trainings and localizations for the local offices in Taiwan. Because Taiwan is a geographically small region, the city offices in Taiwan are crowded in five nearby cities (Taipei, Taichung, Kaoshiung, Tainan, and Hinchu); and Taipei is where the signing auditors condense. In contrast to the U.S., where data on the city office is available (i.e., identity of the city office, audit fees of the city office etc.); there is no such information available in Taiwan. As a result of the lack of data at city-office level, we focus on the role of an individual auditor of engagement team in audit quality (i.e., lead or concurring auditor).

Taiwan has complete supply chains for electronic components, ranging from designing and manufacturing them (up-stream), assembling them (middle-stream), and packing and storing them (down-stream). Generally Accepted Accounting Principles (GAAP) and Generally Accepted Auditing Standards (GAAS) in Taiwan are similar to those in the U.S. since the regulation authority in Taiwan built their accounting and auditing standards on those of U.S.. Some typical causes and types of restatements involve either errors arising from mathematical mistakes, oversight, misuse of facts, or statements that do not comply with existing GAAP at the time they were filed. Our studies define a restatement as the corrections of financial statements not compliant with the GAAP at the time they were filed, similar as Chin and Chi (2009). We exclude restatements caused by mergers & acquisitions, and changes in accounting principles from our analyses.

Two streams of extant studies motivate our paper. The first deals with implications of business partnership for auditing practices. The second relates to differential roles of an incumbent audit firm vs. an auditor in audit quality.

Supply Chain Audit

We are aware of one concurrent working paper that devotes to supply chain audit. Using the U.S. data, Johnstone et al. (2011) find a negative association between employing a supply chain audit and discretionary accruals. They also find companies employing supply chain audit report smaller increase in earnings. In addition, they show audit firms charge higher audit fees if they are hired by both suppliers and their major customers. Our paper contributes incrementally to Johnstone et al. (2011) by taking advantage of our unique international data: (1) we extend the understanding on the role of supply chain audit in the global setting, which is important during the process of harmonizing financial reporting and auditing standards across political and regulatory regimes. Our finding that the supply chain audit alone does not lead to higher audit quality in Taiwan as it does in the U.S. (Johnstone et al. 2011) supports the argument that the source of audit expertise has respective global-level, firm-level, and auditor-level

dimension (Carson 2009). (2) the distinct features of audit reports in Taiwan (at least two participating auditors with two sign-off signatures on audit reports) allow us to explore the role of an individual auditor in the audit quality. Given the concerns that audits are of high quality when conducted by competent personnel but we know very little about who actually implements them (Francis 2011, p. 134), understanding the role an individual auditor plays is essential to understanding how audit independence and transparency could be enhanced at individual vs. firm or country level respectively. (3) we examine the cost of supply chain audit from an alternative angle different from that of Johnstone et al (2011). They indicate that auditors will charge premium for supply chain audit. We investigate the relative effectiveness of supply chain audit for up, middle, and down - stream firms along supply chain. Our results show supply chain audit has little effect on improving audit quality for middle and down - stream firms. Our findings suggest that only up-stream firms engaging in more complicated business models worth the higher audit costs. And (4) we improve the research design by including the likelihood of restatements as a proxy of audit quality, since it is a more direct measure for audit failures. Further, we conduct our analyses in one industry to better control innate requirements to audit services caused by heterogenous business natures. ⁸

Our study also builds up on the literature examining implications of business relationship for financial reporting decisions. Because the value of the supply chain relationship to the partners relies on each other's future prospects, ⁹ supply chain partners could have motives to manipulate the perception of their financial status to continue the business relationship or collude with each other to defeat outside rivals (Baiman and Rajan 2002; Fee and Thomas 2004). Raman and Shahrur (2008) provide that earnings management is used opportunistically to convince the counter party to undertake relationship-specific investment. However, they also find customer-supplier relationships terminate sooner when the magnitude of earnings management is high. Early studies document companies inflate earnings to obtain better price, longer contract period, better credit terms from their business partners (Bowen et al. 1995; Burgstahler and Dichev 1997). The co-existence of the conflicting and aligned interests between supply chain partners could complicate audit practices; which is especially true when an incumbent audit firm or even auditor(s) is hired by business partners. Current audit literature provides few guidance on the issue.

Audit Quality: Audit Firm vs. Auditor

Seminal empirical studies have linked statistical properties of audit reports and audited financial statements with both client characteristics and audit characteristics. When summarizing the role of audit firms in audit process, Francis (2011) points out "(Audit) firms are crucial to understanding audit quality because firms hire and train audit personnel, and incentivize auditors through compensation and other organizational policies. Firms also devise the audit programs and testing procedures that guide the evidence collection process, and firms have internal administrative structures to assure quality and compliance with their audit policies." Audit firm characteristics that have been examined include brand name/size of audit firms, firm-level industry expertise, engagement tenure, and audit fee. The results collectively show that big audit firms (Big 4) are associated with higher audit quality (Simunic and Stein 1987; Becker et al. 1998; Francis et al. 1999; Francis and Yu 2009; Choi et al. 2010). The main source of the prominence of large firms comes from differential firm-level industry expertise (O'Keefe et al. 1994; Craswell et al. 1995; Wright and Wright 1997; Ferguson et al. 2003; Balsam et al. 2003; Krishnan 2003, 2005; Francis et al. 2005). In addition, researchers find an audit firm's tenure adversely affects audit independence and objectivity (Johnson et al. 2002; Myers et al. 2003). Prior studies also document effects of audit fee dependence on earnings quality (Frankel et al. 2002); and on the likelihood of issuing a going-concern audit report (Craswell et al. 2002; DeFond et al. 2002).

One recent development on the audit quality is the role an individual auditor plays. Securities Exchange Commission (SEC) 33-7919 (2000) points out reputational interests for audit firms are not the same as those of practicing auditor(s) who actually implement audit process. Vera-Munoz et al. (2006) list possible reasons why firm-level industry expertise would not be homogenous within the same audit firms or across engagement team members. First, engagement specific expertise is hard to document as well as to select the best practices. Second, even if it is possible to collect and codify the expertise and the

best practices, there is large latitude for an individual auditor to excise his/her own judgments to adjust and apply them. Third, field studies (Irmer et al. 2002) and anecdotal evidence (Head 2001; Power 2000) indicate not everyone embrace IT-based knowledge sharing system. Lastly, performance evaluation concerns could potentially hinder the expertise sharing among individual auditors.

Empirical evidence on an individual auditor's characteristics is scarce. Reichelt and Wang (2010) confirm that audit quality is higher when auditors are both national and city-specific industry specialists. Their results confirm that an individual auditor's expertise could be incremental to firm-level expertise contributing to audit quality in the U.S.. Also using data in Taiwan, Chin and Chi (2009) and Chi and Chin (2011) suggest that the differential industry expertise among Big 4 is driven at practicing auditor - level rather than at firm - level. Specifically, they find lead auditor alone or in conjunction with concurring auditor results in smaller accruals and low likelihood to issue modified opinions; but concurring auditor alone is not different from a non-industry specialist. We extend Chin and Chi (2009) and Chi and Chi and Chi (2011) by focusing on an individual auditor's role in supply chain auditing, where audit practices face new challenges. To our best knowledge, there is no systematic study on to what extent an incumbent audit firm differs from an incumbent auditor when they have differential reputational interests and audit fee concerns.

