The impact of information complexity on audit failures from corporate fraud: Individual auditor level analysis

Yu-Shun Hung[*], Yu-Chen Cheng

Department of Accounting, Fu Jen Catholic University, Taiwan, ROC

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ABSTRACT

This study examines the association between related-party transactions, level of diversification and auditor sanctions arising from corporate fraud. Sample firms are manually collected from the list of auditor partners sanctioned due to corporate fraud published according to the Securities and Exchange Act and the Certified Public Accountants Act in Taiwan between 1992 and 2010. Empirical results indicate that the increasing complexity of corporate information with increasing aggregate monetary values of related-party transactions, especially revenue-based related-party transactions (RPTs), increases the probability of auditor sanctions. Moreover, more complex product diversification raises the likelihood of auditor sanctions. These results support the information asymmetry hypothesis, namely that increasing complexity of corporate information reduces the transparency of information, and thus raises information asymmetry between managers and auditors, resulting in higher audit risk. This investigation suggests that auditors should pay proper attention to providing professional audit work when a company has complex related-party transactions and product diversification. Analytical results could provide research-based evidence for the PCAOB to consider when formulating policy on the auditing of related party transactions (PCAOB, 2014) and the disclosure of engagement partners (PCAOB, 2011).

1. Introduction

The use of related-party transactions (hereafter, RPTs) to conceal large debts exploded after Enron in 2001, generating further scandals involving false accounting from companies such World-Com and Merck. Investors around the world began to question the financial information publicized by corporations and to think that it may contain many implicit problems, such related-party transactions, corporate management practices and poor accounting standards. Taiwan had the high-profile Rebar Group scandal, as well as a scandal involving a dozen photoelectric material manufacturers. These problems become more conspicuous as Taiwanese enterprises internationalize and become more diversified in businesses.

As the global economy grows, reinvestments and business diversity have led to over-investment, which causes complications with information sources. In particular, the intertwined connections of parent-subsidiary companies can become complicated for auditing. Consequently, engagement in investments, financing and other economic activities relies on the authenticity of corporate financial reports. Meanwhile, CPAs play a major role in these new practices, and they assume legal responsibility for financial statement certifications. Blazenko and Scott (1986) argued that a CPA acts as an overseer who can reduce information asymmetry between competent authorities and investors, and helps to promote the accountability of corporate financial reports for stakeholders. In these circumstances, CPAs are responsible for auditing reviews that must be appropriately expressed and with full disclosure, or they face lawsuits or penalties.

Previous academic research on the complexity of related-party transactions and business diversification has mainly focused on the value and business strategies of a company (Dahya, Dimitrov, & McConnell, 2008; Atanasov, Black, Ciccotello, & Gyoshev, 2010; Qian, Khoury, Peng, & Qian, 2010; İbrahim Anıl & Canel, 2013). However, little research has discussed the role of auditors. Those corporate scandals exposed CPAs to risk from lawsuits and

* Corresponding author. 216 Loyola Building, No.510, Zhongzheng Rd., Xinzhuang Dist., New Taipei City 242, Taiwan, ROC.
E-mail address: hung@mail.fju.edu.tw (Y.-S. Hung).
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penalties. For instance, even Arthur Andersen, an accounting firm, was brought down and forced to close, dragging many CPAs into related lawsuits and penalties. Overall, corporate scandals are easily connected with information complexity, such as related-party transactions (Henry, Gordon, Reed, & Louwers, 2012; Bennouri, Nekhili, & Touron, 2015). This is where a CPA plays a critical role. Thus, this research seeks to identify the relationship between the complexity of corporate business diversification and related-party transactions, and the penalties on CPAs resulting from corporate fraud.

Additionally, previous literature on audit failures mainly discussed the impact on audit conservatism (Cahan & Zhang, 2006; Krishnan, 2007; Krishnan, Raghunandan, & Yang, 2007) or on clients' stock prices (Callen & Morel, 2002; Chaney & Philipich, 2002; Asthana, Balsam, & Krishnan, 2003) with a focus on the relevant U.S. litigation environment. Those studies used accounting firms as the study objects, which were largely due to the accounting certification system and related legal acts that impose penalties on CPAs for audit failures. The accounting certification system in Taiwan requires accounting firms and CPAs to disclose their names on the audit reports, while the U.S. only requires the accounting firm name. In addition, a CPA faces a different audit risk environment in the U.S. from Taiwan. In the U.S., the auditor faces higher litigation risks in auditing procedures (Lee & Mande, 2003), while the audit partner in Taiwan with an audit failure mainly faces administrative punishment from supervisory authorities. The prior research did not seek to correlate corporate fraud-related audit failures with corporate information complexity. From this perspective, CPAs in different countries face different litigation-risk environments and different requirements for certification signatures. This work explores these factors for corporate information complexity, such as related-party transactions and business diversification, and investigates whether these complexity factors raise the audit risk leading to corporate fraud-related audit failures on individual auditors.

This investigation found that audit partners are more prone to corporate fraud-related audit failures with larger related-party transactions, particularly those that are revenue-based. This may be because the high monetary value of related-party transactions motivates corporations to hide them through delayed payments or unauthentic transaction records, by exploiting the accounting uncertainty linked with the definition and reporting of RPTs (Bennouri et al., 2015). They thus increase the information asymmetry, causing audit failures from corporate information concealment. Consequently, CPAs may be misled into signing an "unqualified opinion", increasing their chances of penalization. Moreover, this study also found that CPAs are prone to fraud-related audit failures owing to higher levels of business diversification. From the perspective of agency theory, this work speculates that higher business diversification creates higher operational uncertainty and complexity, which can further increase information asymmetry, thus raising audit risk and putting CPAs at risk. Additionally, this investigation concludes that audit partners who belong to Big 4 audit firms, and have long audit tenure and high industry expertise, have low likelihood of audit failures.

This study makes the following contributions. First, in contrast to the U.S., CPAs in emerging economies face less litigation risk due to lower investor protection, and, especially in Taiwan, the punishment is mainly administrative penalties imposed on individual CPAs by competent authorities. This research mainly discusses individual CPA audit failures due to corporate frauds; the accompanying punishment imposed by supervisory authorities, and the correlation between audit failure and corporate information complexity. Chen, Sun, and Wu (2010) noted that CPA certification behavior might be different from an accounting firm's decision

making as a whole. Therefore, this work provides a better understanding of audit failures by individual CPAs than previous investigations on accounting firms.

Second, this study is the first to explore corporate fraud-related audit failure by individual CPAs, as well as its correlation with corporate information complexity. Previous research on audit failures (based on accounting firms) mostly discussed the association with audit quality/conservatism (Cahan & Zhang, 2006; Krishnan, 2007; Krishnan et al., 2007), and impact on client stock prices (Krishnamurthy, Zhou, & Zhou, 2002; Barbera & Martinez, 2006; Brito & Peres, 2006; Dee, Lulseged, & Zhang, 2011). However, this investigation gathers corporate information complexity and corporate fraud to analyze the causes of audit failures by individual CPAs.

Third, this work fills in the knowledge gap in the literature on corporate information transparency. The academic literature on related-party transactions/diversification mainly discussed the impact on firm performance (Dahya et al., 2008; Kohlbeck & Mayhew, 2010; Qian et al., 2010; İbrahim Anıl & Canel, 2013) and earnings quality (Jian & Wong, 2010; Chen, Cheng, & Xiao, 2011). However, few studies have discussed the role of auditors; of these, most consider it from the perspective of auditor choice (Francis, Richard, & Vanstraelen, 2009; Liu & Lai, 2012; Bennouri et al., 2015) or audit fee (Habib, Jiang, & Zhou, 2015). The influence of corporate information complexity on audit failure risks, even on investor capital risks, can be better comprehended through the study of related-party transactions and business diversification.

Finally, the research results can help competent authorities understand corporate information complexity and its impact on interested parties, CPAs and investors. Meanwhile, this research can provide academic evidence for the Public Company Accounting Oversight Board (PCAOB) regarding the auditing of related-party transactions (PCAOB, 2014) and the disclosure of audit partners (PCAOB, 2011).

Section 1 outlines the motivations of this study, as well as its main findings. The rest of this paper is structured as follows. Section 2 reviews the literature on which the hypotheses are based. Section 3 outlines the sample selection procedure and research methodology. Sections 4 and 5 analyze the empirical results. Section 6 summarizes our conclusions.

