The Impact from Quality of Auditing and Independent Directors & Supervisors on the Funding Cost of Newly Issued Corporate Bonds

TOPIC

The impact from quality of auditing and independent directors & supervisors on the funding cost of newly issued corporate bonds

ABSTRACT

The research sampled the non-convertible corporate bonds issued by Taiwan's electronic companies from the year 2000 to 2004. The research found those companies, which were audited by higher-quality auditing firms and by industry auditing experts and which hired independent directors and supervisors, would be able to effectively reduce the interest expense on their newly issued corporate bonds. The finding is consistent with the agency theory. As there is always an asymmetric information between the management and investors/creditors, moral hazard could thus be triggered by the management's self-interest intention and by investors' and creditors' anti-selection. Both (moral hazard and anti-selection) could add to agency cost. Therefore, the needs of auditing and corporate governance mechanism are raised to reduce such costs.

Key words: auditing quality, industry auditing expert, independent directors and supervisors, agency cost

1. PREFACE

As there is always an external agency issue among shareholders, creditors, and the management, a trusted, independent third party (i.e. CPA) is, therefore, expected to conduct a systematic audit on the public information released by the management, so as to eliminate moral hazard from asymmetric information and anti-selection by shareholders (Simunic & Stein 1978). Good quality of auditing can save agency cost. In an article of relations between price and earnings, Subramanyam (1996) pointed out that the earnings coefficient goes up with the earning data's accuracy. Intuitively, the more creditability the information contains, the more influence it will have on the creditors in terms of risk premium requirement. If creditors find that quality of auditing could increase their ability to predict a default risk, they will emphasize more on the quality of auditing on financial reports. However, if such quality of auditing fails to indicate a potential credit default risk (meaning lower quality of auditing), creditors will lose their confidence in the financial reports audited by CPAs.

The study purpose is to employ creditors' reaction towards risk premium for corporate bonds in the primary bond market, to see if a better quality of auditing by CPAs can bring down the funding cost on newly issued corporate bonds. We believe the primary bond market will be able to provide a better setting to analyze the influence of CPA's autonomy on risk premium required by creditors. As the management often hides their financial crunch in the liability items under off-balance sheets, or makes deferred liabilities (losses) to avoid realizing liabilities, they might generate a higher possibility of a default risk for their bonds issued. If creditors can better evaluate the financial strength and business results through CPAs' audited reports, they will be able to effectively indicate how much risk they could undergo. Good quality of auditing in the financial reports can effectively reduce agency cost, so risk premium required by creditors would be lessened while financing cost of issuing new corporate bonds would be cut down, as a result of better quality of auditing from CPAs expected.

Corporate governance mechanism is an action to properly govern the corporate management, in order to ensure a reasonable investment return for fund providers and to avoid the possible losses incurred from the corporate mismanagement (Shleifer and Vishny 1997). Through the establishment of corporate governance mechanism, the interests for the internal management or internal shareholders can be matched to that of external shareholders and creditors, thereby reducing agency cost. The Securities and Exchange Commissions (SEC) in the United States believe the autonomy of a CPA plays a critical role in quality. The more independent a CPA is, the more it can minimize the reasons to affect an auditor's judgment (SEC 2000). The corporate governance organization for maintaining the independence of American CPAs is called audit committee, which is mainly responsible for resolving any conflicts possible between the corporate management and CPAs, while protecting those CPAs who make the financial reports trustworthy. Therefore, they shall be made free from the concerns about being dismissed by the management once their reports are against the corporate interests (Carcello & Neal, 2003). Compared to that in the United States, Taiwan's corporate governance mechanism is still very much in the early start, with most companies yet to set up audit committees. The only relevant regulation is to enforce the establishment of independent directors and supervisors[1] for the newly established listed (OTC) companies as well as old ones, published in February 22nd and 25th in 2002. Though the securities markets in the United States are far advanced compared to Taiwan, Bedard, Chtourou, and Courteau (2004) believed that an audit committee with over half of the members independent is not sufficient to ensure the independence of the committee. It needs entire independent members in the committee to meet the minimum independence requirement.

[1] Taiwan Stock Exchange Corporation and Gre Tai Securities Market (OTC Market) published an amendment to "The Guidance of Checking Listed Securities by Tawian Stock Exchange Corporation" on Feb 22, 2002 and Feb 25, 2002 and "The Guidance of Checking OTC Securities by Gre Tai Securities Market" as well as any related supplementary provisions.

Independent directors are highly regarded as the utmost superintendents. As they do not financially rely on the management, neither are they concerned with job losing or payment cut, they will be less influenced when making decisions. While most Taiwan's firms are closely-held family businesses (Yeh, Lee, and Woidtke, 2001)[1], whether an independent director can necessarily save agency cost and gain trust from external investors and creditors, becomes a relevant issue for the research. Therefore, the other purpose of this study is to examine creditors' response towards the establishment of external independent directors and supervisors. Should they prove to enhance the autonomy of the board, effectively supervise the management, and reduce the agency cost resulting from the management's self-interest behavior, creditors will then have more confidence in the corporate management and thus lower their demand for risk premium.

Unlike the past researches which focused on term of CPAs, the retaining of five major CPA's firms, and the turnover of CPAs during bond issuing to determine the impact of auditing quality on funding cost, this study puts a close eye on other various factors, such as quality of auditing due to CPA's professionalism and independence, auditing work by industry experts, and the establishment of independent directors and supervisors. Evidence showed that such funding cost could be significantly reduced by improved quality of auditing, industry experts' work, and the set-up of independent directors and supervisors.

This research comprises of six sections, with document analysis on section 2, research hypothesis on section 3, data source and research methodology on section 4, empirical findings on section 5, and conclusions and suggestion on the last section.