SAMPLE & RESEARCH DESIGN AND EMPIRICAL PROXIES

Sample Selection

The data requirements differ substantially among empirical tests, so we create two separate samples for analyses on discretionary accruals and restatement firms. Our sample is restricted to Taiwanese listed companies from 2000-2010. We obtain the identities of the electronic suppliers from the Market Observation Post System database in Taiwan. Financial data, audit firm data, signing auditor names, accounting restatements, and governance variables are acquired from the Taiwan Economic Journal database (TEJ).

The Taiwan Market Observation Post data identifies 5,617 annual financial filings in the electronic industry during our sample period (See Table 1, Panel A). Because our empirical analysis focuses on the effects of supply chain audit on audit quality, we require names of a company's major suppliers and those of their auditors. Thus, we eliminate 3,923 observations without such information. Panel A of Table 1 shows 30 observations lack the requisite financial, price, and/or governance data. As a result, 1664 observations from the interaction of the two databases remain. Of these, 632 belong to up-stream, 322 belong to middle-stream, and 710 belong to down-stream businesses.¹⁰ Overall, the number of annual filings declines gradually; this could attribute to that the mainland China takes away significant market shares of electronic industry from Taiwan during our sample period (See Panel B of Table 1)

Next, we reverse the process, and using the disclosed suppliers' information to obtain their major customers in the annual filings. We then cross-check the identities of the audit firms and auditors of these companies and their disclosed customers using TEJ database, which yield 382 observations of supply chain audit (sharing either a common audit firm or auditors), and 1,282 observations of non-supply chain audit. For our restatement analyses, we follow prior studies and further constrain that the audit firms should belong to Taiwan affiliations of the Big 4 and a company should have information on its board structure available. Thus our restatement sample reduces to 891 observations, out of which, 243 have supply chain audit (Panel C of Table 1).

Quality of the Supply Chain Audit

In this paper, we use two measures of audit quality: the magnitude of discretionary accruals and the likelihood of financial restatements. Financial statements are jointly produced by clients and their auditors (Antle and Nalebuff 1991). Two recent papers provide evidence that audit quality maps into earnings quality. Caramanis and Lennox (2008) measure audit quality by actual engagement hours and show that earning quality is higher when auditors exert more efforts (spending longer time on audit assignment). Gunny and Zhang (2012) also document a direct link between audit quality and client's earnings quality.

They document that magnitude of discretionary accruals is greater if its audit firm is on the PCAOB's inspection list. In addition, client firms are more likely to issue restatement.

Following prior research (Choi et al. 2011; Price III et al. 2011; Charles et al. 2010; DeFond and Jiambalvo 1994), we estimate discretionary accruals based on cross-sectional Modified Jones Model¹¹ as follows:

$$TACC_{t} / A_{t-1} = \alpha_{0} [1 / A_{t-1}] + \alpha_{1} [(\Delta REV_{t} - \Delta AR_{t}) / A_{t-1}] + \alpha_{2} [PPE_{t} / A_{t-1}] + \varepsilon_{t}$$
(a)

where $TACC_t$ is the total accruals, A_{t-1} the total assets, ΔREV_t the change in net sales revenue, ΔAR_t the change in net account receivables, PPE_t the net property, plant and equipment.

$$NDACC_{t} = \alpha_{0}^{(1/A_{t-1}]} + \alpha_{1}^{((\Delta REV_{t} - \Delta AR_{t})/A_{t-1}]} + \alpha_{2}^{(PPE_{t}/A_{t-1}]}$$
(b)

$$DACC_{t} = TACC_{t} / A_{t-1} - \alpha_{0} [1/A_{t-1}] - \alpha_{1} [(\Delta REV_{t} - \Delta AR_{t}) / A_{t-1}] - \alpha_{2} [PPE_{t} / A_{t-1}]$$
(c)

First, using coefficients α_0 to α_2 estimated from the OLS regression (a) by year, we estimate nondiscretionary accruals (*NDACC*) for each sample firm. Second, discretionary accruals (*DACC*) is total accruals minus the non-discretionary accruals (*NDACC*). For the second audit quality measure – likelihood of restatement, we also follow prior studies using Taiwan Data (Chin and Chi 2009). We adopt nonmatched procedure as Chin and Chi (2009) to avoid the problems associated with nonrandom matched samples for infrequent events like earnings restatement (Palepu 1986; Zmijewski 1984; Richardson et al. 2003; Cram et al. 2009). This means we consider the likelihood of the misstatement when the misstatement occurs, not when the misstatement is later disclosed publicly as an accounting restatement. In contrast, Johnstone et al. (2011) choose a small increase in net income as an alternative measure of earnings management. We argue though a positive increase in net income could indicate manipulations of earnings, it does not necessarily suggest an audit failure.

The Empirical Models

Similar to Johnstone et al. (2011) and Chi and Chin (2011), we employ the following regressions models to examine the relationship between the supply chain audit and discretionary accruals:

$$DA_{i,t} = \gamma_0 + \gamma_1 SCPA_{i,t} + \gamma_2 GROWTH_{i,t} + \gamma_3 ROA_{i,t} + \gamma_4 LOSS_{i,t} + \gamma_5 SIZE_{i,t} + \gamma_6 LEV_{i,t} + \gamma_7 YEAR_{i,t} + \varepsilon_{i,t}$$

$$DA_{i,t} = \gamma_0 + \gamma_1 INDEXP_{i,t} + \gamma_2 GROWTH_{i,t} + \gamma_3 ROA_{i,t} + \gamma_4 LOSS_{i,t} + \gamma_5 SIZE_{i,t} + \gamma_6 LEV_{i,t} + \gamma_7 YEAR_{i,t} + \varepsilon_{i,t}$$

$$DA_{i,t} = \gamma_0 + \gamma_1 SCPA_{i,t} + \varepsilon_{i,t}$$

$$(1)$$

$$DA_{i,t} = \gamma_0 + \gamma_1 INDEXP_{i,t} + \gamma_2 GROWTH_{i,t} + \gamma_3 ROA_{i,t} + \gamma_4 LOSS_{i,t} + \gamma_5 SIZE_{i,t} + \gamma_6 LEV_{i,t} + \gamma_7 YEAR_{i,t} + \varepsilon_{i,t}$$

$$(2)$$

$$DA_{i,t} = \gamma_0 + \gamma_1 SCPA_{i,t} + \gamma_2 INDEXP_{i,t} + \gamma_3 SCPA_{i,t} \times INDEXP_{i,t} + \gamma_4 GROWTH_{i,t} + \gamma_5 ROA_{i,t} + \gamma_6 LOSS_{i,t} + \gamma_7 SIZE_{i,t} + \gamma_8 LEV_{i,t} + \gamma_9 YEAR_{i,t} + \varepsilon_{i,t}$$
(3)

where:

DA	=	discretionary accruals from the cross-sectional Modified Jones Model(1995);
SCPA	=	dummy variable having a value of 1 if the observation belongs to supply chain audit;
INDEXP	=	dummy variable having a value of 1 if the observation belongs to industry specialization audit; ¹²
GROWTH	=	percentage growth in sales;
ROA	=	net income before extraordinary items divided by total assets;
LOSS	=	dummy variable having a value of 1 if the net income before extra is negative;
SIZE	=	natural logarithm of total assets;

LEV	=	total long-term liabilities divided by	total assets;
YEAR	=	fiscal year dummies.	