2. Literature review and hypotheses development

2.1. Signature requirements of audit partners

Taiwanese regulations have required dual CPA signatures in audit reports since 1983, specifically from both the engagement and review partners. Additionally, the U.K. and other EU countries (such as France, Germany, Luxembourg and the Netherlands) gradually require the engagement partner to sign the audit report. In the U.S., the Public Company Accounting Oversight Board (PCAOB) has issued a recommendation requiring disclosure of the name of the engagement partner in the report, but with no requirement that they personally sign the report (PCAOB, 2011). The Board trusts that mere public disclosure of the name of the engagement partner in the report is adequate to increase accountability and transparency, similar to requiring a partner to sign an audit report (PCAOB, 2011). This study provides research-based evidence for the Board to consider in formulating policy on the identification of audit partners.

2.2. Related-party transactions

The International Accounting Standards No. 24 (IASB, 2009)

defined a related party as a person or entity that is related to the entity that is preparing its financial statements (referred to as the 'reporting entity'). Furthermore, a related-party transaction is defined as a transfer of resources, services or obligations between related parties, regardless of whether a price is charged. The PCAOB in 2014 adopted Auditing Standard No. 18, *Related Parties*, requiring auditors to evaluate transactions and relationships between a firm and its related parties; and especially, to consider any omission as a major fraud risk.[1]

Similarly, prior literature such as Hinton (1989) specified the criterion of the identification of related parties as "having the power to control or significantly influence decision making" in the British Accounting Standard Committee Exposure Draft 46 'Disclosure of Related Party Transactions'. Additionally, the draft describes the major regulations of the disclosure of related party transactions, including the responsibility of companies for the disclosure of conventional and nonconventional transactions distinguishably, and the disclosure of the economically dependent parties, such as customers and suppliers.

Previous related studies focused on the effect on the stock market of related party transactions, such as Rozeff and Zaman (1988), revealed that related-party transactions could not only let corporate insiders earn profits, but also let external investors make use of the public information of such transactions to gain excess returns. Similarly, Lakonishok and Lee (2001) contended that in contrast to the practices taken by general investors, who tend to buy high and sell low, internally related parties have timing benefits in dealing with the stocks of their own companies.

Current studies on related-party transactions are mostly focused on the correlation of the transactions with firm value or operating performances. Notably, most of the findings indicate that such transactions lower firm value (Atanasov et al., 2010; Dahya et al., 2008; Kohlbeck & Mayhew, 2010), and bring poor corporate performance and the increasing probability of financial distress (Ryngaert & Thomas, 2012). Additionally, some studies investigated related-party transactions as a tool of earnings management (Chen et al., 2011; Jian & Wong, 2010).

Specifically, Jian and Wong (2010) examined listed companies in China in 1998–2002, and concluded that a controlling company can inflate its earnings through related-party transactions to make false sales to other companies controlled by shareholders, particularly when the controlled company is a state-owned enterprise or in a low economic development area. Chen et al. (2011) explored the 257 A-share and B-share listed companies in China that launched IPOs in 1999–2000. They discovered that these companies went through shareholder structures to engage in related-party transactions to inflate their performance before IPO, and their related-party transactions became less frequent afterwards. Their actions reduced their subsequent long-term performance, ultimately depressing stock prices.

As for auditing research on related-party transactions, Howard and Taylor (1990) found that the Montana Society of CPAs promulgated five common errors in financial statements to remind auditors, including improper disclosures and possible omission errors of related-party transactions. Gordon, Henry, Louwers, and Reed (2007) performed a literature overview on auditing related-party transactions and concluded that an important reason for audit failures would be related-party transactions. Similarly, Louwers, Henry, Reed, and Gordon (2008) categorized 43 SEC enforcement actions against auditors, and concluded that a lack of professional skepticism and due professional care from auditors are important reasons for audit failures related to accounting fraud involving related-party transactions.

Bennouri et al. (2015) recently examined 85 French sample firms during 2002–2008, and found that clients audited by Big 4 auditors disclosed fewer related-party transactions, *i.e.* a negative relationship between Big 4 auditors and related-party transactions, but this negative relationship was weaker during a more transparent reporting period after 2005 with the adoption of IFRS standards. Habib et al. (2015) found a positive association between related-party transactions and audit fees in China, which supports the inference that related-party transactions increase audit risk.

2.3. Business diversification

Although previous studies provided various definitions of business diversification, they considered the separation of products or markets as an established rule. Gort (1962) defined the diversification as "output heterogeneity", and argued that two different products were servicing different markets, and that the cross elasticity of demand was low in that the resources of one product for short-term usage could not be transferred to the other product. Berry (1975) argued that diversification was a result of increasing contact by businesses with other industries. Pitts and Hopkins (1982) took businesses to replace industries, and defined diversification as the level of simultaneously running multiple businesses by an enterprise. Ramanujam and Varadarajan (1989) provided a rigorous definition of business diversification, based on past research: "An enterprise or a business entity, whether by going through internal development or external mergers, enters a new business domain, leading to the changes of its administrative structure, systems, or other management procedures".

Research on diversification has thus far been more focused on the correlation of diversification strategies with operational performance or corporate values (Qian et al., 2010; İbrahim Anıl & Canel, 2013). However, prior research did not reach a consensus on the correlation between product diversification and business performance (Hoskisson & Hitt, 1990; Ramanujan & Varadarajan, 1989).

Lang and Stulz (1994) indicated that companies with business diversification had lower performance than the ones without, having 13–15% lower corporate values in average; additionally, they found no evidence showing that diversification generated more corporate intangible assets. Berger and Ofek (1995) further identified excess investment as the reason why diversified companies had low corporate values.

Jiraporn, Kim, and Mathur (2008) explored the effect of industrial and geographic business diversification on earnings

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[1] Auditing Standard No. 18, *Related Parties*, aims to strengthen auditor performance requirements for identifying, assessing and responding to the risks of material mis-statement associated with a company's relationships and transactions with its related parties. The standard requires the auditor to: (1) perform specific procedures to obtain an understanding of the company's relationships and transactions with its related parties; (2) assess whether the company has properly identified its related parties and relationships and transactions with its related parties; (3) perform specific procedures if the auditor identifies a previously undisclosed related party or relationship or transaction with a related party to the auditor exists; (4) perform specific procedures for each related party transaction that is either required to be disclosed in the financial statements or determined to be a significant risk; (5) communicate to the audit committee the auditor's evaluation of the company's identification of, accounting for, and disclosure of its relationships and transactions with related parties.

management, and found that industrial diversification reduced corporate earnings management, supporting the offsetting accruals hypothesis.[2] Furthermore, a company that simultaneously engages in industrial and global diversification has very low earnings management, while pure global diversification had no impact on earnings management.

Businesses are increasingly utilizing product diversification as an option for strategy planning (Rumelt, 1974). Product diversification can bring a company many benefits, such as lower earnings volatility (Lewellen, 1971), distribution of corporate investment risks (Chatterjee & Lubatkin, 1990), making economies of scope by using existing resources to enter new businesses, and increased remaining resource usage (Reed & Luffman, 1986). However, such diversification can also lead to additional costs, including organizational communication and coordination, misallocation of resources (Rajan, Servaes, & Zingales, 2000; Scharfstein & Stein, 2000), and greater transaction costs (Hitt & Smart, 1994).

Based on the perspective of agency theory, the complicated organizational structures resulting from business diversification can raise the operational uncertainty, communication costs and coordination among departments, resulting in information asymmetry between shareholders and corporate managers (Myerson, 1982; Harris, Kriebel, & Raviv, 1982) to increase agency costs. Because business diversification can bring many benefits to managers, such as greater manager compensation which is strongly correlated with the corporate scale, managers endeavor to expand the corporate scale through business diversification to gain more rights and higher compensation (Jensen, 1986; Stulz, 1990; Jensen & Murphy, 1990; Denis, Denis, & Sarin, 1997). Managers can also take the diversification approach to reduce their own risks and increase their personal value in the job market.

Although managers can straightforwardly maximize their own benefits under information asymmetry through diversified investments, they may sacrifice the company's goal for maximized corporate benefits (Denis et al., 1997; Stulz, 1990). Williamson (1975) and Stein (1997) noted that the existence of information asymmetry and agency costs increases external capital costs for businesses or conglomerates. Similarly, Harris et al. (1982) concluded that diversified organizations were more complex than single-business companies, and therefore could more easily hit information asymmetry between managers of the main business departments and subsidiary departments, lowering efficiency of resources distribution in the business operations, and in turn increasing the management costs.

In summary, the impact of business diversification on corporate values is not conclusive yet. Some academics argue that diversification can increase corporate value and possibly reduce earnings management, while others believe that such diversification can impair corporate values. Although diversification has many benefits, such as economies of scope and higher resource utilization, it also has disadvantages including misallocated resources and costs of organizational communication and coordination. Additionally, agency theory suggests that diversification can increase the complexity of a company, thus causing information asymmetry.