2. Document Analysis

(1) Measurement of auditing quality

As the quality of auditing cannot be directly observed, the proxy variables are therefore suggested in the analysis. Past studies showed many ways to analyze the connection between the independence of a CPA and the quality of financial reports[2]. Various proxy variables for measuring audit quality include the public expense charged by CPAs, the number of partners, the number of clients (DeAngelo 1981a, Francis, Wilson 1988), reputation of CPAs (Healy, Lys 1986, Francis, Wilson 1988, Beatty 1989), proceedings, if any, following CPAs' auditing (Palmrose 1987), and the market share by industry (Palmrose 1987). The research adopted measurement variables of such ratios as market share and concentration of audited clients as well as the hiring the industry auditing experts, proposed by Wen-Ching Chang, Ling-Tai Chou, and Shiu-Wei Lin (2001)

[2] Yeh et al. (2001) employed stricter methods to measure control power and found 76% of Taiwan's publicly traded companies are closely held by families.

[3] See Kinney et al.(2004)。

DeAngelo (1981b) believed that quality of auditing could be defined as the common possibilities between the CPA's detection of a flaw in clients' accounting system and the CPA's disclosure of such flaw. A high-quality audit can always be expected to capture a defect in the accounting practice. Watts and Zimmerman(1986) believed what DeAngelo(1981b) called the CPA's ability to identify defective accounting system is the CPA's professional capability. The ability to disclose a real problem in an accounting system is deemed as the CPA's professional detached independence. Owning so much potential value, an external audit is an effective way for a company to supervise itself. (Jensen and Meckling 1976, Watts and Zimmerman 1986). As the high-quality CPA's auditing could locate and disclose any mistake in the financial reports, faulty accounting information would be significantly reduced and financial reports would be much valued by their users. (DeAngelo 1981a, Watts and Zimmerman 1983). Therefore, when issuing corporate bonds, a company can enhance the trustworthiness of its financial reports via a good-quality auditing, plus their clients can get a better understanding of the company's financial status and business results through the audited reports.

The professional ability of a CPA to see a discrepancy or a fault in financial reports can be developed by training or auditing experience accumulating. When a CPA firm is gaining more experience in a certain industry, it will have more in-depth understanding of relevant information about economy, accounting, and auditing in such field. Though in-house training and experience heritage, a CPA firm can have its knowledge spread around and strengthen its auditing ability to correct inappropriate disclosure in the financial reports. Each business has its own "accounting techniques". CPAs always gain more industry knowledge after heavily building up auditing experience in a certain business. (Velury, Reisch, and O'Reilly, 2003). Hogan's and Jeter's (1999) research indicated a trend of significant increase in the concentration of auditing people within a certain industry. This could result in a professionalized industry capability and enhance a CPA's professional ability, so as to ensure a better quality of auditing[4]. Therefore, this research utilized market share by different industry type as a proxy measure in replacement of the professional capability of auditing people.

$$MS_{ik} = \frac{\sum_{j=1}^{J_{ik}} \sqrt{A_{ijk}}}{\sum_{k=1}^{K_i} \sum_{j=1}^{J_{ik}} \sqrt{A_{ijk}}}$$

Among that,

MS_{ik} = the market share of CPA firm (k) in the industry (i)
i = 1, 2, ...I, representating the type of industry where the listed company client belongs
j = 1, 2, ...J, representating the listed company client
k = 1, 2, ...K, representating the CPA firm
K_i = the number of CPA firms in industry (i)
A_{ijk} = total assets of client (j) being audited by CPA firm (k) in the industry (i)

The public expense of auditing is mainly decided by customer base. The bigger customer base is, the more it will contribute to a CPA firm's revenue. And such firm will become more financially dependent on it. It could bring potential competitors to the incumbent auditing personnel. Therefore, large-scale clients may tend to leverage a CPA firm's financial reliance and industry competition to kick in their influence into financial reports, thereby jeopardizing the quality of CPA auditing. Reynolds and Francis (2000) also pointed out that the degree of CPAs' independence varied when facing different clients.

[4] also likely to be caused by more efficient auditing work or economic scale

A clients' size does not necessarily affect the quality of auditing, but it does generate a higher probability for the client to wield its power into auditing work, thus lowering the quality of auditing (Wen-Ching Chang et al. 2001). Therefore, when a certain client's base is getting bigger against total customer base, the auditing people will find it harder to stay independent (Deis, Donal, and Girous 1992). Like Wen-Ching Chang et al. (2001), this research also uses the concept of Herfindahl Index to capture the independent, detached attitude of CPAs according to the degree of customer concentration in the CPA firm. In the following equation, H_{ik} represents client concentration in the CPA firm (k) in the industry (i).

$$H_{ik} = \sum_{j \in J_{ik}} \left[\frac{\sqrt{A_{ijk}}}{\sum_{j \in J_{ik}} \sqrt{A_{ijk}}} \right]^2$$

A higher H value means higher customer concentration in the CPA firm. When the major clients have higher financial impact on such firm, auditing personnel will tend to be guided by few clients and their independence might be more easily compromised. The degree of detached independence is measured by $1/H_{ik}$. The quality of auditing includes both CPA's professional ability and their detached independence. Here MS/H_{ik} represents the quality of auditing in the CPA firm (k) in the industry (i). When a CPA firm enjoys a higher market share and lower client concentration, it will generate higher quality of auditing, and vice versa.

Different businesses have their own specialized "accounting techniques". The corporate management uses those accounting practices to realize assets, liabilities, revenues and expenses so as to reflect its own real financial status. Therefore, it takes different auditing skills for a CPA to work on different firms. Simunic and Stein (1987) applied quality-differentiated theory in analyzing the product attribute of auditing services and in judging such attribute. When the company has a different characteristic and attribute, they will have a different need for auditing services. Craswell et al. (1995) pointed out that the eight major CPA firms are entitled to charge a higher expense on their clients due to their strong brand awareness and in-depth industry expertise. Based on the quality differentiated economic theory (Klein and Leffler, 1981; Shapiro, 1982), the industry auditing experts generate higher quality of auditing, thereby reducing agency cost and contract cost.