For our analyses on the relation between supply chain audit and likelihood of restatement, we employ similar specifications as Chin and Chi (2009) and other prior studies on restatements. For example, existing studies show certain firm characteristics, such as return on assets, leverage, and liquidity, affect the likelihood of restatement (Kinney and McDaniel 1989; DeFond and Jiambalov 1991; Francis et al. 2005; Hogan and Wilkins 2008). In addition, priors studies indicate that a firm's growth opportunity measured by sales growth, market to book, and a firm's size also influence incidence of restatements (Stice 1991; Chaney and Philipich 2002; Frankel et al. 2002; Cahan and Zhang 2006; Dechow et al. 1996; Richardson et al. 2002; Desai et al. 2006). Recent studies establish the link between the corporate governance strength (e.g., board structure and other governance schemes) and the audit quality (DeAngelo 1981b; Conyon and Peck 1998; Beasley 1996; Klein 2002; Xie et al. 2003; Cheng and Farber 2008; Coles et al. 2008; Young et al. 2008). Incorporating into the extant evidence, we employ the following empirical model, where:

RESTATE	=	dummy variable having a value of one if a financial restatement incurs;
SCPA	=	dummy variable having a value of one if the observation belongs to supply
		chain audit;
GROWTH	=	percentage growth in sales;
MB	=	market-to-book value of equity at year-end;
ROA	=	net income before extraordinary items divided by total assets;
LEV	=	total long-term liabilities divided by total assets;
QUICK	=	current assets (less inventories) divided by current liabilities;
SIZE	=	natural logarithm of total assets;
INDBOD	=	number of independent directors on the board divided by the total board size;
BDSIZE	=	the number of the board members;
DUALITY	=	dummy variable having the value of 1 if the chairman of the board is also the
		CEO;
DEVIATION	=	voting rights minus cash flow rights;
CONTROL	=	the voting rights of the ultimate owner divided by the total voting rights;
YEAR	=	fiscal year dummies.

EMPIRICAL RESULTS

Descriptive Statistics

Table 2 Panel A reports descriptive statistics for discretionary accruals sample. When comparing among up, middle, and down-stream firms, we find the middle-stream firms have the largest magnitude of *DA* (with a mean of 0.0142), followed by down-stream (with a mean of 0.0037) and up-stream firms (with a mean of 0.0009). At the same time, up-stream firms are more likely to adopt supply chain audit (with a mean of 0.2690) than middle and down-stream firms (with a mean of 0.1925 and 0.2113 respectively). Both up and down-stream firms are more likely to hire audit firm/or auditors with firm-level industry expertise (*INDEXP*) than middle-stream ones (with a mean of 0.2706, 0.2831, and 0.2516 respectively). Middle-stream firms are the most efficient in achieving their *ROA* (with a mean of 0.0534).

Table 2 Panel B contrasts differences between firms having and without supply chain audit. There is no statistical difference in the magnitude of discretionary accruals (*DA*) between SCPA and Non-SCPA firms. However, SCPAs have the following salient characteristics: (1) the audit firm/or auditors are more

likely to be industry specialists (*INDEXP*) (2) they are more efficient in generating higher *ROA* (3) less likely to experience *LOSS*; (4) they are larger companies; (5) they have relatively lower debt ratio.

Table 2 Panel C shows the correlation among key variables we use in the discretionary accruals sample. The *DA* weakly negatively correlates with both the *SCPA* and *INDEXP* (with Pearson coefficients of -0.003 and -0.013 respectively). The *DA* significantly correlates with *GROWTH*, *ROA*, and *LOSS*.

Table 2 Panels D, E, F focus on the restatement sample. Overall, we find the SCPA firms are more efficient, liquid, solvent, and larger (*ROA* = 0.1082 and *QUICK*=2.3837, *LEV*=0.0634, *SIZE*=15.3463) than the Non-SCPA ones (*ROA*=0.0847 and *QUICK*=1.9434, *LEV*=0.0771, *SIZE*=14.8911). These results indicate that the SCPAs on average are better performers than the Non-SCPAs. However, when turning to the governance status and board structure (*INDBOD*, *BDSIZE*, *DUALITY*, *CONTROL*), we find there is no significant difference between the SCPAs and Non-SCPAs, which suggests the strength of internal control is not a main factor when a company determines whether it should share an incumbent audit firm or auditor(s). In addition, when comparing among up, middle, and down-stream firms, the results reveal up-stream firms having higher *MB*, *ROA*, *QUICK* and *SIZE* than middle and down-stream companies. In addition, Pearson correlation matrix shows (Panel F) that *RESTATMENT* weakly negatively correlate with the *SCPA*, *LEV*, *QUICK*, *INDBOD*, *DEVLATION*, which is consistent with findings in prior research, showing that strong corporate governance improves the audit quality (DeAngelo 1981b; Conyon and Peck 1998; Beasley 1996; Klein 2002; Xie et al. 2003; Cheng and Farber 2008; Coles et al. 2008; Young et al. 2008).

Regression Results on the Relationship Between Supply Chain Audit and Discretionary Accruals

The existing literature indicates there are multiple dimensions of audit expertise (Francis 2011; Carson 2009; Reichelt and Wang 2010; Chin and Chi 2009; Chi and Chin 2011). Johnstone et al. (2011) further argue that the supply chain audit requires much deeper engagement-specific expertise. We propose supply chain audit requires engagement – specific individual expertise on top of the firm-level industry expertise, Therefore, we first consider the effects of the supply chain audit and industry expertise separately; then examine the interaction effect of these two factors.

Table 3 Panel A reveals *SCPA* and *INDEXP* negatively relate to the magnitude of the discretionary accruals (*SCPA*=-0.0058 and *INDEXP*=-0.0030 respectively). However, the effects are not significant. These findings indicate when a company employs a supply chain audit or hire auditors with industry expertise, the audit quality could be enhanced to a certain extent but not significantly. The practicing auditors could have deeper knowledge on a specific engagement; however, they could lack overall knowledge on the electronic industry. On the other hand, an audit firm could have firm-wide specific procedures/guidelines in place for the electronic industry, but these firm-wide procedures/guidelines still need adjustments and modifications by the practicing auditors. Our insights echo Chin and Chi (2009) who report that firm-level industry expertise alone is not associated with the likelihood of a modified audit opinion; and only when firm-level industry expertise is in combination with individual auditor's specialty, the audit quality could be improved.

Next, we add the interaction term of *SCPA* and *INDEXP* into our specification (the $SCPA \times INDEXP$ =-0.0333, t=-2.27), we find it significantly depresses the magnitude of discretionary accruals. This finding suggests, in order to improve the audit quality, the auditors not only need to know the uniqueness of their clients but also the overall accounting cycles of the electronic industry. When separating the discretionary accruals based on their signs, we confirm that the supply chain auditors with industry expertise could depress both positive and negative accruals (i.e., income increasing and income decreasing activities).

We conduct further analyses based on firms adopting supply chain audit. We explore whether there are differential effects of hiring an incumbent audit firm vs. hiring an incumbent common auditor(s). We take advantage from the dual sign-off requirement on audit reports in Taiwan. We construct sub-groups (1) hiring both incumbent lead & concurring auditors; (2) hiring an incumbent lead auditor; (3) hiring an incumbent concurring auditor; (4) hiring either an incumbent or lead auditor but with reverse titles (i.e. a lead auditor of a customer switched to a concurring auditor for its supplier); (5) hiring different auditor(s)

of an incumbent audit firm. Our comparison base is sub-group (5). Table 3 Panel B shows hiring both lead and concurring auditors (SAU_1 =-0.0384, t=-0.73); or hiring the concurring auditor (SAU_3 =-0.0013, t=-0.05) weakly reduces the discretionary accruals relatively to hiring different auditors of the incumbent audit firm. Chin and Chi (2009) provide compliment findings that the lead auditor either alone or with the concurring auditor is associated with lower absolute value of discretionary accruals.