Furthermore, auditing research on the link between auditor choice and organizational complexity indicates a positive link between them. Francis et al. (2009) demonstrated that businesses with diversified ownership structures, were inclined to hire Big 4 auditors. Similarly, Liu and Lai (2012) found that based on agency theory, diversified clients hiring Big N auditors could decrease information asymmetry between managers and investors. However, Choi, Kim, Qiu, and Zang (2012) indicated that auditors could improve accrual-based earnings quality only for less diversified clients.

2.4. Audit failure

Previous literature on audit failure mainly discussed the association with audit quality and the characteristics of audited clients. Palmrose (1988) examined auditing and certification quality based on audit failures and lawsuits, and concluded that non-Big 8 accounting firms had higher lawsuit ratios than the Big 8 accounting firms, thus confirming that the top 8 and non-top 8 firms have a differentiation in quality. The Big 8 firms are providers of high quality audit services, based on the assumption that high quality auditing involves fewer audit-related lawsuits. Knapp (1991) revealed that the evaluations on audit quality by audit committee members could be affected by the accounting firm's size and the auditor's tenure.

Regarding the characteristics of audited clients, Stice (1991) applied a paired-samples approach to study the correlation of the client and CPA characteristics that correlated with audit lawsuits, and identified these as corporate financial status, asset structure and market values. Moreover, audited clients involved in lawsuits had higher ratios of accounts receivable to total assets, and of inventory to total assets. Lys and Watts (1994) adopted paired samples to examine the characteristics of the audited client and auditor, and found that a CPA had the highest possibility of a lawsuit when giving qualified opinion for a company with a bigger size, financial difficulties and low stock prices, or when using non-structural audit methods or when the audited client was of high importance (i.e. the audit fees were a large portion of the total CPA fees). Their research inferred that unauthentic financial statements and audit failure were strongly correlated with lawsuit factors.

Similarly, Carcello and Palmrose (1994) also employed paired samples, and found that bankruptcy and lawsuits were significantly correlated, and that modified audit reports could reduce the possibility of lawsuits. In addition, they found that modified audit reports issued before bankruptcy could reduce the rate and level of lawsuits filed after bankruptcy. Moreland (1995) revealed that investors had negative impressions of a client audited by an accounting firm that was punished by the SEC as they would question its certified earnings statements, reducing the company's earnings response coefficient. Schwartz (1997) argued that the responsibility for indemnification offered CPAs motivation to treat their work seriously and provided investors with "insurance". However, such an arrangement could encourage investors to over-invest in risky assets. This proved that a CPA's legal responsibility could stimulate CPAs to exert their best endeavor, in turn raising the audit quality and inducing investors to an optimal investment level.

Current research on CPA punishment is mostly focused on the influence of punishment on stock prices or the market reactions for certified clients (Barbera & Martinez, 2006; Brito & Peres, 2006; Dee et al., 2011; Krishnamurthy et al., 2002), or a correlation between CPA punishment and audit quality/conservatism (Cahan & Zhang, 2006; Krishnan, 2007; Krishnan et al., 2007). Chaney and Philipich (2002) indicated that Arthur Andersen's other audit clients suffered abnormal stock returns after Andersen admitted destroying important Enron documents, revealing that uncertainty regarding the audit quality offered by Arthur Andersen hurried a fall in client stock prices. Moreover, Brito and Peres (2006)

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[2] Jiraporn et al. (2008) presented a two-aspect hypothesis as follows: 1. an assumption on information asymmetry that suggests that diversification could raise organizational complexity, implying that business diversification and earnings management are positively correlated; 2. an offsetting accruals hypothesis indicates that the accrued cash flows out of different regions or departments are not highly correlated, and making earnings management difficult as the cash flows would offset one another, leading to an estimated negative correlation between business diversification and earnings management.

indicated that the stock prices of Andersen clients were negatively influenced, while those of clients of the other Big 4 firms displayed no significant impacts. However, Barbera and Martinez (2006) found no significantly negative influence on the stock prices of listed firms in Spain that had been audited by Andersen.

As for the impact of auditor switching, Krishnamurthy et al. (2002) found that clients audited by Andersen revealed a more negative market reaction than clients of other Big 4 audit firms when the news broke that Andersen would face charges. Their clients announcing their motives to switch to another Big 4 firm enjoyed higher stock returns than those who switched to a non-Big 4 firm because abnormal corporate returns increase when investors believe its auditor is strongly independent. Similarly, Asthana et al. (2003) showed that the stock prices of Andersen clients suffered significant losses, the extent of which was related to the services Andersen provided, and the stock prices of clients audited by other Big 5 audit firms also fell. While the stock prices of Andersen clients appreciated when they announced their motive to change auditors, switching to auditors by non-Anderson clients had no effect on stock price.

As for audit conservatism, Cahan and Zhang (2006) observed abnormal accrual changes by Arthur Andersen clients from an accounting firm perspective to explore succeeding CPA audit conservatism toward client earnings management. They discovered that in conditions that other lawsuit risk factors were controlled, the Arthur Andersen client's 2002 discretionary accruals were significantly less than for 2001 in comparison with the clients of the other Big 4 accounting firms. Their finding indicated that succeeding CPAs for the Arthur Andersen clients relative to other Big 4 auditors took a more conservative attitude in the accrual threshold. Krishnan (2007) reached a similar result. Additionally, Krishnan et al. (2007) found that succeeding CPAs tended to issue qualified audit opinions on business continuation for large-scale clients who were previously certified by Arthur Andersen, further demonstrating that the succeeding CPAs practiced certification conservatism on these large-scale clients concerned with higher lawsuit risks.

2.5. Hypotheses development

The existent literature shows that related-party transactions can raise corporate information complexity (Lakonishok & Lee, 2001) and reduce information transparency, thus increasing investor risk in reliance on corporate information for investment. Additionally, based on agency theory, managers can easily make unconventional behavioral decisions that benefit themselves and may implicitly harm the company. Moreover, many empirical studies support the theory that a company can perform related-party transactions to inflate its earnings (Jian & Wong, 2010), but that it will hurt performance in the long term (Chen et al., 2011; Ryngaert & Thomas, 2012). Conversely, efficiency-enhancing theory argues that related-party transactions can be employed to decrease transaction costs between firms and outsiders, and to optimize internal resource allocation (Habib et al., 2015; Khanna & Palepu, 2000).

Auditing Standard No. 18 requires auditors to regard any omission of related-party transactions as a potentially serious fraud risk (PCAOB, 2014). Auditors need to exert extra efforts to perform specified audit procedures. Related-party transactions may raise the risks of material misstatement or fraud, which increases audit risks (Habib et al., 2015). Consequently, this study argues that the financial statements of a company with complex related-party transactions can easily be unauthentic, increasing information asymmetry between the company and the CPA, in turn raising the probability of audit failure from corporate fraud. Conversely, auditors are required to exert additional audit effort (PCAOB, 2014)

when working on related-party transactions, due to the high associated audit risk, and may thus receive high audit fees (Habib et al., 2015). Moreover, the literature on auditor-client matching suggests that auditors evaluated the business risk of a client in their decision of audit designation (Cassell, Giroux, Myers, & Omer, 2012). Thus, the likelihood of audit failure may not increase with the level of related-party transactions.

Based on these above arguments, the following nondirectional hypothesis is developed:

H1. *Ceteris paribus*, the complexity of related-party transactions and the likelihood of audit partner punishment are linked.

The literature on agency theory demonstrates that business diversification raises operational uncertainty and manager job complexity, thus increasing information asymmetry between shareholders and managers (Harris et al., 1982; Myerson, 1982) and leading to higher agency costs. Managers may engage in diversified investments based on their personal interests other than the corporate value maximization because a diversified company faces a higher level information asymmetry (Denis et al., 1997; Stulz, 1990). Hence, some auditing studies have found that more diversified clients have higher demands for higher quality auditors (Francis et al., 2009; Liu & Lai, 2012).

Additionally, the information asymmetry assumption holds that business diversification can raise the organizational complexity, thus increasing the information asymmetry between corporate outsiders and internal management. Outsider expectations of the diversified company have higher-level earnings management (Jiraporn et al., 2008). However, auditors have limited ability to constrain earnings management for more diversified clients (Choi et al., 2012).

Accordingly, we argue that higher diversification can make business operations and information more complex, and raises CPA audit risk. A company that uses complex diversification to try covering its authentic financial figures has a high probability of audit failure arising from corporate fraud.