(2) The Mechanism of Corporate Governance

The board of directors plays an important role in corporate governance and can be deemed as a major instrument to control the top management (Kose and Senbet, 1998). External directors are regarded as the highest superintendents, as they are not financially dependent on the corporate management and therefore they are not concerned with job losing and payment cut. This concept is called "monitoring effect theory". Moreover, in order to gain the opportunity to be hired by other entities as an external director, they will be motivated to build up their reputation as a professional supervisor, resulting Subsequently, they will be retaining much more independence when dealing with the management (Fama, 1980, Fama and Jensen, 1983)。

Rosenstein and Wyatt (1990) indicated market always reacts positively after an announcement of external director appointment posted on the Wall Street Journal. Hermalin and Weisbach (1988) proved in a research that there was a connection between the change of top management and business performance. The board of directors dominated mostly by external directors will be more sensitive than the one mostly by internal directors. Likely, Cotter et al. (1997) found that a company with more external directors among its board members could take on higher earnings target. Beasley (1996) and Dechow and Sloan (1996) discovered that the board of directors containing more external directors proved to effectively reduce the chance of erroneous disclosure of its financial reports. Finally, Klein (2002) found that a company having independent directors was less likely to use unusual accrued items to manipulate their earning figures.

The above-mentioned supervising effect theories seemed to be vindicated in some real evidence, but were not evidenced by directors' independence in some other cases. Many researches questioned the connection between the independence of board members and business performance (Hermalin et al. 1991, Bhagat et at. 2002). A study of Wu-Chun Chi et al. (2004) also noted that occurrence of unusual accrued items in Taiwan should not be linked to its system of independent directors and supervisors. However, that research period covered only the year of 2002 when Taiwan launched the mechanism of corporate governance and established independent directors and supervisors in the early begin.

The effectiveness of an audit committee can be enhanced by their autonomic power (BRC 1999), the experience of corporate governance (Fama 1980, Fama & Jensen 1983), and the professional financial background. Carcello and Neal (2003) studied the likelihood of a CPA to be retained after he or she expressed a qualified audit opinion towards the company's going concern assumption, finding the probability is largely decided by the dominance of the audit committee, the professionalism of corporate governance, and the entire shareholding percentage by the audit committee. Given that the audit committee is less independent, that the company fails to execute corporate governance, and that the audit committee owns more shares of the company, the CPA who gives a qualified opinion towards the company's going concern assumption in the audit report is more likely to be dismissed. Therefore, the independence of such committee is highly linked to the make-up of such committee. If the autonomy is mere formality, it can hardly generate any expected function.

3. Research Hypothesis

In a study of a connection between the quality of information disclosure and funding cost of newly issued corporate bonds, Sengupta (1998) found a quality disclosure could reduce the effective interest rate charged on the newly issued corporate bonds. That is, a timely and detailed information release can alleviate the qualms about default risk of a company for the creditors and bondholders. In addition, as there is always an asymmetric information between the management and investors/creditors, the needs for auditing is thereby brought up, aiming to remove the moral hazard caused by the management's self-interest intention, as well as the agency cost resulted from the anti-selection by investors and creditors. The connection between the quality of auditing and funding cost is explained by the degree of information inconsistency. Less asymmetric information among the three parties indicates a better quality of auditing and higher autonomy of CPAs, thereby reducing the requirement of credit risk premium as bondholders expect a lower default risk from the company.

The research adopts the ratios such as market share by industry and customer concentration, in order to score the quality of auditing. A higher score represents a better quality of auditing. Based on the financial information released by the company, an investor of the new corporate bonds will have more capability to predict a default risk. Therefore, a high-scored quality of auditing would be able to reduce funding cost of newly issued corporate bonds.

H1: The funding cost of newly issued corporate bonds will be reduced by higher quality of auditing, with other conditions remaining unchanged.

In addition to the ratio of industry market to customer concentration used as a proxy variable to determine the quality of auditing, this research alternatively adopts proxy measures such as market share by industry type to determine the degree of industry specialization (Palmorse 1986; Craswell et al. 1995). As the demand for industry auditing experts surfaces, CPA firms would invest more in building professional industry expertise and bring in more industry specialized clients. Meanwhile, a specific industry has its own particular type of contracts and accounting principles. Therefore, industry auditing experts can always generate higher quality of auditing than the non-industry auditing experts do. Once the bond investors have more confidence with the company, they will be willing to reduce the risk premium required on the interest rate charge for the newly issued corporate bonds.

H2: The funding cost of newly issued corporate bonds will be lower for a company which is audited by industry experts, than a company which is not, with other conditions remaining unchanged.

According to the points of Bushman and Smith (2001), the mechanism of corporate governance can be divided into internal mechanism and external mechanism. Apparently, Taiwan's system of setting up independent directors and supervisors belongs to internal one. As we are still in the early start of launching corporate governance and have not yet established audit committee, such committee's duies thereby would be taken by the independent directors and supervisors in Taiwan's companies. The relevant regulations here only govern their qualification. The way they perform duties is just the same as directors and supervisors. Other researches indicate that external directors could effectively monitor the business performance in a company (Fama 1980, Fama & Jensen 1983, Hermalin et al. 1988). Therefore, the funding cost of newly issued corporate bonds will be expected lower following the establishment of external directors and supervisors.

H3: The funding cost of newly issued corporate bonds will be lower for a company which has set up the positions of independent directors and supervisors, than a company which has not, with other conditions remaining unchanged.

4. Data Source and Research Methodology

(1) Data source and research period

The research sampled the non-convertible corporate bonds[5] issued by Taiwan's listed and OTC electronic companies from 2000 to 2004. All the data regarding corporate bond issuing, CPAs' audit reports, and the issuers' financial information are quoted from the Taiwan Economic Journal (TEJ) Data Bank, and all the data regarding external directors and supervisors are quoted from the Market Observation Post System (MOPS) under Taiwan Stock Exchange Co[6].

(2) Sample selection

(a) There are 3,352 samples of convertible and non-convertible corporate bonds issued in NT$ dollar from the year 2000 to 2004. This research select 1,769 cases out of 3,352 of non-convertible bonds issued by the listed and OTC companies, subtracted 53 banking-security houses and OTC firms having totally different commercial and financial type, as well as 9 companies lack of complete financial data, and is finally left with only 1,699 samples.