Table 3 Panel C reports the regression results after controlling for business complexity. The coefficients of $SCPA \times INDEXP$ = -0.0651, -0.0595, and 0.0183 and t= -2.94, -1.94 and 0.76 respectively for the up, middle and down-stream firms. These results imply the supply chain audit plays a more active role in enhancing audit quality for up-stream than for the middle and down- stream firms.

Regression Results on the Relationship between Supply Chain Audit and Likelihood of Restatements

According to Caramanis and Lennox (2008), and Gunny and Zhang (2012), a more direct measure of audit quality is the likelihood of financial restatement. We examine the relationship between supply chain audit and the likelihood of restatements after we control other factors contributing to financial restatement (i.e., firm accounting performance, firm characteristics, and corporate governance). Table 4 Panel A reveals *SCPA* and *INDEXP* negatively relate to the likelihood of restatements (*SCPA*=-0.2884 and *INDEXP*=-0.1528 respectively). However, the effects are not significant. The coefficient on the *SCPA* * *INDEXP* is not significant neither.

Similar to our discretionary accruals tests, we explore whether there is differential effects of hiring an incumbent audit firm vs. an incumbent auditor(s) on restatement likelihood. Table 4 Panel B shows hiring both lead and concurring auditors simultaneously increases the likelihood of restatement (SAU_1=8.0474, t=9.63) relatively to hiring different auditors within the same audit firm. However, hiring either the incumbent lead auditor (SAU_2 =-4.0707, t=-6.45) or concurring auditor (SAU_3 =-3.5432, t=-8.71) significantly reduces the likelihood of restatement relatively to hiring different auditors of the same audit firm. Interestingly, hiring either the lead or the concurring with switched job title (i.e., a lead auditor of a customer switched to a concurring auditor for its supplier) results in weak decrease in the likelihood of restatements (SAU=-0.1352, t=-0.33) relatively to hiring different auditors of the same audit firm. Our findings provide the intuition that committing the exact incumbent engagement team for a supplier and its major customers will hinder audit quality. Yet, keeping one member of the incumbent engagement team (either lead or concurring auditor) effectively reduces the likelihood of restatement. It sheds lights on how an audit firm should balance between an individual's engagement - specific expertise and his/her independence and objectiveness. Our findings have implications for whether the PCAOB's initiatives (e.g. mandatory audit rotation, engagement partner's signature) should be carried on at audit firm-level or individual auditor-level.

The control variables in our analyses generally have the expected relationship with the likelihood of restatement, and are consistent with what have been documented in the literature. For example, *GROWTH*, *MB*, *DUALITY* and *CONTROL* increase the likelihood of restatements; and *ROA*, *QUICK*, and *INDBOD* decrease the likelihood of restatements.

Table 4 Panel C reports the regression results after controlling the firms' production complexity. The coefficients of *SCPA* equal to -2.2946, -1.8320, and -0.1361 and t=-3.12, -1.62 and -0.39 respectively for the up, middle and down-stream suppliers. The results show that the supply chain audit plays a more pronounced role in reducing likelihood of restatement for the up-stream than for middle and down-stream firms. In sum, using the likelihood of restatement as an alternative audit quality measure, our findings qualitatively confirm those in our discretionary accruals sample.

CONCLUSION

Despite supply chain relationship plays a crucial role in today's capricious economy, and more and more suppliers and their customers choose to share a common audit firm or common auditor(s), we know little about how audit practice(s) might be influenced or respond to this phenomenon (Johnston et al.

2011). The recent audit failures divulging along the supply chain (e.g., Diamond Foods, Groupon) highlight the importance of understanding clients' strategic alliances for audit firms.

Using a unique data set from the electronic industry in Taiwan, where the dual sign-off requirement on the audit report is implemented (i.e., both the lead and concurring auditors need to sign off the audit report), we examine the effect of supply chain audit on the audit quality at both firm-level and individual auditor-level. We find supply chain audit by itself is not associated with high audit quality. However, supply chain audit, coupled with firm-level industry expertise, results in low discretionary accruals and weakly reduction in restatement probability. Further, we find sharing either an incumbent lead or concurring auditor decreases the likelihood of restatement, compared to keeping none of them. Conversely, keeping both the incumbent lead and concurring auditors increases the likelihood of the restatement. Moreover, our analyses suggest supply chain audit contributes more to audit quality for up than for middle and down - stream firms. Our findings suggest audit firms can enhance audit quality by keeping balance between firm – level and individual – level audit expertise. Further, our results indicate supply chain audit is more imperative for firms with more complex operations. We believe our study provide timely insights for the recent initiatives of PCAOB (2011) regarding mandatory audit rotation and engagement partner's signature.

ENDNOTES

- For example, prior studies identifying drivers contributing to audit quality include audit tenure, fee dependence (Reynolds and Francis 2000; Carey and Simnett 2006; Krishnan 1994; Johnson et al. 2002; Lennox 2005), audit firm size (Becker et al.1998;Francis et al. 1999; Francis and Yu 2009; Choi et al. 2010), engagement expertise (Reichelt and Wang 2010), and auditor gender (Chin and Chi 2008). In addition, research provides a direct link between low audit quality and low earnings quality of clients (Caramanis and Lennox 2008; Dechow et al. 2011; Gunny and Zhang 2012). Please refer to Francis (2011) for more details.
- 2. The logic behind this measure is audit firms with more clients in an industry will develop deeper expertise in that industry.
- 3. The likelihood of restatement also weakly reduces. One possible reason is SCA in combination with firm level expertise is more efficient in detecting accounting problems other than severe ones which would cause to restate. Another possible reason is we have 44 restating firms in our sample, which is consistent with reports in current literature that less than 2% of all financial statements would have a future restatement (Francis 2011). However, the small number of restatement could result in our tests lack of statistical power.
- 4. http:// pcaobus.org/rules/rulemaking/docket029/pcaob_release_2011-007.pdf.
- 5. http://pcaobus.org/Rules/Rulemaking/Pages/Docket034.aspx.
- 6. Article No. 2 of the Criteria Governing Approval for Auditing and Certification of Financial Reports of Public Companies by Certified Public Accountants (TSFB 1982, 1983) and Statement of Auditing Standards No. 33 "Auditor Report on Financial Statements" (Taiwan Accounting and Research Development Foundation 1999). Also see Chin and Chi (2009), and Chi and Chin (2011).
- 7. The statistics is provided by Taiwan Economic Journal, 2010.
- 8. Johnstone et al. (2011, p.7) express that in their sample, only 10.7 percent of suppliers and their major customer pairs are in the same industry. This implies majority "pairs" they use to examine supply chain audit quality could be facing various business incentives and operating environments, which could affect audit inputs and outputs (Francis 2011). To remove the innate requirements of business natures to audit quality, we cluster our analyses on one industry.
- 9. Major customers can affect supplier's revenue, expense, and cash flow cycles as well as their future growth (Baiman and Rajan 2002; Hertzel et al. 2008); suppliers can also influence customers' operating costs, sustainability, and capital structure (Gavirneni et al. 1999; Fee and Thomas 2004).
- 10. Our classification is based on the standards of the Future of the Electronic Industry published by Taiwan Changhong Inc. Up-stream firms include IC and PCB manufactures, designers, and testers. Middle-stream firms include memory cards, storages, screens, powers lines; and the down-stream firms include notebook, desktop, networks, and computer peripherals.