Conversely, agency theory suggests a high demand for diversified firms to appoint high-quality auditors to reduce information asymmetry. The auditor choice literature indicates that firms with high level of information complexity can hire high-quality auditors to lower the degree of earnings management (Francis et al., 2009), and to appreciate firm value (Liu & Lai, 2012). Additionally, based on reputation protection hypothesis, high-quality auditors perform more audit procedures with due professional care when accepting more diversified clients, and thus the likelihood of audit failure may not rise with client business diversification.

Based on above arguments, this work presents the following nondirectional hypothesis:

H2. *Ceteris paribus*, an association exists between the complexity of diversification and the likelihood of audit partner punishment.

3. Methodology

3.1. Sample selection

This investigation takes CPA punishment as the study object. The punishment data of audit partners was sourced from the names listed by the Taiwan Securities and Futures Bureau in punishment for violation of the Securities and Exchange Law and CPA Law. The names were compared one by one against the Executive Yuan's publication or news released to check whether they were of certified companies with frauds and complete financial data. After eliminating de-listed firms during the research period, those

adopting a non-calendar fiscal year and those belonging to particular regulated industries such as finance and insurance, 99 observations (firm/year) were selected. Additionally, based on the existent literature (Lawrence, Minutti-Meza, & Zhang, 2011), this study adopted Prosperity Scores Matching (PSM).[3] The 1:2 matching approach was employed to ensure that the empirical results were not too optimistic (Manski & Lerman, 1977). Therefore, after excluding incomplete data, there were 288 final observations (firm/year) for H1.[4] The period was from 1992 to 2010. Furthermore, to assess the degree of product diversification, this work compared the TEJ production-marketing model data for each company, one by one, against the ROC Standard Industrial Classification (SIC) published in 2016 by Executive Yuan's Directorate-General of Budget, Accounting and Statistics, and then coded and classified the products by their attributes. The number of final observations (firm/year) for H2 after removing incomplete data was 171.

3.2. Regression model development

First, referring to prior literature (Lawrence et al., 2011), Propensity Scores Matching was applied to match sample data. Specifically, the propensity score of auditor sanction was estimated using a logistic regression model based on firm-specific elements such as firm size, inventory, accounts receivable, financial status and sales growth.

In the above equations, G(.) denotes a logistic cumulative distribution function, and $\mathbf{X}$ denotes the matrix of independent variables. The dependent variable of interest, *Sanction*, is a dummy variable to indicate whether a CPA has received punishment, where 1 means *yes* and 0 means *no*.

Additionally, the independent variable of interest for H1 is the number of related-party transactions, *RPT*. The model adopts these 10 related-party transaction items disclosed in financial statements, as percentages: sales processing revenues with related parties in net operating revenues; purchases from the related party in total purchases in the current period; accounts receivable/notes with related parties in total accounts receivable and the notes; account payable/notes with related parties in total accounts payable and those notes; interest income with related parties in total interest income; interest expenses with related parties in total interest expenses; non-operating income from related parties (including rents, commissions, and investment gains, among others) in sales revenue; non-operating expenses from related parties (including rents, commissions, and investment gains, among others) divided by sales revenue; property transaction losses with related parties in investment and asset disposal losses, and property transaction gains with related parties in investment and asset disposal gains. Referring to Bushman, Chen, Engel, and Smith (2004), the data figures were converted using percentile rankings into ranges of 0–1, which were then summed into a comprehensive related-party transaction (*RPT*) indicator. The value of *RPT* denotes

$$Sanction_t = \beta_0 + \beta_1 Size_{i,t-1} + \beta_2 Inv_{i,t-1} + \beta_3 AR_{i,t-1} + \beta_4 ZSCORE_{t-1} + \beta_5 ZFC_{i,t-1} \\ + \beta_6 Growth_{i,t-1} + year\ fixed - effect + industry\ fixed - effect + \varepsilon_{i,t}, \tag{1}$$

The primary regression model for H1 was designed to capture the effect of related-party transactions on auditor sanctions resulting from corporate fraud. The model was based on logistic regression of firm-specific characteristics, auditor characteristics, year fixed effects and industry fixed effects.

the volume of transactions between the firm and its related parties. Thus, a higher *RPT* indicates a higher volume of transactions between the firm and its related parties.

Additionally, the 10-item comprehensive index (*RPT*) was further separated into a 5-item revenue-based composite indicator (*RPT_revenue*) and a 5-item expense-based one (*RPT_expense*). The

$$P(Sanction_{i,t}|\mathbf{X}) = G(RPT_{i(or\ i-1),t}, Size_{i,t-1}, Inv_{i,t-1}, AR_{i,t-1}, ZFC_{i,t-1}, \\ Growth_{i,t-1}, Big4_{i,t}, Independent_{i,t}, Tenure_{i,t}, Specialist_{i,t}, \\ year\ fixed - effect, industry\ fixed - effect, \varepsilon_{i,t}), \tag{2}$$

Similarly, the following logistic regression model was employed below to test H2 for estimating the impact of diversification on auditor sanction that arose from corporate fraud.

revenue-based composite indicators comprise the percentages of sales processing revenues with related parties in net operating revenues; accounts receivable notes with related parties in total

$$P(Sanction_{i,t}|\mathbf{X}) = G(Diversification_{i,t}, Size_{i,t-1}, Inv_{i,t-1}, AR_{i,t-1}, ZFC_{i,t-1}, \\ Growth_{i,t-1}, Big4_{i,t}, Independent_{i,t}, Tenure_{i,t}, Specialist_{i,t}, \\ year\ fixed - effect, industry\ fixed - effect, \varepsilon_{i,t}), \tag{3}$$

accounts receivable plus those notes; interest income with related parties in total interest income; non-operating income from the related party in sales revenue, and property transactions gain with related parties in investment disposal gains plus asset disposal

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gains. The 5-item expense-based composite indicator comprises the remaining five items in the composition of *RPT*.

The independent variable of interest for H2 was the level of diversification, *Diversification*. To measure the level of product diversification, the data of corporate product sales sourced from the TEJ databases was manually matched to two-digit SIC product codes The Herfindahl index of Berry (1975) was used to calculate product diversification, as follows:

$$Diversification = 1 - \sum_i^n S_i^2 \qquad (4)$$

where S_i denotes the industrial sales of the products of corporation i in proportion to the total sales, and n is the number of industries in which company i engages.

The factors on CPA punishment were divided into client and CPA characteristics. On client characteristics, previous studies (Stice, 1991; Lys & Watts, 1994; Bonner, Palmrose, & Young, 1998) have revealed that the client's corporate scale influenced CPA lawsuit risk, and eventually affected CPA attitudes toward client auditing. Hence, this study took the natural logarithm of total assets to symbolize the corporate scale (*Size*). Stice (1991) found that the ratios of accounts receivable and inventory to total assets were positively correlated with the CPA punishment risk. Therefore, this work employed these ratios *AR* and *Inv* as control variables, and expected them to have positive correlations with the CPA punishment risk.

Stice (1991) found that a client in financial difficulties causes a CPA to face high lawsuit risks. Lys and Watts (1994) and Bonner et al. (1998) reached similar results. However, Carcello and Palmrose (1994) concluded that a client with a better financial condition before bankruptcy implies a higher probability of auditor litigation, and thus predicted a negative relationship between the Zmijewski (1984) score and auditor litigation. Therefore, based on the measurement of Zmijewski (1984), this study included the client's financial condition (*ZFC*) as a control variable (i.e. higher values imply more likelihood of default) but with no expectation of direction. As for client growth opportunity, Stice (1991) also observed that sales growth and CPA lawsuit risk were positively correlated. Therefore, this work included sales growth as one of the control variables, with the expectation of a positive correlation with the CPA punishment risk (*Growth*).

Moreover, regarding CPA characteristics, Palmrose (1988) observed that accounting firms other than the Big 8 faced higher lawsuit risks, indirectly demonstrating that the Big 8 accounting firms offered the highest quality services. However, other studies have shown different results (Lys & Watts, 1994; Stice, 1991). Therefore, this investigation adopted a dummy variable to set apart Big 4 and non-Big 4 accounting firms for different CPA lawsuit risks, where 1 represents Big 4 audit, and 0 represents non-Big 4 audit (*Big*4). Additionally, previous literature (Lys & Watts, 1994; Stice, 1991) showed that a CPA faced greater lawsuit risks with clients of greater importance (i.e. a specific client's revenue deflating total revenues of the CPA's all clients). Stice (1991) measured the client's importance using a scale 0–1, with the most important clients given a score 0. The Stice formula is 1 – (client revenue/total revenues of all clients of the CPA). This study defined the result of the Stice formula as audit independence, *Independent*, and focused on the longest tenure of engagement audit partners. This variable, *Independent*, represented that a more independent CPA has a lower probability of receiving punishment, and expected to find a negative correlation with CPA punishment risk.