(b) As the regulations of setting up independent directors and supervisors has been launched in Taiwan not until 2002, the sample size of establishing directors and supervisors that affects funding cost of corporate bonds issued is 1,114.

(c) The research only covers the CPA firms that are still in business during the study period and does not count in any merger or acquisition of those firms, if any, beyond the period. Exhibit 1 is an analysis of the samples.

[5] Corporate bonds are classified into ordinary corporate bond, CB, and ECB. This study excludes the last two so as to better control the samples.

[6] Website: http://newmops.tse.com.tw

Exhibit 1 – Samples Analysis

	Sample size
Samples of corporate bonds issued form 2000 to 2004	3,352
Minus: non-convertible corporate bond (including warrants)	(1,583)
Samples of convertible corporate bonds	1,769
Minus: Banking institutions	(31)
Securities houses	(22)
OTC firms	(8)
Firms lack of complete financial data	9
Samples used in the research	1,699
Minus: samples during 2000 and 2001	585
Samples from 2002 to 2004	1,114
Samples of non-electronic companies	1,027
Samples of electronic companies	672

(3) Research model

This study adopts the effective interest rate of newly issued corporate bonds, after deducting the Treasury Bond rate (representing a risk-free interest rate), as an agency variable of funding cost. This is similar to what Reiter(1991); Ziebart and Reiter(1992); Shi(2003) have done in the their researches. The main purpose of our study is to prove the impact from the quality of auditing and independent directors & supervisors on the funding cost of newly issued corporate bonds. Meanwhile, it also examine the correlation of the above two factors, brought up by several past studies (such as Fisher, 1959; Jaffec, 1975; Sorensen, 1979; Boardman & McEnally, 1981; Kidwell et. Al, 1984; Wilson & Howard, 1984; Fung & Rudd, 1986; Lamy & Thompson, 1988; Feroz & Wilson, 1992; Ziebart & Reiter, 1992). Those studies pointed out several factors that could affect funding cost for issuing bonds, including company strength (default risk), corporate bond features (issuer's size, tenor, bond), and economic cycle. The empirical model is as follows:

$$YTDIFF_{it} = \beta_0 + \beta_1 AUD_{it} + \beta_2 BONDA_{it-1} + \beta_3 INTCOV_{it} + \beta_4 LEV_{it-1} + \beta_5 ROA_{it}$$
$$+ \beta_6 RATE_{it} + \beta_7 MATU_{it} + \beta_8 INSU_{it} + \beta_9 FSIZE_{it-1} + \sum_{t=2001}^{2004} \alpha_t YEARDUMMY + \varepsilon_{it}$$
$$+ ELEC_t \qquad (1)$$

YTDIFF(interest premium) represents the effective rate for issuing corporate bonds, subtracted by the 364-day Treasury Bond rate (risk-free rate). AUD represents three experimental variables, such as ADUITQ (scores of auditing quality), PROF (industry auditing experts), and SUPER (the establishment of independent directors and supervisors). β_1 coefficient is expected significantly less than zero, indicating a higher score of auditing quality, the hiring of industry auditing experts, and the set-up of independent directors and supervisors could to reduce the interest premium for issuing new corporate bonds. The definitions of other variables are detailed in the exhibit 2.

(a) Research variables

$AUDITO_{it}$ stands for the score of auditing quality by CPA firms for the company (i) in the year (t), which is calculated by the ratios of industry market share and industry concentration of those listed and OTC firms audited by CPA firms.

$PROF_{it}$ represents a dummy variable determining if a CPA firm is a professional auditing expert. The value 1 means yes and 0 means not. Although there is no public information released by the auditing agency regarding development of auditing expertise (Casterella et al., 2004), those firms with extensive auditing experience in a certain industry and therefore having more industry related knowledge will be widely seen as an expert (Velury et al., 2003). Applying this point, this research determines an expert (MS) by the calculating market share of each industry based on the asset size of listed and OTC firms. However, there are different views towards deciding standard of industry market share among researches. For example, Palmrose (1986) and Ferguson & Stokes (2002) regarded the firm occupying the most market share in a industry as the industry expert, while Hogan & Jeter (1999) and Defond et al. (2000) included the largest firms in terms of market share. Craswell et al. (1995) and Ferguson & Stokes (2002) selected the firm having a market share over 10% (or 20%) and made the number of samples over 30 in a industry. Based on the above criteria, this research adopts the standard of having a market share over 20% and of company number over 30 in an industry.

$SUPER_{it}$ is a dummy variable representing if the company (i) has set up independent directors and supervisors in the year (t), with the value 1 indicating yes and 0 indicating not. Some researchers believed the independent director would not financially rely on the companies and intend to promote their publicity so as to be hired by other firms, thus increasing their autonomy when monitoring the business performance in a company. However, some others argued the independent directors are not necessarily able to manage the business performance of the company (Cotter et al., 1997). This research suggests that the establishment of independent directors and supervisors in Taiwan should have provided favorable influence on the funding cost, as Taiwan has implemented such regulation since 2002 and would have made fund providers pay attention to such issue after so many years.

(b) Control variables

Various control variables of factors that affect funding costs for issuing corporate bonds, are quoted from a few researches such as Fisher, 1959; Jaffec, 1975; Sorensen, 1979; Boardman & McEnally, 1981; Kidwell et. Al, 1984; Wilson & Howard, 1984; Fung & Rudd, 1986; Lamy & Thompson, 1988; Feroz & Wilson, 1992; Ziebart & Reiter, 1992.

The size of corporate bonds (BONDA) is defined as the result of total corporate bonds issued during the period divided by total initial assets, which is expected to be positively correlated to funding cost. As higher default risk is derived from more bonds issuing, which in turn results in higher funding cost for issuing debts.. The correlation sign, therefore, is expected to be positive.