- 11. We also use alternative discretionary accruals measures (Kothari et al. 2005; Becker et al. 1998; Ashbaug et al. 2003; Leuz et al. 2003; Jaggi et al. 2006; Chi and Chin 2011) in our untabulated analyses, and our results generally remain the same.
- 12. We measure market share by accumulating clients' assets audited by an audit firm within an industry (Balsam et al. 2003; Krishnan 2003). We then rank audit firms by their market share and define that an audit firm has firm-level expertise if it has the largest market share of that industry.

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					SAME	PLE SELF	CTION	4						ł
PanelA : Sample select	tionrefi	nemen	J											
													Obs.	
Annual filing on the Ma	rket Obs	ervatic	on Post Sy	stem (200	02010)	-							5,617	
(without disclosures on th	ne main s	upplie	rs)										(3, 923)	
(without financial inform	nation)												(30)	
Sub-total (discretionary a	accrual sa	umple											1,664	
(without information on t	ooard str	ucture)											(721)	
(not belong to the affiliat Total (restatement sample	ions of t e)	he Big	4)										(82) 891	
Panel B : Yearly distribut	ution (D	iscret	ionary an	alysis saı	nple)									
year 200 supply chain	00	2001	2002	2003	5	004 2	005	2006	2007	2008	20	09 2(010	Total
UP 56	5	92	67	74	7	1 5	6	47	38	37	3(3	1	632
Middle 33		55	99	29	3	0	6	19	16	19	1	3 1	3	322
Down 74	1 1	37	128	67	9	1 5	69	49	37	35	32	2 3	1	710
Total 16:	3 2	94	291	170	16	52 1.	37	115	91	91	1. L	2 3	5	1,664
Percentage (%) 9.8	0 17	.67	17.49	10.22	.6	74 8.	23	6.91	5.47	5.47	4.5	1 4.	51	100
Panel C : Distribution o	of Big 4 (CPA fi	IINS ACFO	ss supply	chains	(Restate)	ment an	alysis sa	mple)					
Big 4 CPA 1 Supply chain	lim	Delo	itte & Tot	ic <mark>he</mark> c		Ernst & Yo	gung		KPMG			PwC		
Type of Big 4 CPA firm		Ъ	Middle	Down	UP	Middle	Down	UP	Middle	Down	СЪ	Middle	Down	Total
Supply chain auditor		55	17	31	12	6	15	29	5	33	L	12	18	
ne	IIIIICI	-	0/00-11)cn)	100	0/4.04/00		Colline of	(0/275-1)10	1940	905	(0/CI.+)/C	20.2	742
Non-supply chain auditor		74	51	132	40	25	35	62	39	69	48	26	47	
Su	mmer	2	57(28.84%	(100(11.22%	()		.70(19.08%	()	1	21(13.58%	(648
Subtotal		129	68	163	52	34	50	91	44	102	55	38	65	
Total		ŝ	60(40.40%	(1	136(15.27%	()		237(26.60%	()	1	58(17.73%	(891
%		14.48	7.63	18.29	5.84	3.82	5.61	10.21	4.94	11.45	6.17	4.26	7.30	

TARLE 1

APPENDIX

					DEACK	IC TATI DI	ALIBIICA					Ø
PanelA :	Compari	son amon	g up, mid	dle and down	1-stream fit	ms (Discret	tionary acci	ruals sampl	le)			
	Total	sample (n=	=1,664)	ď	-stream (n=6	(32)	Midd	lle-stream (n	i=322)	Dow	n-stream (n=	=710)
Variable ^a	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
DA	0.0046	0.0009	0.1385	0.0009	-0.0058	0.1250	0.0142	0.0140	0.1402	0.0037	-0.0005	0.1489
SCPA	0.2296	0.0000	0.4207	0.2690	0.0000	0.4438	0.1925	0.0000	0.3949	0.2113	0.0000	0.4085
INDEXP	0.2722	0.0000	0.4452	0.2706	0.0000	0.4446	0.2516	0.0000	0.4346	0.2831	0.0000	0.4508
GROWTH	0.2227	0.0990	1.0932	0.1849	0660.0	0.4795	0.3251	0.1177	1.9093	0.2099	0.0913	0.9705
ROA	0.0495	0.0567	0.1242	0.0534	0.0564	0.1385	0.0379	0.0560	0.1115	0.0512	0.0584	0.1158
SSOT	0.2320	0.0000	0.4222	0.2642	0.0000	0.4413	0.2391	0.0000	0.4272	0.2000	0.0000	0.4003
SIZE	14.6751	14.5047	1.2498	14.7984	14.5753	1.4106	14.8139	14.7484	1.2234	14.5024	14.3680	1.0784
LEV	0.0748	0.0400	0.0934	0.0822	0.0400	0.0999	0.0805	0.0400	0.0957	0.0656	0.0300	0.0852
Panel B :	supply ch	nain audit	vs. Non-s	upply chain ;	audit (Disci	retional acc	ruals sampl	le)				6
		5	Supply C	Shain Audit (n=	-382)		Non-Suppl	y Chain Aud	it (n=1,282)	- 10 - 10	Differen	ices ^b
Variable ^a		M	ean	Median	Std. Dev.		Mean	Median	Std. De	v.	t-test	Wilcoxon
DA		0.0	039	-0.0051	0.1323		0.0049	0.0026	0.1404	105	0.120	0.840
INDEXP		0.3	429	0.0000	0.4753		0.2512	0.0000	0.4339		-3.548***	-3.536***
GROWTH		0.2	223	0.1256	0.5699		0.2228	0.0909	1.2062		0.008	-1.341
ROA		0.0	1716	0.0663	0.1235		0.0429	0.0547	0.1237		-3.980***	-3.645***
LOSS		0.1	702	0.0000	0.3763		0.2504	0.0000	0.4334	Ŷ	3.270***	3.260***
SIZE		15.0	1147	14.8131	1.4178	1	4.5739	14.4301	1.1769		-6.117***	-5.173***
LEV		0.0	1618	0.0100	0.0923		0.0786	0.0400	0.0934	20	3.092***	4.408***
Panel C: 4	Corelatoi	n matrix	(Discretio	nary accrual	s sample) n	=1664						
Variable ^{a,c}		DA	S	CPA	INDEXP	GROWT	H	ROA	SSOT	SIZE	[2]	LEV
PA			9	.021	-0.022	0.283	3†	0.345†	-0.343†	-0.04	0	0.108†
SCPA		-0.003			0.087†	0.033	3	10.089†	+080.0-	0.12	17†	-0.108†
INDEXP		-0.013	0	1087		-0.022	2	10.069†	-0.067†	0.06	109	-0.051†
GROWTH		0.107	0	000	-0.040			0.440†	-0.344†	0.00	8	0.055†
ROA		0.389†	0	±260.	0.073†	0.12(14		-0.731	0.06	57†	-0.193†
SSOT		-0.326†	9	+080+	-0.067†	-0.063	3† -	-0.721†		-0.07	19,	0.135†
SIZE		-0.033	0	.148†	0.048†	-0.057	7†	0.082†	-0.052			0.234†
LEV		0.044	9	:076†	-0.034	0.035	- 6	-0.185†	0.159†	0.22	±01	