Further, related works (Stice, 1991; St. Pierre & Anderson, 1984) found that a CPA faced higher lawsuit risks in the first three years

with a client due to unfamiliarity with them. However, Lys and Watts (1994) argued that a longer relationship with a client would increase reliance of the CPA on the client, thus increasing lawsuit risks. Stice (1991) found that CPA tenure with a specific client of less than three years was positively correlated with the CPA lawsuit risk, although Lys and Watts (1994) found no significant correlation. Therefore, in reference to previous literature (Stice, 1991; St. Pierre & Anderson, 1984), the CPA tenure with a specific client was as a dummy variable, setting to 1 for more than three years of CPA tenure, otherwise 0 (*Tenure*). Following the previous research (Balsam, Krishnan, & Yang, 2003; Chin & Chi, 2009), this study adopted auditor market shares as a proxy of auditor industry expertise, particularly at the partner levels. Specifically, the auditor market share was calculated as the sales of clients audited by an auditor with a longer tenure within an industry divided by the total sales of all listed firms within the same industry (*Specialist*).

4. Empirical results

4.1. Descriptive statistics

Table 1 presents the descriptive statistics for the H1 samples. With the 1:2 paired samples, the CPA punishment average was 0.3438, indicating that 34.38% of CPAs in the sample received punishment. The comprehensive index of related-party transactions (*RPT*) from the transformation of 10 related party transaction items was 5.7125.

With respect to control variables, the average inventory was 16.0487% of the total assets, and the average value of accounts receivable was 16.2657% of total assets. The average value of client financial health status was −1.1289, with a minimum value of −4.4856 and a maximum value of 2.7186. Clients had average sales growth of 22.9542% with a fairly wide variance. With regards to auditor characteristics, 69.79% of the sample clients were audited by the Big 4 audit firms, of which 76.04% had audit tenure with specific clients for over three years. The average market share of sales for clients audited by an auditor with longer tenure within an industry was 2.95%.

Table 2 lists the descriptive statistics for the H2 samples. Among the 1:2 paired samples, due to some missing diversification data, the audit partner punishment rate averaged 0.5263, meaning that 52.63% of the CPAs had received punishment in the H2 sample. The average level of diversification indicator was 0.35. As for the control variables, the average inventory value was 15.5888% of the total assets, and the average value of accounts receivable was 14.0717% of the total assets. The average financial health status was −0.9703, implying that the corporate financial status was stable in average. The average sales growth was 24.3504%. Additionally, 61.99% of the sample clients were audited by the Big 4 audit firms, and 71.35% of the audit tenures with specific clients were more than three years. The average market share of the client sales audited by the engagement partner with the longer tenure within an industry was 3.2275% with a wide variance.

4.2. Correlation analysis

Table 3 shows the correlated coefficients among the variables for H1. *Sanction* and *RPT* were positively correlated, and reached statistical significance (Spearman: 0.1034, 10% significance), implying that larger amounts of related-party transactions might incur audit failures. The subsequent regression analysis provides a detailed discussion. Additionally, *Sanction* was significantly and negatively correlated with *Big*4, *Independent*, *Tenure* and *Specialist*, revealing that auditor partners belonging to Big 4 audit firms or

Table 1
Descriptive statistics (H1).[a,b,c]

Variables	Mean	Standard Deviation	Minimum	Q1	Median	Q3	Maximum
Sanction	0.3438	0.4758	0.0000	0.0000	0.0000	1.0000	1.0000
RPT	5.7125	1.2953	3.4738	4.7993	5.7964	6.4829	9.1715
Size	15.6859	1.4856	11.3648	14.6520	15.8261	16.7759	18.7427
Inv (%)	16.0487	15.1866	0.0000	6.5671	11.8885	20.2367	79.1634
AR (%)	16.2657	13.0445	0.0915	5.9940	14.0045	22.2509	56.9916
ZFC	−1.1289	1.3685	−4.4856	−1.9506	−1.2876	−0.4232	2.7186
Growth (%)	22.9542	69.5517	−67.1300	−0.7350	12.4000	32.2500	913.0600
*Big*4	0.6979	0.4600	0.0000	0.0000	1.0000	1.0000	1.0000
Independent	0.8305	0.2405	0.0000	0.7766	0.9432	0.9801	0.9995
Tenure	0.7604	0.4276	0.0000	1.0000	1.0000	1.0000	1.0000
Specialist (%)	2.9500	4.4874	0.0000	0.2800	1.3400	3.2900	21.8300

[a] Definition of each variable: *Sanction* represents a dummy variable to indicate whether a CPA has received a punishment, i.e. value 1 means yes, 0 means no; *RPT* represents the comprehensive indicator of related-party transactions; *Size* represents corporate size, measuring as the natural logarithm of total assets; *Inv* represents the ratios of inventory to total assets; *AR* represents the ratios of accounts receivable to total assets; *ZFC* represents financial condition; *Growth* represents the ratio of sales growth; *Big*4 represents a dummy variable to indicate whether a CPA belongs to a Big4 firm, where value 1 is the big 4 audit, and 0 is the non-big 4 audit; *Independent* represents audit independence, where *Independent* = 1 − (client revenue/total revenues of the CPA's all clients); *Tenure* represents audit tenure, measuring by a dummy variable, where the value is 1 for more than 3 years of the CPA term, otherwise 0. *Specialist* represents auditor industry expertise, measuring as the sales of clients audited by an audit partner with longer tenure within an industry divided by total sales of all listed firms within the same industry.
[b] There is a total of 288 observations during 1992—2010 period.
[c] Variables in the top or the bottom 1% of their respective distributions are designated as outliers, in which the outliers are winsorized from the original data.

Table 2
Descriptive statistics (H2).[a,b,c]

Variables	Mean	Standard Deviation	Minimum	Q1	Median	Q3	Maximum
Sanction	0.5263	0.5008	0.0000	0.0000	1.0000	1.0000	1.0000
Diversification	0.3500	0.3750	0.0000	0.0000	0.2367	0.5701	1.0000
Size	16.0374	1.3932	11.9929	15.1071	16.2460	17.0567	18.6087
Inv (%)	15.5888	14.5848	0.0000	6.5773	11.1513	19.3024	79.1634
AR (%)	14.0717	11.8386	0.0915	4.2380	12.9275	20.1062	56.9916
ZFC	−0.9703	1.3248	−4.0466	−1.9235	−1.0797	−0.1954	2.7186
Growth (%)	24.3504	82.0060	−67.1300	−0.7800	12.6200	30.6300	913.0600
*Big*4	0.6199	0.4868	0.0000	0.0000	1.0000	1.0000	1.0000
Independent	0.8097	0.2587	0.0000	0.7199	0.9390	0.9777	0.9992
Tenure	0.7135	0.4535	0.0000	0.0000	1.0000	1.0000	1.0000
Specialist (%)	3.2275	4.6285	0.0000	0.4600	1.7400	3.7300	21.8300

[a] Definition of each variable: *Sanction* represents a dummy variable to indicate whether a CPA has received a punishment, i.e. value 1 means yes, 0 means no; *Diversification* represents the level of product diversification; *Size* represents corporate size, measuring as the natural logarithm of total assets; *Inv* represents the ratios of inventory to total assets; *AR* represents the ratios of accounts receivable to total assets; *ZFC* represents financial condition; *Growth* represents the ratio of sales growth; *Big*4 represents a dummy variable to indicate whether a CPA belongs to a Big4 firm, where value 1 is the big 4 audit, and 0 is the non-big 4 audit.; *Independent* represents audit independence, where *Independent* = 1 − (client revenue/total revenues of the CPA's all clients); *Tenure* represents audit tenure, measuring by a dummy variable, where the value is 1 for more than 3 years of the CPA term, otherwise 0. *Specialist* represents auditor industry expertise, measuring as the sales of clients audited by an audit partner with longer tenure within an industry divided by total sales of all listed firms within the same industry.
[b] There is a total of 171 observations during 1992—2010 period.
[c] Variables in the top or the bottom 1% of their respective distributions are designated as outliers, in which the outliers are winsorized from the original data.

Table 3
Correlation matrices (H1)[a,b,c,d] (N = 288).