Time interest earned coverage (INCOV) is the multiple of earnings before income tax (EBIT) divided by interest expenses. A company with higher time interest earned coverage will enjoy lower debt interest rate or funding cost. The sign is therefore expected be negative.

Leverage ratio (LEV) is the result of initial total liabilities divided by total initial assets. Leverage ratio indicates the debt volume of a company. A higher leverage ratio is deemed to increase the default risk, so the sign is expected to be positive.

Return on asset (ROA) is the result of recurring net income during the period divided by total initial assets. A higher ROA usually implies a higher solvency and lower default risk, and therefore, is expected to have a negative correlation with funding cost and so have a negative sign.

Bond rate (RATE) is 1 when the corporate bond is carrying a floating rate, and is 0 otherwise. When the bond is fixed-rate, investors need to predict the future trend of interest rate and then decide the rate level they can accept. Therefore, it could be positively or negatively correlated to funding cost.

Maturity of bonds (MATU) is a natural logarithm taken from the tenor of corporate bonds. Ziebart & Reiter (1992) pointed out bond maturity is positively correlated to funding costs, meaning that a corporate bond with longer tenor would have higher interest cost. Thus, the sign is expected to be positive.

Guarantee (INSU) is 1 when the issuer provides collaterals, and is 0 otherwise. If the bond issuer provides certain amount of guarantee, the bondholders can sell collaterals and get compensated once the issuers become insolvent. Hence, bondholders are faced with less risk in this case and will be willing to lower the risk premium, thereby reducing the interest rate for issuing corporate bonds. The sign is expected to be negative.

Company size (FSIZE) is measured by a natural logarithm taken from total initial assets. As larger-sized issuers tend to own more resources to repay their debts so as to reduce the default risk faced by the creditors and thereby reduce the interest rate of corporate bonds issued. The sign is thereby expected to be negative (Carey et al., 1993).

The electronic companies (ELEC) is 1 and non-electronic is 0. As the samples of electronic firms account for 40% of total, the sector is installed as a control variable for better control the industry effect. The year (YEARDUMMY) is the sampling period from 2000 to 2004, with 2000 the benchmark. There are 4 dummy variables totally.

Exhibit 2 – Definitions of variables

Variable	Definition	Expected sign
1. Research variables		
AUDITQ	industry market share to industry concentration	—
PROF	a dummy variable for representing an auditing experts, with 1 meaning yes and 0 meaning not, determined by whether the market share of the CPA firm is over 20%.	—
SUPER	a dummy variable representing if independent directors and supervisors are set up, with 1 meaning yes and 0 meaning not	—
2. Control variables		
BONDA	total corporate bonds issued during the period divided by total initial assets	+
INCOV	earnings before income tax divided by	—

	interest expense	
LEV	initial total debts divided by total initial assets	+
ROA	recurring net income during certain period divided by total initial assets	−
RATE	1 for floating rate, and 0 otherwise	?
MATU	A natural logarithm taken from the tenor of corporate bonds	+
INSU	a dummy variable for guarantee. 1 when the issuer provides guarantee, and 0otherwise.	−
FSIZE	a natural logarithm taken from total initial assets	−
ELEC	1 for electronic firms and 0 for non-electronic	?
YEAR	a dummy variable for year, with 2000 of benchmark	?

5. Empirical Findings

(1) Analysis of empirical findings

(a) Descriptive analysis

Exhibit 3 lists the descriptive statistics for each variable. According to the data, the gap between the effective interest rate for issuing corporate bonds from 2000 to 2004 and the interest rate of 364-day Treasury bonds issued by the Central Bank Taiwan is 0.0151 on average. The reason behind the gap is that interest rate has been on a downward trend for the past five years, widening the rate gap between. The average quality of auditing by CPA firms is 6.315, with the highest 38.123 and lowest 0.018, implying a big diversity among CPAs' auditing quality. The percentage of auditing experts over total is 49.56%, and that of the companies establishing independent directors and supervisors over total is 18.31%. The ratio of bonds issued over total initial assets is 7.9% on average, with the highest 76.96% and median 5.448%. The average multiple of time interest earned coverage is 11.1, with the lowest –50.18. Average leverage ratio is 43.80%, with highest 81.54%, indicating a huge difference among issuers' financial status. Average ROA is 7.65%, with the highest 40.33% and lowest –21.90%, also indicating a big diversity among issuers' profitability. Floating-rate corporate bonds account for 16.95% of total, and guaranteed corporate bonds stand for 43.44% of total.

Exhibit 3 – Descriptive Statistics

variables	sample size	mean	standard deviation	maximum	median	minimum
YTDIFF	1699	0.015063	0.010835	0.054	0.0108	0.00027
AUDITQ	1699	6.314595	8.30597	38.12294	1.388147	0.018175
PROF	1699	0.495586	0.500128	1	0	0
SUPER	1114	0.183124	0.386942	1	0	0
BONDA(%)	1699	7.9	9.858	76.959	5.448	0.4635
INCOV	1699	11.09727	14.90924	263.57	6.09	-50.18
LEV(%)	1699	43.80287	12.36996	81.54	43.74	20.04
ROA	1699	0.076477	0.084223	0.403327	0.0603	-0.21897
RATE	1699	0.169511	0.375314	1	0	0
MATU	1699	1.638615	0.232025	2.484907	1.609438	1.098612
INSU	1699	0.434373	0.49582	1	0	0
FSIZE	1699	18.30234	1.19225	19.63183	18.47345	13.55169

Exhibit 4 shows the results of each variable on Pearson and Spearman analysis. The upper-right part in the diagonal line of the matrix represents Pearson correlated, and the lower-left area is Spearman correlated. As expected, the results of YTDIFF (interest premium) and quality of auditing (AUDITQ), industry auditing expert (PROF), the ratio of corporate bonds over total assets (BONDA), guarantee (INSU), and return on assets (ROA) are significantly negatively correlated. However, YTDIFF (interest premium) is significantly positively correlated to part of control variables such as leverage ratio (LEV) and company size (FSIZE). The correlation sign of interest premium on each variable is consistent to our expectation, except for company size. However, as there is a significant correlation among several independent variables, a further VIF test is needed to determine if there exists multicollinearity.