TABLE 2 DESCRIPTIVE STATISTICS

Panel D : Su	oply chain	audit (Re:	statement ss	unple)								
	Total	l sample (n=	=243)	Up-s	tream (n=1	03)	Midd	le-stream (n=43)	Down	n-stream (n	(16=1
Variableª	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
GROWTH	0.1640	0.1276	0.3774	0.1744	0.1555	0.3690	0.1946	0.0993	0.4987	0.1395	0.1063	0.3233
MB	2.0937	1.5800	1.6245	2.3676	1.6100	1.9947	1.3463	1.1700	0.5702	2.1342	1.7700	1.3965
ROA	0.1082	0.0841	0.0886	0.1263	0.0911	0.1053	0.0795	0.0791	0.0606	0.1016	0.0831	0.0750
LEV	0.0634	0.0100	0.0867	0.0660	0.0000	0.0902	0.0702	0.0300	0.0938	0.0576	0.0000	0.0800
QUICK	2.3837	1.6670	1.8856	3.0167	2.2673	2.3103	1.8791	1.4562	1.5090	1.9352	1.5655	1.2453
SIZE	15.3463	15.1640	1.4020	15.7301	15.7378	1.5490	14.9680	14.9265	1.3182	15.1065	15.1493	1.1683
INDBOD	0.1153	0.0000	0.1553	0.0983	0.0000	0.1499	0660.0	0.0000	0.1641	0.1421	0.0000	0.1550
BDSIZE	6.6214	7.0000	1.4731	6.6504	7.0000	1.3627	6.1860	6.0000	1.1803	6.7835	7.0000	1.6660
DUALITY	0.4691	0.0000	0.5000	0.3981	0.0000	0.4919	0.4651	0.0000	0.2547	0.5464	1.0000	0.5004
DEVIATION	0.0997	0.0412	0.1490	0.1063	0.0393	0.1554	0.1634	0.0524	0.2116	0.0644	0.0291	0.0874
CONTROL	0.5828	0.5556	0.1913	0.5938	0.5714	0.2057	0.5973	0.5714	0.2270	0.5647	0.5000	0.0076
Panel E: No.	n-supply cl	hain audit	(Restateme	ont sample)								
	Total	sample (n=	-648)	Up-st	tream (n=2	(24)	Middle	-stream (I	1=141)	Down	-stream (n	=283)
Variable ^a	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
GROWTH	0.1808	0.1202	0.3517	0.1753	0.1131	0.3477	0.1883	0.1571	0.3217	0.1815	0.1009	0.3697
MB	1.8238	1.5600	1.0969	2.0202	1.6700	1.2674	1.6995	1.4600	1.0344	1.7303	1.5600	0.9548
ROA	0.0847	0.0727	0.0737	0.0951	0.0785	0.0862	0.0755	0.0687	0.0661	0.0814	0.0713	0.0653
LEV	0.0771	0.0400	0.0920	0.0792	0.0400	0.0982	0.0860	0.0600	0.0901	0.0710	0.0300	0.0878
QUICK	1.9434	1.4281	1.5650	2.3691	1.6896	1.9260	1.7470	1.3241	1.1481	1.7044	1.3155	1.3455
SIZE	14.8911	14.7548	1.1014	14.9461	14.8780	1.1937	15.1713	15.0290	1.0733	14.7080	14.5134	1.0046
INDBOD	0.1131	0.0000	0.1559	0.1542	0.1548	0.1538	0.0665	0.0000	0.1300	1.1039	0.0000	0.1619
BDSIZE	6.2423	6.0000	1.7069	6.6295	7.0000	1.5622	5.9291	5.0000	1.5196	6.0919	5.0000	1.8485
DUALITY	0.3873	0.0000	0.4875	0.3750	0.0000	0.4852	0.5106	1.0000	0.5017	0.3357	0.0000	0.4731
DEVIATION	0.0545	0.0222	0.0788	0.0641	0.0294	0.0916	0.0622	0.0352	0.0845	0.0430	0.0174	0.0619
CONTROL	0.5405	0.5000	0.1821	0.5242	0.5000	0.1773	0.5715	0.5383	0.1575	0.5380	0.5000	0.1954

TABLE 2 (CONT.)

Variable ** RESTATE SCPA GROWTH MB ROA LEV RESTATE -0.024 -0.016 0.029 0.022 0.014 RCPA -0.075 0.035 0.036 0.054 -0.054	AULIU						
RESTATE -0.024 -0.016 0.029 0.022 0.014 SCP4 -0.075 0.038 0.0064 -0.055	SUCCA	SIZE	INDBOD	BDSIZE	DUALITY	DEVIATION	CONTROL
SCP24 -0.026 -0.026 -0.026 -0.055 -0.038 -0.0004 -0.0054	-0.039	0.056	-0.042	0.009	0.031	0.006	0.041
17770 17770 17770 17770 17770 17770	0.132†	0.166†	0.013	0.145†	0.074	0.147†	0.076†
GROWTH 0.047 -0.021 0.267† 0.367† 0.164†	-0.070	0.073†	-0.008	0.053	-0.078†	0.047	0.029
MB 0.025 0.095† 0.219† 0.668† -0.125†	0.274†	0.041	0.132†	0.1067	-0.085†	0.045	-0.090†
ROA 0.024 0.132† 0.313† 0.718† -0.174†	0.323†	0.093†	0.125†	0.112†	-0.111†	0.039	-0.047
LEV -0.004 -0.067† 0.136† -0.094† -0.153†	-0.213†	0.173†	-0.043	0.096†	-0.085†	-0.020	-0.03
QUICK -0.033 0.118† -0.132† 0.207† 0.260† -0.110†		-0.024	0.060†	0.066	0.036	0.053	-0.008
SIZE 0.094† 0.168† 0.063 0.036 0.070† 0.149†	-0.033		-0.145†	0.255†	-0.176†	0.040	0.291†
INDBOD -0.041 0.008 0.026 0.130† 0.146† -0.018	0.022	-0.140†		0.178†	0.031	-0.111†	-0.408†
BDSIZE 0.037 0.102† 0.030 0.076† 0.080† 0.111†	0.096†	0.293†	0.092†		-0.083†	0.132†	-0.040
DUALITY 0.031 0.074 -0.080 -0.080† -0.116† -0.071†	0.051	-0.189†	0.030	-0.107†		-0.050	-0.045
DEVIATION -0.015 0.192† 0.035 -0.034 0.028 -0.005	0.019	0.063†	-0.116†	0.109†	-0.003		0.228†
	0.060	0 301+	-0.411+	-0.033	-0.044	0.279†	

the total voting rights. ^b Asterisks *, **, *** indicate two-tailed significance at the 0.10, 0.05, and 0.01 levels, respectively. ^c Asterisks \dagger indicate two-tailed significance at the 0.05 level or better.