	Sanction	*RPT*	*Size*	*Inv*	*AR*	*ZFC*	*Growth*	*Big*4	*Independent*	*Tenure*	*Specialist*
Sanction	1	0.1034*	0.0095	−0.047	−0.0152	0.0273	0.0827	−0.3995***	−0.1608***	−0.2446***	−0.113*
RPT	0.0915	1	0.3932***	−0.0367	−0.0867	0.1929***	−0.0373	−0.0229	−0.1598***	−0.0107	0.1114*
Size	0.0319	0.3596***	1	−0.0763	−0.3413***	0.0073	0.0323	0.0863	−0.2703***	0.0357	0.4526***
Inv	−0.0421	−0.0273	−0.1242**	1	−0.0074	−0.0198	0.1697***	0.014	0.0316	0.0204	−0.1159**
AR	−0.0091	−0.082	−0.3892***	0.2076***	1	−0.0157	0.1258**	−0.0045	−0.012	−0.0122	−0.1091*
ZFC	0.0373	0.2018***	0.0555	0.0385	0.0264	1	−0.127**	−0.1263**	0.0061	−0.2018***	−0.186***
Growth	0.0704	−0.1005*	0.0538	0.1572***	0.2491***	−0.1717***	1	0.0576	−0.0206	0.0542	0.0237
*Big*4	−0.3995***	−0.0169	0.0748	−0.0108	−0.0214	−0.1032*	0.0703	1	0.4223***	0.1268**	0.1753***
Independent	−0.0711	−0.1757***	−0.4379***	−0.0409	0.0192	−0.0584	−0.0994*	0.3579***	1	0.0761	−0.0349
Tenure	−0.2446***	0.0024	0.0282	0.0251	0.0226	−0.1864***	0.0702	0.1268**	0.039	1	0.1822***
Specialist	−0.0166	0.2542***	0.5474***	−0.0052	−0.0494	−0.1652***	0.0931	0.1546***	−0.2324***	0.1923***	1

[a] Lower-left side is Spearman rank correlation coefficient; upper-right side is Pearson correlation coefficient.
[b] Definition of each variable in this table refers to Table 1.
[c] *** represents 1% level of significance; ** represents 5% level of significance; and * represents 10% level of significance.
[d] Variables in the top or the bottom 1% of their respective distributions are designated as outliers, in which the outliers are winsorized from the original data.

with more independence, longer audit tenure, or higher level of industry expertise were less likely to incur audit failure. All of the correlation coefficients of independent variables were less than 0.7, where the preliminary observation indicated no serious collinearity

Table 4
Correlation matrices (H2)[a,b,c,d] (N = 171).

	Sanction	Diversification	Size	Inv	AR	ZFC	Growth	Big4	Independent	Tenure	Specialist
Sanction	1	0.2494***	−0.1254	−0.0247	0.1608**	−0.1364*	0.1267*	−0.3327***	−0.1565**	−0.2127***	−0.1966***
Diversification	0.1929**	1	−0.0418	0.1069	0.0619	−0.0847	0.0969	−0.1245	0.0305	−0.0559	−0.0161
Size	−0.0968	−0.048	1	−0.0869	−0.4161***	0.0664	0.0339	0.141*	−0.2324***	0.0649	0.4937***
Inv	−0.0151	0.1488*	−0.1604**	1	0.0746	−0.0034	0.1957**	0.1149	0.0463	0.0781	−0.1396*
AR	0.117	0.0011	−0.4103***	0.2615***	1	−0.0807	0.2072***	−0.1541**	−0.1071	−0.0284	−0.1376*
ZFC	−0.1068	−0.0251	0.0703	0.015	−0.1258	1	−0.0999	−0.0726	0.0046	−0.1561**	−0.2577***
Growth	0.1852**	−0.0434	0.0356	0.1331*	0.2963***	−0.1499*	1	0.0672	−0.0431	0.0433	−0.0275
Big4	−0.3327***	−0.1092	0.1328*	0.0168	−0.1218	−0.0687	0.0173	1	0.4404***	0.0899	0.2218***
Independent	0.0222	−0.0173	−0.3811***	−0.0481	−0.0322	−0.0653	−0.152**	0.3486***	1	0.0479	−0.0002
Tenure	−0.2127***	−0.0375	0.0438	0.1081	0.0181	−0.1567**	0.0086	0.0899	0.0001	1	0.2118***
Specialist	−0.1095	0.0034	0.5462***	−0.0088	−0.0225	−0.2272***	0.0673	0.1802**	−0.2256***	0.2737***	1

[a] Lower-left side is Spearman rank correlation coefficient; upper-right side is Pearson correlation coefficient.
[b] Definition of each variable in this table refers to Table 2.
[c] *** represents 1% level of significance; ** represents 5% level of significance; and * represents 10% level of significance.
[d] Variables in the top or the bottom 1% of their respective distributions are designated as outliers, in which the outliers are winsorized from the original data.

Table 5
Univariate analysis (H1) (N = 288).[b,d]

Variables[a]	Observations	Group	Mean of CPA punishments	Median of CPA punishments	Differences of Mean[c] (t-test)	Differences of Median[c] (Wilcoxon z-test)
Big4	87	Non-Big 4	0.6322	1	6.9278***	6.769***
	201	Big4	0.2189	0		
Specialist_D	277	Non-specialists	0.3574	0	12.3897***	2.443**
	11	Specialists	0	0		

[a] Definition of each variable: Big4 represents a dummy variable to indicate whether a CPA belongs to a Big4 firm, where value 1 is the big 4 audit, and 0 is the non-big 4 audit; Specialist_D represents a dummy variable to indicate whether a CPA is an industry specialist, measuring by the variable Specialist, and following Krishnan (2003), the auditor's market share exceeds 15 percent recognized as industry specialists.
[b] There is a total of 288 observations during 1992–2010 period.
[c] The two-sample t-test is designed to test whether the means between two groups are significantly different, and the two-sample Wilcoxon rank-sum (Mann-Whitney) test is designed to test whether the medians between two groups are significantly different.
[d] *** represents 1% level of significance; ** represents 5% level of significance; and * represents 10% level of significance.

among them. Subsequently examined variance inflation factors (VIFs) were all below 10, also indicating no serious collinearity.

Table 4 presents the correlated coefficients among the variables for H2. First, Sanction and Diversification were significantly and positively correlated, indicating that a higher level of business diversification implied a higher probability of CPA punishment. With respect to firm-specific variables, the likelihood of audit failures (Sanction) was negatively correlated with financial health status, but positively correlated with sales growth and the ratio of accounts receivable to total assets. For auditor characteristics, the likelihood of audit failure (Sanction) was negatively correlated with Big 4 audit firms, audit tenure, and audit industry expertise. Additionally, all the correlation coefficients of the independent variables were all below 0.7, meaning that the preliminary observation showed no obvious collinearity among them. The subsequently examined variance inflation factors (VIFs) were all less than 10, also indicating a lack of strong collinearity.

4.3. Univariate analysis results

Since previous literature found that audit failure was linked with auditor reputation and audit expertise (Chaney & Philipich, 2002), this study first tested the differences in CPA punishments incurred by Big 4 auditors and non-Big 4 ones, and further verified the differences in CPA punishments between industry specialists and non-industry specialists.[5] A mean/median differential test was thus conducted to observe whether the likelihood of CPA punishments incurred by Big 4 auditors differs from those incurred by

non-Big 4 auditors, and further to investigate whether the likelihood of CPA punishments with industry experts is lower than that with non-industry specialists.

Table 5 presents the test results for H1 sample firms, and similarly Table 6 displays the test results for H2 sample firms. In both the H1 and H2 samples, the differential test results for Big 4 auditors versus non-Big 4 ones indicated that the mean/median of CPA punishments incurred by non-Big 4 auditors was significantly higher than that incurred by Big 4 auditors. Non-Big 4 auditors thus had a higher likelihood of audit failure than Big 4 auditors, suggesting that Big 4 auditors exert more effort to maintain their brand-name reputation.

Additionally, Tables 5 and 6 both demonstrate that the means/medians of CPA punishments for non-industry specialists were significantly higher than those for industry specialists. These results confirm that non-industry specialists have a significantly higher likelihood of audit failure than industry specialists, indicating that audit expertise can indeed reduce audit risk. Therefore, based on univariate analysis, this investigation supports that auditor reputation and audit expertise are associated with audit failure, and subsequently adds these two audit characteristics into empirical models to perform rigorous regression analysis.

4.4. Multivariate regression results

4.4.1. Related-party transaction and CPA punishment

Table 7 shows the relationship between current related-party transactions and the probability of CPA punishment. This study used the logistic regression model for analysis of H1, and found that it fitted the model specification, where the chi-square statistics reach 1% significance level. The dependent variable, Sanction,

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[5] We are grateful to the reviewer for making this suggestion.