Exhibit 4 – Pearson (Spearman) Coefficient Matrix

	YTDIFF	RATE	INSU	AUDITQ	PROF	LEV	INTCOV	ROA	BONDA	MATU	FSIZE
YTDIFF	1	0.142 (0.000)***	-0.156 (0.000)***	-0.064 (0.008)***	-0.046 (0.055)*	0.058 (0.016)**	-0.022 (0.3735)	-0.062 (0.010)***	-0.070 (0.004)***	0.130 (0.000)***	0.231 (0.000)***
RATE	0.213 (0.000)***	1	0.022 (0.368)	0.088 (0.000)***	0.255 (0.000)***	-0.020 (0.414)	0.268 (0.000)***	0.185 (0.000)***	-0.074 (0.002)***	-0.048 (0.049)**	0.076 (0.001)***
INSU	-0.168 (0.000)***	0.022 (0.368)	1	0.036 (0.132)	-0.365 (0.000)***	0.150 (0.000)***	-0.076 (0.001)***	-0.207 (0.000)***	0.094 (0.000)***	-0.224 (0.000)***	-0.578 (0.000)***
AUDITQ	-0.082 (0.000)***	0.025 (0.302)	-0.113 (0.000)***	1	0.257 (0.000)***	-0.209 (0.000)***	0.343 (0.000)***	0.160 (0.000)***	0.251 (0.000)***	-0.149 (0.000)***	-0.220 (0.000)***
PROF	-0.016 (0.503)	0.255 (0.000)***	-0.365 (0.000)***	0.312 (0.000)***	1	-0.066 (0.006)***	0.252 (0.000)***	0.311 (0.000)***	0.112 (0.000)***	0.014 0.5710	0.153 (0.000)***
LEV	0.051 (0.034)**	-0.035 (0.145)	0.107 (0.000)***	-0.337 (0.000)***	-0.057 (0.017)**	1	-0.169 (0.000)***	-0.199 (0.000)***	0.023 (0.351)	-0.051 (0.035)**	-0.070 (0.003)***
INTCOV	-0.027 0.2696	0.274 (0.000)***	-0.184 (0.000)***	0.441 (0.000)***	0.378 (0.000)***	-0.196 (0.000)***	1	0.689 (0.000)***	0.138 (0.000)***	-0.012 0.6332	-0.131 (0.000)***
ROA	-0.042 0.0819	0.268 (0.000)***	-0.250 (0.000)***	0.342 (0.000)***	0.419 (0.000)***	-0.097 (0.000)***	0.912 (0.000)***	1	0.172 (0.000)***	0.068 (0.005)***	0.016 (0.505)
BONDA	0.042 0.0820	-0.116 (0.000)***	-0.069 0.0043	0.224 (0.000)***	-0.027 (0.270)	-0.007 (0.766)	0.198 (0.000)***	0.197 (0.000)***	1	0.006 (0.819)	-0.441 (0.000)***
MATU	0.142 (0.000)***	0.005 0.8481	-0.299 (0.000)***	-0.157 (0.000)***	0.039 (0.104)	0.013 (0.589)	0.058 (0.017)**	0.073 (0.002)***	-0.013 (0.584)	1	0.262 (0.000)***
FSIZE	0.212 (0.000)***	0.059 0.0149	-0.592 (0.000)***	-0.157 (0.000)***	0.183 (0.000)***	-0.035 0.1517	-0.134 (0.000)***	-0.045 0.0626	-0.330 (0.000)***	0.331 (0.000)***	1

( ) represents p value.

***, **, * represents the significant level of 1%, 5%, 10%, respectively.

The upper-right part in the diagonal line in the matrix represents Pearson correlated, and the lower-left area is Spearman correlated

(b) Quality of auditing and interest premium

Exhibit 5 summarizes the results of OLS regression conducted between the interest premium of corporate bonds (YTDIFF) and each variable. In Model 1, the score of auditing quality (AUDITQ) is used to measure the direction and extent to which the interest premium of the corporate bonds may varies. In Model 2, the fact of hiring industry auditing experts (PROF) is determined to measure the direction and extent to which the interest premium of the corporate bonds changes. In Model 3, the factor of independent directors and supervisors is determined to measure the direction and extent to which the interest premium of the corporate bonds differs. In Model 4, both the factors of score of auditing quality and industry auditing experts are used to measure the direction and extent to which the interest premium of the corporate bonds moves. Finally, in Model 5, factors such as the score of auditing quality, industry auditing experts, and independent directors and supervisors from 2002 to 2004 are used to measure the direction and extent to which the interest premium of the corporate bonds varies. As heteroskedasticity is observed during the regression analysis, this research thus replaces regular t-test by White-adjusted t-statistic (White, 1980).

In the measurement of Model 1, the AUDITQ coefficient shows significantly negative ($p<0.01$), thus supporting the hypothesis 1 and indicating that higher quality of auditing reduces interest premium of corporate bonds. With other condition remaining unchanged, when the score of auditing quality increases by 1, the interest premium will be reduced by 0.0001. Except for the factors of company size (FSIZE) and return on assets (ROA), the signs of all other control variables are consistent with our expectation. At a significant level $\alpha=1\%$, interest premium (YTDIFF) is significantly correlated to the ratio of total corporate bonds over total initial assets (BONDA), leverage ratio (LEV), bond maturity (MATU), and company's size (FSIZE). However, the sign of company size is different from expected. Leverage ratio turns significance at a significant level α 10%. The measurement implies when the percentage of the corporate bonds over total initial assets is higher, and when the tenor and leverage ratio for issuing the corporate bonds is higher, the interest charge for issuing corporate bonds will be raised. Model 1 shows an adjusted R^2 of 18.2%, implying the extent to which interest premium of corporate bonds can be explained by the research and control variables is 18.2%. Variance inflation factors are all below 10 among independent variables, signaling little impact of multicollinearity.