		(1)	((2)		(3)		Discretionary	accruals >0	Discretionary	accruals <0
Variable ^a	Pred. Sign	Coefficient	t-value ^b	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Intercept		0.0801	2.12**	0.0838	2.24**	0.0804	2.14**	0.2128	4.69***	-0.1586	4.15***
SCPA	¢.	-0.0058	-0.77			0.0050	0.52	0.0170	1.52	0.0073	0.84
INDEXP	I			-0.0030	-0.44	0.0060	0.74	0.0137	1.49*	0.0013	0.16
SCPA×INDEXP	L					-0.0333	-2.27**	-0.0446	-2.60***	-0.0258	-1.92**
GROWTH	+	0.0029	0.54	0.0028	0.53	0.0029	0.54	0.0127	2.23**	-0.0195	-1.22
ROA	+	0.3432	7.57***	0.3429	7.55***	0.3472	7.65***	0.1880	3.58***	0.2930	5.75***
SSOT	1	-0.0314	-3.18***	-0.0314	-3.17***	-0.0307	-3.09***	-0.0150	-1.41*	0.0063	0.61
SIZE	¢.,	-0.0077	-3.07***	-0.0080	-3.22***	-0.0077	-3.08***	-0.0117	-3.99***	0.0057	2.23**
LEV	+	0.1808	5.43***	0.1831	5.50***	0.1776	5.33***	0.0239	0.71	0.0637	1.66**
YEAR		Included		Included		Included		Included		Included	
Adj. R ²		22.66%		22.64%		22.88%		15.76%		20.58%	
F-statistic		24.27***		24.18***		21.81***		7.41***		7.00***	
Nobs.		1,664		1,664		1,664		836		828	

TABLE 3(CONT.) DISCRETIONARY ACCRUALS AND SUPPLY CHAIN AUDIT/INCUMBENT AUDITOR EFFECT

Panel B: Portfolio	of lead and concurri	ing supply cl	nain auditors		
Type ^a Type of CPA	(Lead, Concurring)	(Lead, -)	(-, Concurring)	(Lead or Concurring)	(-,-)
SCPA	29	56	46	115	267
Variable ^b	Pred. S	bign	Coefficien	t <i>t</i> -va	lue ^c
Intercept			0.0890	2.3	8**
SAU_1	?		-0.0384	-0.7	3
SAU_2	?		0.0108	0.3	1
SAU_3	?		-0.0013	-0.0	5
SAU	?		0.0174	1.0	2
GROWTH	+		0.0027	0.5	1
ROA	+		0.3426	7.4	7***
LOSS	—		-0.0311	-3.1	0***
SIZE	?		-0.0086	-3.4	6***
LEV	+		0.1844	5.6	0***
YEAR			Included		
Adj. R^2			22.75%		
F-statistic			20.71***	:	
Nobs.			1,664		

^a (Lead, Concurring) denotes that companies hired both lead and concurring supply chain auditors. (Lead, –) denotes that companies hired lead supply chain auditors. (–, Concurring) denotes that companies hired concurring supply chain auditors. (Lead or Concurring) denotes that companies hired the lead or concurring supply chain auditor. (–, –) denotes that companies hired a supply chain audit firm.

^b The definitions of the variables reported in this table are: $SAU_1 =$ dummy variable having a value of 1 if the observation hired both lead and concurring supply chain auditors; $SAU_2 =$ dummy variable having a value of 1 if the observation hired lead supply chain auditors; $SAU_2 =$ dummy variable having a value of 1 if the observation hired concurring supply chain auditors; SAU = dummy variable having a value of 1 if the observation hired concurring supply chain auditors; SAU = dummy variable having a value of 1 if the observation hired concurring supply chain auditors; SAU = dummy variable having a value of 1 if the observation hired the lead or concurring supply chain auditor; GROWTH = percentage growth in sales; ROA = net income before extraordinary items divided by total assets; LOSS = dummy variable having a value of 1 if the net income before extra is negative; LEV = total long-term liabilities divided by total assets; SIZE = natural logarithm of total assets; YEAR = fiscal year dummies.

^c Asterisks *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. One-tailed for directional expectations, two-tailed for others.

		Up-str	eam	Middle-s	stream	Down-s	tream
Variable ^a	Pred. Sign	Coefficient	<i>t</i> -value ^b	Coefficient	<i>t</i> -value	Coefficient	t-value
Intercept		0.0721	1.26	0.0948	1.02	0.0728	1.12
SCPA	6	0.0020	0.13	0.0349	1.86*	-0.0009	-0.06
NDEXP	1	0.0191	1.49*	0.0166	0.88	-0.0046	-0.38
SCPA×INDEXP	1	-0.0651	-2.94***	-0.0595	-1.94**	0.0183	0.76
GROWTH	+	0.0047	0.25	0.0130	4.28***	-0.0112	-0.93
FOX	+	0.3404	5.30***	0.4861	5.44***	0.3536	4.58***
SSO	Ĩ	-0.0114	-0.83	-0.0438	-2.12**	-0.0387	-2.15**
SIZE	c.	-0.0088	-2.35***	-0.0102	-1.60	-0.0054	-1.24
LEV	+	0.1444	2.52***	0.1382	2.16**	0.1942	3.75***
YEAR		Included		Included		Included	
Adj. R ²		23.78%		38.47%		21.81%	
^q -statistic		8.35***		11.05***		9.32***	
Nobs.		632		322		710	
The definitions of the variables r observation belongs to industry s 1 if the net income before extrai Activities ** ***indicate sitrai	reported in this table a specialization audit, C is negative; <i>LEV</i> = tot	ure: <i>SCPA</i> = dummy vari <i>7ROWTH</i> = percentage { al long-term liabilities d	lable having a value of 1 powth in sales; <i>ROA</i> = 1 ivided by total assets; <i>Si</i>	l if the observation belong: net income before extraordi <i>IZE</i> = natural logarithm of t	s to supply chain audit, <i>i</i> nary items divided by to otal assets; <i>YEAR</i> = fisc	<i>INDEXP</i> = dummy variable vtal assets; <i>LOSS</i> = dummy al year dummies.	: having a value of 1 if t variable having a value (
1 if the net income before extra Asterisks *, **, *** indicate sig	is negative; <i>LEV</i> =tot mificance at the 0.10,	al long-term liabilities d 0.05, and 0.01 levels, re:	ivided by total assets; S. spectively. One-tailed fo	<i>IZE</i> = natural logarithm of 1 or directional expectations,	total assets; YEAh two-tailed for oth	R = fisc lers.	A = fiscal year dummies. lers.

TABLE 3 (CONT.)