Table 6
Univariate analysis (H2) (N = 171).[b,d]

Variables[a]	Observations	Group	Mean of CPA punishments	Median of CPA punishments	Differences of Mean[c] (*t*-test)	Differences of Median[c] (Wilcoxon *z*-test)
Big4	65	Non-Big 4	0.7385	1	4.7027***	4.338***
	106	Big4	0.3962	0		
Specialist_D	164	Non-specialists	0.5488	1	14.0799***	2.839***
	7	Specialists	0	0		

[a] Definition of each variable in this table refers to Table 5.

[b] There is a total of 171 observations during 1992–2010 period.

[c] The two-sample *t*-test is designed to test whether the means between two groups are significantly different, and the two-sample Wilcoxon rank-sum (Mann-Whitney) test is designed to test whether the medians between two groups are significantly different.

[d] *** represents 1% level of significance; ** represents 5% level of significance; and * represents 10% level of significance.

Table 7
Related-party transactions and CPA punishment (H1).[a,b,c,d,e]

Variables	Expected Sign			
Constant		−2.2532 (0.371)	−2.4304 (0.338)	−2.0836 (0.396)
RPT	+	0.3027**(0.025)		
RPT_revenue	+		0.5709***(0.009)	
RPT_expense	+			0.2707 (0.279)
Size	+	0.1219 (0.433)	0.1333 (0.396)	0.1753 (0.236)
Inv	+	−0.0154 (0.299)	−0.0119 (0.423)	−0.0172 (0.255)
AR	+	−0.0102 (0.433)	−0.0091 (0.493)	−0.0095 (0.451)
ZFC	?	−0.1508 (0.217)	−0.1529 (0.22)	−0.122 (0.296)
Growth	+	0.0059***(0.006)	0.0057***(0.003)	0.0058***(0.006)
Big4	?	−2.5783***(<0.0001)	−2.6235***(<0.0001)	−2.5112***(<0.0001)
Independent	−	0.6651 (0.364)	0.7404 (0.309)	0.5466 (0.445)
Tenure	?	−1.5505***(<0.0001)	−1.5551***(<0.0001)	−1.5298***(<0.0001)
Specialist	−	−0.0697 (0.22)	−0.0749 (0.186)	−0.0666 (0.218)
year_FE		Yes	Yes	Yes
industry_FE		Yes	Yes	Yes
N		288	288	288
Wald χ^2 Statistics		71.32***	71.92***	67.96***
(Pseudo) *R*-squared		0.2359	0.2410	0.2259

[a] Definition of each variable in this table refers to Table 1. In addition, *RPT_revenue* and *RPT_expense* represent revenue-based related-party transactions and expense-based ones.

[b] *** represents 1% level of significance; ** represents 5% level of significance; and * represents 10% level of significance.

[c] The number in the parenthesis represents p-value of each estimated coefficient in a two-tailed test.

[d] The Logistic regression models are estimated with robust standard errors (White, 1980) to mitigate the problem of heteroskedasticity.

[e] Variables in the top or the bottom 1% of their respective distributions are designated as outliers, in which the outliers are winsorized from the original data.

Table 8
Prior related-party transactions and CPA punishment (H1).[a,b,c,d,e]

Variables	Expected Sign			
Constant		−1.808 (0.464)	−2.0219 (0.411)	−1.8038 (0.465)
RPT_1	+	0.2123 (0.116)		
RPT_revenue_1	+		0.367*(0.09)	
RPT_expense_1	+			0.2425 (0.325)
Size	+	0.14 (0.379)	0.1535 (0.32)	0.1731 (0.27)
Inv	+	−0.017 (0.277)	−0.0142 (0.362)	−0.0182 (0.246)
AR	+	−0.01 (0.429)	−0.0087 (0.492)	−0.0099 (0.43)
ZFC	?	−0.1195 (0.312)	−0.1223 (0.303)	−0.1091 (0.345)
Growth	+	0.0054***(0.009)	0.0054***(0.006)	0.0056***(0.008)
Big4	?	−2.5084***(<0.0001)	−2.5371***(<0.0001)	−2.4857***(<0.0001)
Independent	−	0.544 (0.448)	0.5481 (0.444)	0.5292 (0.456)
Tenure	?	−1.5309***(<0.0001)	−1.4882***(<0.0001)	−1.5524***(<0.0001)
Specialist	−	−0.0663 (0.217)	−0.0688 (0.198)	−0.066 (0.217)
year_FE		Yes	Yes	Yes
industry_FE		Yes	Yes	Yes
N		288	288	288
Wald χ^2 Statistics		70.61***	67.65***	69.96***
(Pseudo) *R*-squared		0.2291	0.2297	0.2254

[a] Definition of each variable in this table refers to Table 1. In addition, *RPT_1*, *RPT_revenue_1* and *RPT_expense_1* represent prior comprehensive index of related-party transactions, prior revenue-based related-party transactions and prior expense-based ones, respectively.

[b] *** represents 1% level of significance; ** represents 5% level of significance; and * represents 10% level of significance.

[c] The number in the parenthesis represents p-value of each estimated coefficient in a two-tailed test.

[d] The Logistic regression models are estimated with robust standard errors (White, 1980) to mitigate the problem of heteroskedasticity.

[e] Variables in the top or the bottom 1% of their respective distributions are designated as outliers, in which the outliers are winsorized from the original data.

represents whether the CPA has incurred punishment, where 1 means "yes", and 0 means "no". The interested independent variable is the comprehensive index of related-party transactions, *RPT*. The empirical results reveal that the likelihood of CPA punishment is significantly and positively associated with the related-party transaction (the coefficient is 0.3027, with a 5% significance level).

Additionally, this work further separated the 10-item comprehensive index (*RPT*) into two 5-item composite indicators, i.e. revenue-based (*RPT_revenue*) and expense-based (*RPT_expense*). As indicated in Table 7, the coefficient of *RPT_revenue* was significantly positive, while that of *RPT_expense* was insignificantly positive. This result suggests that the positive relationship between related-party transactions and the probability of CPA punishment mainly derives from revenue-based related-party transactions.

Furthermore, to eliminate the possible endogeneity problem, Table 8 presents the relationship between prior related-party transactions and the probability of CPA punishment. The coefficient of prior related-party transactions (*RPT_1*) was positive, and nearly reached a 10% significance level. Similarly, the coefficient of prior revenue-based related-party transactions (*RPT_revenue_1*) was significantly positive, while that of prior expense-based related-party transactions (*RPT_expense_1*) was insignificantly positive, indicating that revenue-based related-party transactions are major causes of audit failure.

The untabulated results indicate that the elements of related-party transactions with the strongest impact on the likelihood of audit failure are sales with related parties, interest with related parties, and property transactions with related parties.

These results further reveal that a higher monetary value of related-party transactions leads to higher information complexity, for which the CPA needs to exert additional efforts to verify each related-party transaction for identifying any omission within it (PCAOB, 2014). However, the client might hide information about related-party transactions, for instance by concealing delayed payments, or giving unauthentic transaction records, resulting from accounting uncertainty related to the definition and reporting of related-party transactions (Bennouri et al., 2015). This causes the information presented to the CPA to be incomplete, leading to audit failure. Corporate transfers of benefits often occur among related businesses or specific persons. These transactions can bring in equity agency issues, where a higher ratio of related-party equity and internal trading leads to greater damage to corporate value (Dahya et al., 2008; Henry et al., 2012). Therefore, more complex related-party transactions result in higher CPA audit risks, and raise the probability of audit failure and CPA punishment, consistently with the expectations for H1.[6]

Among control variables related to client characteristics, only firm growth opportunity (*Growth*) was significantly and positively linked with CPA punishments. Other client characteristics, such as client size, the ratios of inventory and assets receivables and financial conditions, were not significant, implying that these characteristics are not major factors in audit failure after controlling for other factors.

Regarding auditor characteristics, the coefficient of *Big*4 was significantly negative, implying that non-Big 4 audit firms face greater lawsuit risks (Palmrose, 1988). This finding indirectly confirms that Big 4 audit firms offer better financial certification and decrease the probability of CPA punishment than other audit firms.