The experimental variables in Model 2 of Exhibit 5 are the asset market share of the listed and OTC companies audited by the CPA firms for judging if they are industry auditing experts (PROF). The measurement shows a negative coefficient of PROF ($P<0.01$), backing up the hypothesis 2 and indicating the interest premium for a bond issuer that has been audited by industry experts will be less than that for the bond issuer that has not. That is, with other conditions remaining changed, the interest premium for a bond issuer which has been audited by industry experts will be less than the one for the bond issuers which has not been audited by industry experts by 0.0049. Except for time interest earned coverage (INTCOV) and leverage ratio (LEV) coefficients not showing significance, all the other control variable coefficients are showing significance and are consistent with our expectation. However, the sign of company size differs from our expectation. The measurement of Model 2 shows an adjusted R^2 of 21.4%, meaniing that the degree to which interest premium of corporate bonds can be explained by research and control variables is 21.4%. Variance inflation factors are all below 10 among independent variables, implying little impact of multicollinearity.

Both factors of the score of auditing quality and industry auditing expert, in Model 4 of Exhibit 5, are used to measure the direction and extent to which the interest premium of the corporate bonds vary. The regression shows a significantly negative coefficient for industry auditing expert at a significant level $\alpha=1\%$, implying industry auditing experts help to bring down interest premium. However, as tolerance for quality of auditing remains low, there might be a significant multicollinearity in the analysis. The regression results appear to be significant, but the sign is different from our expection. Except for the time interest earned coverage (INTCOV) and leverage ratio (LEV)

coefficients not showing significance, all the other control variable coefficients appear to be significant and consistent with our expectation. However, the coefficient sign for company size is not.

(c) The set-up of independent directors and supervisors and interest premium

As Taiwan has established the regulations for establishing independent directors and supervisors since 2002, we collected a total of 1,114 data samples from 2002 to 2004, to examine the impact of independent director and supervisor on the interest premium of corporate bonds. There are 204 companies having established independent directors and supervisors out of the 1,114 samples. Model 3 of exhibit 5 displays the results of regression. SUPER coefficient turns significantly negative, supporting hypothesis 3 and indicating that the establishment of independent directors and supervisors can reduce the interest premium of corporate bonds by 0.0063, with other conditions remaining unchanged. Other control variables such as bond size, company size, guarantee, and bond rate coefficients all turn positive. The measurement of Model 3 includes an adjusted R^2 is 12.32%, saying that the degree to which interest premium of corporate bonds can be explained by research and control variables is 12.82%. Variance inflation factors are all below 10 among independent variables, implying little impact of multicollinearity.

We again used the data of 2002~2004 to test the impact of auditing quality score, industry auditing experts, and independent directors and supervisors on the interest premium of corporate bonds and listed the results in Model 5 of the exhibit 5. The coefficients of hiring industry auditing experts and setting up independent directors and supervisors both turn negative ($P<0.01$), with an adjusted R^2 of 13.74%, implying the industry auditing experts and independent directors and supervisors can both significantly reduce interest premium for corporate bonds. Results from the regression further reinforce the above hypothesis.

In summary, the study proves the quality of auditing by CPA firms, industry auditing experts and independent directors and supervisors to be significantly negative to the interest premium for issuing corporate bonds ($P<0.01$). In other words, the three hypotheses of improving quality of auditing, hiring industry auditing experts, and establishing independent directors and supervisors, aiming to save the funding cost of issuing corporate bonds, all have been supported by our findings.

Exhitbit 5 OLS Regression test

Independent Variables	Sign expected	Dependent variable - YTDIFF MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Constant		-0.0311	-0.03005	-0.05842	-0.0306	-0.05273
		(-6.5721)***	(-6.5528)***	(-6.6322)***	(-6.7197)***	(-6.09137)
AUDITQ	-	-0.0001			0.00009	0.00007
		(-2.8129)***			(1.9936)**	(1.2231)
PROF	-		-0.0049		-0.0053	-0.0031
			(-8.3611)***		(-8.1714)***	(-3.5947)***
SUPER	-			-0.0063		-0.0051
				(-7.5423)***		(-5.8814)***
BONDA	+	0.0143	0.0185	0.0519	0.0186	0.0518
		(7.1153)***	(9.4198)***	(5.8772)***	(9.4543)***	(-5.8814)***
INCOV	-	-0.00002	-0.00003	-0.00005	-0.00004	-0.00005
		(-0.9477)	(-1.3222)	(-1.2019)	(-1.5283)	(-1.3254)
LEV	+	0.00004	0.00002	-0.00003	0.00001	(-0.00005)
		(1.7909)*	(1.0573)	(-1.0797)	(0.6436)	(-1.500)
ROA	-	0.0018	0.0085	0.01304	0.0104	0.01728
		(0.4505)	(2.2407)**	(1.2975)	(2.4873)**	(1.6898)
RATE	?	0.00288	0.0037	0.0023	0.0037	0.0029
		(4.6034)***	(5.8191)***	(3.2647)***	(5.7997)***	(4.0585)***
MATU	+	0.00324	0.0024	0.0018	0.0024	0.0005
		(3.5831)***	(5.8191)***	(0.9404)	(2.7238)**	(0.2651)
INSU	-	0.0004	-0.0011	0.0020	-0.0012	0.0009
		(0.5889)	(-1.8148)*	(2.1134)**	(-1.9969)**	(0.9012)
FSIZE	-	0.0016	0.0017	0.0037	0.0018	0.0036
		(6.0422)***	(6.8528)***	(7.5329)***	(7.1103)	(7.4755)***
ELEC	?	0.0013	-0.0008	0.00044	-0.0021	-0.0009
		(1.4264)	(-1.2891)	(0.5379)	(-2.2319)**	(-0.693)
N		1699	1699	1114	1699	1114
F		27.98	34.03	14.64	31.98	13.66
Adjusted R^2		0.182	0.214	0.1282	0.2149	0.1374

YTDIFF: Effective rate minus 364-day Treasury bond rate

AUDITQ: industry market share / industry concentration (by the summarized date from listed and OTC companies)

PROF: dummy variable representing industry auditing experts with 1 meaning yes and 0 meaning not

SUPER: dummy variable representing independent director and supervisor establishment with 1 meaning yes and 0 meaning not.