		(1	())	2)	0	3)
Variable ^a	Pred. Sign	Coefficient	z-value ^b	Coefficient	z-value	Coefficient	z-value
Intercept		-5.9030	-5.42***	-5.6161	-5.23***	-6.0031	-5.40***
SCPA	ż	-0.2884	-1.22			-0.2096	-0.75
INDEXP	L			-0.1528	-0.77	-0.0760	-0.35
SCPA×INDEXP	I					-0.2697	-0.62
GROWTH	+	0.3418	1.44*	0.3313	1.41*	0.3602	1.50*
MB	+	0.0963	0.92	0.0887	0.86	0.0925	0.87
ROA)	0.1732	0.09	0.1507	0.08	0.3410	0.18
LEV	+	-0.6692	-0.57	-0.7161	-0.63	-0.8334	-0.74
QUICK	1	-0.0691	-0.82	-0.0843	-0.98	-0.0699	-0.82
SIZE	ċ	0.1989	2.41***	0.1854	2.32***	0.2065	2.53***
INDBOD	1	-0.4302	-0.51	-0.4732	-0.55	-0.3918	-0.46
BDSIZE	ľ.	0.0179	0.29	0.0161	0.26	0.0211	0.34
DUALITY	+	0.3069	1.68**	0.2782	1.58*	0.3104	1.71**
DEVIATION	+	-0.1442	-0.16	-0.4765	-0.52	-0.2858	-0.31
CONTROL	+	-0.0016	-0.00	0.0230	0.04	-0.0108	-0.02
YEAR		Included		Included		Included	
Wald Test,F(p-value)		41.90(0.00)		48.62(0.00)		54.59(0.00)	
Pseudo R ²		13.55%		13.11%		13.87%	
Nobs.		891		891		891	
^a The definitions of the varia: observation belongs to indu assets; <i>LEV</i> = total long-te independent directors on thu <i>DEVLATION</i> = voting rights	bles reported in this tabl ustry specialization audit run liabilities divided b e board divided by the to s minus cash flow rights	e are: SCPA = dummy ; GGROWTH = percents y total assets; QUICK tal board size; BDSIZE ; CONTROL = the votin	variable having a value of age growth in sales; $MB =$ = current assets (less inv = the number of the board grights of the ultimate ow	 if the observation belong market-to-book value of eq entories) divided by curren members; <i>DUALITY</i> = dum ner divided by the total voti. 	s to supply chain audit, $I\Lambda$ nity at year-end; ROA = ne t liabilities; $SIZE$ = nature my variable having the val agrights; $YEAR$ = fiscal ye	DEXP = dummy variable has t income before extraordinar ul logarithm of total assets; ue of 1 if the chairman of the ar dummies.	ving a value of 1 if the γ items divided by total INDBOD = number of board is also the CEO;
^b Asterisks *, **, *** indicat	e significance at the 0.10	, 0.05, and 0.01 levels, 1	respectively. One-tailed for	r directional expectations, tw	o-tailed for others.		

TABLE 4

	TABLE 4 (CONT.)
RESTATEMENT AND SUPPLY	CHAIN AUDIT/INCUMBENT AUDITOR EFFECT

Panel B: Portfolio of	f lead and concurr	ing supply c	hain auditors		
Type ^a Type of CPA	(Lead, Concurring)	(Lead, -)	(-, Concurring)	(Lead or Concurring)	(-,-)
SCPA	18	33	30	75	168
Variable ^b	Pred	. Sign	Coefficient	z-value	e c
Intercept			-5.7661	-5.23**	*
SAU_1		?	8.0474	9.63**	*
SAU_2		?	-4.0707	-6.45**	*
SAU_3		?	-3.5432	-8.71**	*
SAU		?	-0.1352	-0.33	
GROWTH		+	0.3755	1.61*	
MB		+	0.0940	0.88	
ROA			-0.1180	-0.06	
LEV		+	-0.5671	-0.49	
QUICK		_	-0.0773	-0.85	
SIZE		?	0.1901	2.30**	
INDBOD			-0.5243	-0.60	
BDSIZE		_	0.0143	0.23	
DUALITY		+	0.2811	1.55*	
DEVIATION		+	-0.2713	-0.32	
CONTROL		+	0.0590	0.10	
YEAR			Included		
Wald Test, F(p-val	ue)		971.29(0.00)		
Pseudo R ²			13.97%		
Nobs.			891		

^a (Lead, Concurring) denotes that companies hired both lead and concurring supply chain auditors. (Lead, –) denotes that companies hired lead supply chain auditors. (–, Concurring) denotes that companies hired concurring supply chain auditors. (Lead or Concurring) denotes that companies hired the lead or concurring supply chain auditor. (–, –) denotes that companies hired a supply chain audit firm.

^b The definitions of the variables reported in this table are: $SAU_1 =$ dummy variable having a value of 1 if the observation hired both lead and concurring supply chain auditors; $SAU_2 =$ dummy variable having a value of 1 if the observation hired lead supply chain auditors; $SAU_3 =$ dummy variable having a value of 1 if the observation hired concurring supply chain auditors; SAU = dummy variable having a value of 1 if the observation hired concurring supply chain auditors; SAU = dummy variable having a value of 1 if the observation hired concurring supply chain auditors; SAU = dummy variable having a value of 1 if the observation hired concurring supply chain auditors; SAU = dummy variable having a value of 1 if the observation hired the lead or concurring supply chain auditor; GROWTH = percentage growth in sales; MB = market-to-book value of equity at year-end; ROA = net income before extraordinary items divided by total assets; LEV = total long-term liabilities divided by total assets; QUICK = current assets (less inventories) divided by current liabilities; SIZE = natural logarithm of total assets; INDBOD = number of independent directors on the board divided by the total board size; BDSIZE = the number of the board members; DUALITY = dummy variable having the value of 1 if the chairman of the board is also the CEO; DEVIATION = voting rights minus cash flow rights; CONTROL = the voting rights of the ultimate owner divided by the total voting rights; YEAR = fiscal year dummies.

^c Asterisks *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. One-tailed for directional expectations, two-tailed for others.

		Total sa	mple	Up-str.	eam	Middle-:	stream	Down-st	tream
Variable ^a	Pred. Sign	Coefficient	z-value ^b	Coefficient	z-value	Coefficient	z-value	Coefficient	z-value
Intercept		-5.9030	-5.42***	-4.7773	-1.88**	-61.3695	-3.42***	-14.5675	-4.46***
SCPA	1	-0.2884	-1.22	-2.2946	-3.12***	-1.8320	-1.62*	-0.1361	-0.39
GROWTH	+	0.3418	1.44*	2.0392	3.38***	-4.8034	-2.65***	-1.4933	-2.06**
MB	+	0.0963	0.92	-0.4454	-2.29**	-1.6277	-2.44***	0.7985	3.69***
ROA	I	0.1732	0.09	5.5638	2.33***	1.3007	0.14	-10.1739	-2.12**
LEV	+	-0.6692	-0.57	-8.7787	-1.58*	-12.4398	-1.70**	1.8324	1.08
QUICK	I	-0.0691	-0.82	-0.4139	-2.23**	-1.6057	-1.33*	0.0825	0.64
SIZE	ė	0.1989	2.41**	0.4035	1.58	4.0087	3.42***	0.6905	3.16***
INDBOD	1	-0.4302	-0.51	0.4120	0.24	5.8828	1.28*	-2.5249	-1.33*
BDSIZE	I	0.0179	0.29	-0.4600	-2.91***	-0.8282	-1.57*	0.1140	1.51*
DUALITY	+	0.3069	1.68**	0.0334	0.12	6.1315	2.92***	0.7415	1.80**
DEVIATION	÷	-0.1442	-0.16	2.3693	1.41*	-3.2421	-0.46	3.4626	1.85**
CONTROL	+	-0.0016	-0.00	0.0306	0.02	-2.2612	-0.89	-1.7556	-1.81**
YEAR		Included		Included		Included		Included	
Wald Test, F(p-valu	e)	41.90(0.00)		56.22(0.00)		26.59(0.01)		51.84(0.00)	
Pseudo R ²		13.55%		41.96%		63.68%		41.55%	
Nobs.		891		327		184		380	

TABLE 4 (CONT.)

the board members; *DUALITY* = dummy variable having the value of 1 if the chairman of the board is also the CEO; *DEVIATION* = voting rights minus cash flow rights; *CONTROL* = the voting rights of the ultimate owner divided by the total voting rights; *YEAR* = fiscal year dummies. ^b Asterisks *, ***, **** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. One-tailed for directional expectations, two-tailed for others.

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