Table 9
Business diversification and CPA punishment (H2).[a,b,c,d,e]

Variables	Expected Sign	Coefficient	Robust Standard Error	*p*-value
Constant		−2.1045	4.0244	0.601
Diversification	+	2.909***	0.9924	0.003
Size	+	0.2457	0.2313	0.288
Inv	+	−0.031	0.0249	0.214
AR	+	−0.0135	0.0223	0.544
ZFC	?	−0.3729**	0.1741	0.032
Growth	+	0.0045**	0.0027	0.095
Big4	?	−2.1138***	0.6375	0.001
Independent	−	−1.2096	1.1099	0.276
Tenure	?	−1.3787***	0.5897	0.019
Specialist	−	−0.1634**	0.0715	0.022
year_FE			Yes	
industry_FE			Yes	
N			171	
Wald χ^2 Statistics			53.28***	
(Pseudo) *R*-squared			0.3740	

[a] Definition of each variable in this table refers to Table 2.
[b] *** represents 1% level of significance; ** represents 5% level of significance; and * represents 10% level of significance.
[c] The p-value of each estimated coefficient adopts a two-tailed test.
[d] The Logistic regression models are estimated with robust standard errors (White, 1980) to mitigate the problem of heteroskedasticity.
[e] Variables in the top or the bottom 1% of their respective distributions are designated as outliers, in which the outliers are winsorized from the original data.

Additionally, the coefficient of *Tenure* was significantly negative, consistently with the results obtained by Stice (1991), who argued that a CPA may face higher lawsuit risks in the first three years with a company owing to a lack of familiarity with the audited company; therefore, a longer audit tenure with the client could lower the probability of CPA punishment.

4.4.2. Diversification and CPA punishment

Table 9 presents the link between business diversification and CPA punishment. This study adopted the logistic regression analysis in H2. The test for the model specification fitted the function well, with chi-square statistics reaching 1% significance level. The independent variable of interest was the level of business diversification, *Diversification*. The empirical result indicates that the likelihood of CPA punishment is significantly positively associated with related-party transactions (i.e. the coefficient is 2.909 and reaches a 1% significant level).

The analytical results suggest that higher corporate diversification results in higher probability of CPA punishment. This finding also confirms the hypothesis of information asymmetry, and supports the agency theory based on the literature on business diversification, which is that diversification can raise the degree of information asymmetry and complicate business operations. Hence, higher diversification leads to more complex information processing and more uncertain business operations. Diversification was significantly and positively correlated with CPA punishment, consistent with the expectation of H2.

With regards to control variables, the client's financial status and CPA punishment were significantly and negatively correlated, consistent with the prediction of Carcello and Palmrose (1994). This finding shows that a healthier prior financial condition implies a greater likelihood of CPA punishments. The client's sales growth and CPA punishment are significantly and positively correlated, indicating that client sales growth increases the probability of audit failure. As for auditor characteristics, *Big*4, *Tenure* and *Specialist* are significantly and negatively correlated with CPA punishment, further indicating that auditors belonging to Big 4 audit firms, with longer audit tenure or with higher levels of industry expertise have

low probability of CPA punishment, similar to the findings of Palmrose (1988) and Stice (1991).

5. Sensitivity analyses

5.1. Re-examination of hypotheses without some serious scandals

The above empirical results include some sample firms, such as Procomp, Infodisc, Summit, and the Rebar Group, that were involved in serious accounting scandals. Audit partners involved in these scandals might experience different sanctions from audit partners involved in other mistakes.[7] To help eliminate confusion in the results, this investigation performed the analysis again, excluding firms with serious scandals.

The results[8] show the regression analyses after excluding firms with serious fraud. The findings were similar to those in Tables 7 and 9. The coefficient of *RPT* was positive and reached 5% significant level; that of *RPT_revenue* was positive and reached 5% significant level, and that of *RPT_expense* was positive but not significant. Similarly, the coefficient of *Diversification* was positive, and reached 5% significant level. Analytical results reveal that after excluding firms involved in serious scandals, corporate related-party transactions and diversification increased information complexity and auditing difficulties, thus raising the likelihood of audit failure.

5.2. Endogeneity problem

Recent accounting scandals worldwide, including Enron, Adelphia, Parmalat, and the Rebar Group generally involved related-party transactions. These transactions are often currently viewed as devices for accounting fraud and for minority shareholder expropriation (Bennouri et al., 2015). Similarly, Henry et al. (2012) noted that related-party transactions were related with fraud commitment by managers and controlling stockholders.

The auditor-client matching literature shows that auditors regard the business risk of a firm as an important factor in their appointment decisions (Cassell et al., 2012). Conversely, the difference in audit quality selected by firms conveys an information signal to outsiders (Fan & Wong, 2005), where firms with many related-party transactions may be reluctant to appoint high-quality auditors. Although this study examines the impact of related-party transactions on the likelihood of audit failure, the above arguments suggest that a potential endogeneity may exist between related-party transactions and the likelihood of audit failure.

Therefore, this work employed the probit model with instrument variables to re-examine the relationship between related-party transactions and the likelihood of audit failure. The results[9] reveal that the coefficient of *RPT* was positive and reached 10% significance level; specifically, that of *RPT_revenue* was positive and reached 10% significant level, and that of *RPT_expense* was positive but was not significant. These results demonstrate that related-party transactions are significantly positively related to the likelihood of audit failure after eliminating the endogeneity effect. This positive relationship is primarily driven by revenue-based related-party transactions.

6. Conclusion

In a capitalist society, a CPA is responsible for auditing its client's

financial statements and issuing auditing comments. The CPA acts as an interface between the corporate client and outside investors. The CPA is legally obliged to hold an objective and independent stand in auditing the corporate client's financial statements and in honestly disclosing any unauthenticity. However, the Enron scandal clearly reveals that companies may threaten or encourage CPAs to window-dress their financial statements, and to cover up their financial difficulties for attracting external investors. The CPA can easily be punished once the scandal erupts. Such scandals also negatively affect the CPA's audit quality and jeopardize its reputation, such that financial statements for other companies certified by this CPA will also be questioned.

The prior research has indicated that enterprises often engage in unconventional transactions with related parties to window-dress their financial statements. As well as the related-party transactions, global reinvestment and business diversification from economic growth have led businesses to over-invest. Consequently, financial information becomes increasingly complex, particularly within the intertwined connections of parent-subsidiary companies, making auditing difficult. Investors engaged in investments, financing and other economic activities rely increasingly on the authenticity of corporate financial statements. Meanwhile, the increased legal responsibility of the CPA has expanded its role as a gatekeeper for financial statements. Accounting and auditing laws have matured in recent years; in contrast with CPAs in developed countries, CPAs in Taiwan mostly receive administrative punishment rulings. To avoid punishments, CPAs will endeavor to scrutinize the financial statements that they audit. With this background, this work studies the correlations of related-party transactions and business diversification with CPA punishment.

Empirical results reveal that larger related-party transactions are associated with a higher probability of CPA punishment. The reason may be that material related-party transactions lead a company to rely excessively on such transactions, requiring the CPA to verify each transaction to see whether the related party exists. To make it worse, the company may not fully disclose its related-party transactions with delayed payments and unauthentic transaction records due to the accounting uncertainty surrounding RPT reporting (Bennouri et al., 2015). Consequently, the financial information given to the CPA may be incomplete. The CPA may be blamed for the issuance of an unqualified audit opinion on the financial statements, increasing the probability of punishment. Additionally, wider business diversification can also lead to a higher probability of CPA punishment. This investigation concludes that greater diversification can raise business operational uncertainty and manager job complexity, increasing the degree of information asymmetry and operational complexity. This inference supports the literature from agency theory, which contends that business diversification increases the complexity of information processing and the probability of CPA punishment.

This research has the following implications. This work aims to provide external investors with relevant information to grasp the linkage of CPA auditing and certification with corporate business strategies and management. It addresses whether the CPA is in an independent position before making investments, thus improving the profitability of investment decisions. This study also provides suggestions for corporations to pay greater attention to business items subjectively in abnormal related-party transactions, thus empowering management to communicate with CPAs on related-party transactions and business diversification to reduce the probability of CPA punishment. This investigation also provides competent authorities with information to help them focus on corporate related-party transactions and business diversification, so that they can enforce standards requiring CPAs to be rigorous in audit procedures to minimize audit failure. Authorities should

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[7] We are grateful to the reviewer for making this suggestion.
[8] The results are not displayed, but can be provided on request.
[9] The results are not displayed, but can be provided on request.

require CPAs to focus on monitoring efficiency for corporate governance of highly internationalized corporations. This study recommends CPAs to cautiously endeavor to watch for abnormal transactions to reduce the probability of audit failure when encountering unauthentic financial statements or highly complex related-party transactions. For highly internationalized corporations, auditors should focus on ensuring diversification is properly executed under the enforcement of internal control and corporate governance.

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