BONDA: corporate bonds issued during the period / total initial assets

INCOV: EBIT / interest expense

ELEC: 1 means electronic companies and 0 means not

LEV: initial total liability / total initial assets

ROA: recurring net income / total initial assets

RATE: 1 means floating rate and 0 means fixed

MATU: a natural logarithm taken from the bond tenor

INSU: 1 means guarantee offered and 0 means not

FSIZE: a natural logarithm taken from initial assets

YEARDUMMY: a dummy variable for year

1.( ) representing t value, ***, **, * means 1%, 5%, 10% significant levels respectively. The ordinary t value is replaced by the White-adjusted t-statistic to calculate all the statistics

2. Variance inflation factors of all independent variables are <10, implying little multicollinearity impact

3. All the regressions have included the year-control variable, which is not displayed in the table due to limited space

(2) Sensitivity analysis

To reinforce the results of this research, we also seek the score of auditing quality (MAUDIT) based on the listed companies audited by CPA firms. We also conduct multiple regression analyses to determine the qualification of industry auditing experts (RPROF) by calculating market share of all the companies (listed and OTC companies) being audited, and we generate the results as listed in Exhibit 6. The score of auditing quality (MAUDIT) is significantly negative (P<0.01), with a coefficient -0.00001. The industry auditing expert coefficient also shows a negative -0.0041 (P<0.01). The result of a simultaneous test on the above two variables is also significantly negative (P<0.01), which is the same as previously mentioned, implying higher quality of auditing and having industry auditing experts can reduce the interest premium for issuing corporate bonds.

Exhibit 6 Sensitivity Analysis

Independent Variable	Sign expected	Dependent variable - YTDIFF Quality of auditing	Industry Expert	Both
Constant		-0.0316 (-6.6747)***	-0.0359 (-7.4162)***	-0.0356 (-7.3472)***
MAUDIT	-	-0.00001 (-15.279)***		-0.00001 (-16.262)***
RPROF	-		-0.00411 (-7.3617)***	-0.0041 (-7.3812)***
BONDA	+	0.01375 (6.8193)***	0.0168 (8.5637)***	0.0167 (8.538)***
INCOV	-	-0.00003 (-1.2722)	-0.00002 (-0.7507)	-0.00002 (-0.7656)
LEV	+	0.00003 (1.4319)	0.00004 (2.0935)**	0.00004 (2.0984)**
ROA	-	0.0035 (0.8841)	0.0062 (1.63457)	0.0063 (1.6512)*
RATE	?	0.0027 (4.3158)***	0.003732 (5.7915)***	0.0037 (5.7702)***
MATU	+	0.00329 (3.6238)***	0.0032 (3.6792)***	0.0033 (3.6985)***
INSU	-	0.0004 (0.6341)	-0.0002 (-0.2790)	-0.0002 (-0.2911)
FSIZE	-	0.0016 (6.2876)***	0.0019 (7.2805)***	0.0019 (7.207)***
ELEC	?	-0.0003 (-0.5790)	-0.0004 (-0.7429)	-0.0004 (-0.7525)
N		1699	1699	1699
F		27.65	32.87	30.81
Adjusted R^2		0.180	0.208	0.208

YTDIFF: Effective rate minus 364-day Treasury bond rate
MAUDIT: industry market share / industry concentration (based on listed and OTC companies)
RPROF: a dummy variable representing industry auditing experts, with 1 meaning yes and 0 meaning not
BONDA: corporate bonds issued during the period / total initial assets
INCOV: earning before income tax / interest expense
ELEC: 1 means electronic companies and 0 means not

YEARDUMMY: a dummy variable for year

LEV: initial total liabilities / total initial assets
ROA: recurring net income / total initial assets

RATE: 1 means floating rate and 0 means fixed

MATU: a natural logarithm taken from the bond tenor
INSU: 1 means guarantee offered and 0 means not
FSIZE:LOG: a natural logarithm taken from initial assets

1.( ) representing t value, ***, **, * means 1%, 5%, 10% significant levels respectively. The ordinary t value is replaced by White-adjusted t-statistic to calculate all the statistics
2. Variance inflation factors of all independent variables are <10, implying little multicollinearity impact
3. All the regressions have included year-control variable, not displayed in the table due to limited space

6. Conclusions and Suggestions

Unlike the past researches which focused on term of CPAs, the retaining of five major CPA's firms, and the turnover of CPAs during bond issuing to determine the impact of auditing quality on funding cost, this study puts a close eye on other various factors, such as quality of auditing due to CPA's professionalism and independence, auditing work by industry experts, and the establishment of independent directors and supervisors (in lieu of the audit committee in the U.S.), that is less discussed in the modern studies.

External audit has its potential value, serving as an effective way to monitor the company itself (Jensen & Meckling, 1976; Watts & Zimmerman, 1986). The quality of auditing by CPAs can detect and report any flaw in financial statements. By reducing the erroneous accounting disclosure, financial statement can be improved (DeAngelo, 1981a; Watts & Zimmerman, 1983). This research proves that better quality of auditing and hiring industrial auditing experts could significantly reduce funding cost for issuing corporate bonds. Beasley (1996) and Dechow & Sloan (1996) found the board of directors having more external members will be less likely to manipulate their earning figures by unusual accrued items. This research also proves the independent directors and supervisors will contribute to corporate governance and thus save the funding cost of newly issued corporate bonds.

As limited by the sample size, this research only covers 18.31% of total samples that establishes independent directors and supervisors. In addition, the study is focused in the early period when relevant regulations were launched regarding the establishment of independent directors and supervisors. On the other hand, a company with even only one independent director would be included in our database, possibly causing a biased data capturing. It is suggested that the following researches could collect and test longer period of samples after the launch of regulations, so as to generate a more reliable result.